

PROJECT MANUAL / SPECIFICATIONS

VOLUME 2 OF 3
DIVISIONS 02 - 20

ENLARGED CITY SCHOOL DISTRICT OF MIDDLETOWN
223 Wisner Road, Middletown, NY 10940

TWIN TOWERS MIDDLE SCHOOL ADDITIONS AND ALTERATIONS

NYSED Project Control No. 44-10-00-01-0-001-041

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BID ISSUE: DECEMBER 14, 2023

THE UNDERSIGNED CERTIFIES THAT TO THE BEST OF HIS KNOWLEDGE, INFORMATION AND BELIEF, THE PLANS AND SPECIFICATIONS ARE IN ACCORDANCE WITH APPLICABLE REQUIREMENTS OF THE NEW YORK STATE UNIFORM FIRE PREVENTION AND BUILDING CODE, THE STATE ENERGY CONSERVATION CONSTRUCTION CODE, AND BUILDING STANDARDS OF THE EDUCATION DEPARTMENT, AND THAT THE PLANS AND SPECIFICATIONS REQUIRE THAT NO ASBESTOS CONTAINING MATERIAL SHALL BE USED.

Walter Hauser, AIA

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December 14, 2023
Construction Documents
SED No. 44-10-00-01-0-001-041

Enlarged City School District of Middletown
Twin Towers Middle School
Additions and Alterations

334600 SUBDRAINAGE

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SECTION 024119 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of a building or structure.
2. Salvage of selected building components and elements.
3. Repair procedures for selective demolition operations.

B. Related Sections include the following:

1. Division 01 General Requirements for temporary construction and environmental-protection measures for selective demolition operations.
2. Division 01 General Requirements for cutting and patching procedures for selective demolition operations.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.4 SUBMITTALS

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

- B. Proposed Dust-Control, Noise-Control and Other Special Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
- C. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
- D. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.
- E. Predemolition Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.

1.5 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Professional Engineer Qualifications: Comply with Division 01 General Requirements.
- C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Standards: Comply with ANSI A10.6 and NFPA 241.
- E. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 01 General Requirements.

1.6 PROJECT CONDITIONS

- A. Owner will occupy portions of site and buildings immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted. Provide not less than 2 weeks' notice to Owner of activities that will affect Owner's operations.
- B. Owner may elect to salvage certain items from areas of construction other than those indicated on Drawings as "salvage" prior to selective demolition operations. Give 2 weeks notice to Owner prior to commencing any selective demolition processes to allow for Owner salvage operations.

- C. Maintain access to existing walkways, roadways, and other adjacent occupied or used facilities.
 - 1. Do not close or obstruct walkways, roadways, or other occupied or used facilities without written permission from authorities having jurisdiction.
- D. Owner assumes no responsibility for condition of areas to be selectively demolished.
 - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- E. Hazardous Materials: Remediation of existing hazardous materials, if any, will be completed prior to commencement of selective demolition in the areas where hazardous materials are present.
 - 1. If materials suspected of containing hazardous materials that have not been previously identified in the Contract Documents are encountered, do not disturb; immediately notify Architect and Owner.
 - 2. A hazardous materials report is included in the Specifications for information only.
- F. Storage or sale of removed items or materials on-site will not be permitted.
- G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations. Cutting and Patching of Existing Roofing System: Contractors performing cutting and patching of the existing roof membrane shall be certified installers by the existing roof membrane manufacturer for their products. When existing roofing system is still under warranty, coordinate all work on the existing roofing system with manufacturer. All cutting and patching work on roofing system shall be performed in a manner that does not void the warranty.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
 - 1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 2. Use materials whose installed performance equals or surpasses that of existing materials.
- B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- E. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES

- A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.
- B. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.
 - 1. Provide at least 2 weeks' notice to Owner if shutdown of service is required during changeover.
- C. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
 - 2. If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building.
 - 3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
 - 4. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.3 PREPARATION

- A. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.

- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
 - 2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
- C. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent site improvements, structures 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.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Provide special protection measures as required by Owner.
- D. Temporary Enclosures: Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects
- E. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
- F. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.

3.4 POLLUTION CONTROLS

- A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
 - 1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- C. Cleaning: 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.

3.5 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 5. Maintain adequate ventilation when using cutting torches.
 - 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 9. Dispose of demolished items and materials promptly.
 - 10. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.
- B. Removed and Salvaged Items: Comply with the following:

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

C. Removed and Reinstalled Items: Comply with the following:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
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.

D. Salvage items indicated on the Drawings as "salvage".

E. Existing Facilities: Comply with Owner's requirements for using and protecting elevators, stairs, walkways, building entries, and other building facilities during selective demolition operations.

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

G. Concrete: Demolish in small sections. Cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated.

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

I. Brick Masonry and Cast Stone to be Salvaged: Carefully dismantle brick veneer and cast stone trim at exterior walls where demolition is indicated. Salvage existing removed brick and cast stone for reuse. Remove mortar, anchors, and ties from brick masonry and cast stone. Clean and stack undamaged, whole brick masonry and cast stone units on wood pallets and provide weatherproof covering. Locate stored brick and cast stone where directed by Architect.

J. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

K. Air-Conditioning Equipment: Remove equipment without releasing refrigerants.

3.6 PATCHING AND REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.
- B. Patching: Comply with Division 01 Section "Cutting and Patching."
- C. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
 - 1. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.
- D. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.
- E. Floors and Walls: Where walls or partitions that are demolished extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - 1. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 - 2. Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.
 - 3. Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
- F. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION 024119

SECTION 026100 – REMOVAL OR REUSE OF CONTAMINATED SOIL

PART 1 - GENERAL

1.1 Applicable provisions of the Conditions of the Contract and Division #1, General Requirements, govern work in this Section.

1.2 DESCRIPTION OF WORK

- a. The work of this Section consists of the following: excavation, handling, stockpiling, temporary on-site storage, transportation, and disposal of coal ash material ("contaminated soil") in the soil encountered during excavation and construction activities that require special handling at the Twin Towers Middle School site.
- b. Soils eligible for reuse at the Site are defined under Section 2.5.
- c. A preliminary soil waste characterization field study was conducted by Tectonic Engineering Consultants, Geologists, & Land Surveyors, D.P.C. (Tectonic) in August 2021 for a portion of the project site suspected of containing contaminated soils. Full details of this preliminary investigation are available in the Limited Phase II Environmental Site Assessment (ESA) Report, dated September 3, 2021, which is included in Section 003000. Recommendations from the report are as follows:
 - i. Environmental soil samples were collected from eight borings (B-1 to B-8). An additional boring, B-9, was advanced to determine the depth of an observed coal ash layer. Five borings (B-1, B-2, B-3, B-6, and B-9) were advanced to fifteen feet (ft.) with groundwater encountered at depths ranging from seven (7) to thirteen (13) feet below grade (ft-bg). One (1) discrete soil sample was collected from each boring (B-1 to B-8), where ash layers were observed, or from below any historic fill. The analytical test results for the soil samples were compared to the Soil Clean-Up Objectives (SCOs) set forth on 8 NYCRR Part 375 -6.8 (a) Unrestricted Use Soil Cleanup Objectives and (b) Restricted Use Soil Cleanup Objectives (Part 375) and all the Supplemental Soil Clean-up Objectives (SSCOs) set forth by the New York State Department of Environmental Conservation (NYSDEC) Final Commissioner Policy, CP-51 (CP-51).
 - ii. Each sample was screened with a calibrated MiniRAE 3000 Photo-ionization Detector (PID) for the presence of Volatile Organic Compound (VOCs); No PID readings exceeded background concentrations for all borings. Analytical test results detected VOCs and SVOCs below their respective Part 375/CP-51 SCOs/SSCOs for all uses.
 - iii. Visual evidence in borings B-2, B-3, and B-9 revealed contamination in the form of fill material, ash, and coal. Additionally, Aluminum, Calcium, Iron, Lead, Mercury, Nickel, and Zinc metals were detected above their respective Part 375/CP-51 SCOs/SSCOs. Therefore, the study classified the on-site materials as non-hazardous regulated material.

e. This specification represents the site-specific Soil Management Plan. The subject soils are classified as non-hazardous contaminated regulated material by the State of New York. Material scheduled for excavation and off-site disposal shall be disposed of at an appropriate, permitted facility that can accept the waste.

f. Soil reuse considerations are included in section 2.5.

1.3 RELATED WORK SPECIFIED ELSEWHERE - Entire Project Specification with specific reference to the sections of Division 31, 32 and 33.

PART 2 - PRODUCTS

2.1. SEGREGATION AND STORAGE

- A. A minimum of 10-mil or two (2) layers of 6-mil polyethylene sheeting shall be used as a segregation layer laid beneath stockpile(s) of contaminated soil. Additionally, a minimum of 10-mil polyethylene sheeting will be used as stockpile cover(s), while the soil remains staged prior to reuse or off-site disposal.
- B. A partial containment berm made of silt fence shall be utilized around stockpiled soils to control runoff and minimize erosion.

2.2. FIELD ORGANIC VAPOR MONITORING

- A. In-situ soil characterization should be conducted during excavation operations in the affected area in accordance with the industry-accepted sampling procedures. Sampling should be based on soil encountered that exhibits staining, free product and/or elevated Photo Ionization Detector (PID) readings.

2.3. SAMPLING AND ANALYSIS

- A. Soil samples will be collected using reusable sample collection devices. All reusable sample collection devices, such as shovels or hand trowels, shall be stainless steel. All devices shall be decontaminated before and after collection of each sample. All methods necessary to decontaminate the sampling equipment shall be used. The contractor shall be responsible for proper handling and disposal of all decontamination materials and fluids.
- B. All disposable sampling devices shall be constructed of inert materials such as polyethylene, silicon, or Teflon. All disposable sampling devices shall be used only once and properly disposed.

2.4. TRANSPORTATION AND DISPOSAL

- A. The Contractor must assure that the waste transporter's appropriate choice of vehicles and operating practices are fitted to prevent spillage or leakage of contaminated material during transportation.

2.5. REUSE OF SOILS

- A. As per the NYSDEC Pre-determined BUD Part 360.12(c)(ii), "fill material generated outside of New York City with no evidence of historical impacts such as reported spill events, or visual or other indications (odors, etc.) of chemical or physical contamination," may be re-used on Site. In the event that visual or other indications of contamination are observed during soil disturbance activities, NYSDEC Part 360.13(c) states: "fill material used as backfill for the excavation from which the fill material was taken, or as fill in areas of similar physical characteristics on the project property is exempt from regulation under this Part [360]".
- B. If fill material exhibits historical or visual evidence of contamination (including odors) and will be used in an area with public access, the relocated fill material must be covered with a minimum of 12 inches of soil or fill material that meets the criteria for general fill as defined in Part 360. General fill is defined in Table 2 of Part 360 as follows:

TABLE 2: Fill Material Beneficial Use

Fill Material Type	Fill Material End Use	Physical Criteria	Maximum Concentration Levels
General Fill	Any setting where the fill material meets the engineering criteria, for use, except: 1. Undeveloped land; and 2. Agricultural crop land. General Fill may also be used in the same manner as Restricted-Use Fill and Limited-Use Fill.	Only soil, sand, gravel or rock; no non-soil constituents.	Lower of Protection of Public Health-Residential Land Use and Protection of Groundwater in Table 375-6.8(b) of this Title.

PART 3 - EXECUTION

3.1 GENERAL

- A. Work activities under this specification section shall be performed in accordance with the contract documents and with applicable Contaminated Material Handling Plan, Field Sampling Plan and Disposal Plan as described below. The Contractor shall initiate any measures necessary to protect the safety and health of workers and the general public based on the potential hazards associated with potentially contaminated soil.
- B. Regulatory Compliance: The Contractor shall conduct all tasks in accordance with all applicable Federal, State, County, and local regulations.

3.2 PREPARATION:

- A. Preparation of Plans / Reports: The Contractor shall be required to prepare the plans and reports described below. Two (2) copies of each applicable plan shall be submitted to the Engineer for acceptance at least thirty (30) calendar days prior to commencing work.

Plans and reports shall be prepared based on the type(s) of contamination and locations identified in the contract documents. If a different type of contamination is encountered

during work, and additional plans must be written, the thirty (30) calendar day lead time for submittals may be modified by the Engineer as appropriate.

1. Contaminated Material Handling Plan (CMHP): The CMHP shall describe the procedures to be used to segregate contaminated soil during excavation, soil storage/stockpile procedures, and safety and health issues. The following information shall be included in the CMHP:
 - a. Name and address of the plan preparer;
 - b. Contract name, contract number and description;
 - c. Describe procedures to be used to segregate contaminated soil during excavation;
 - d. Location of intended soil stockpile, trucks, roll-off container and other storage areas;
 - e. Describe how contaminated soil will be moved to soil storage locations;
 - f. Describe how soil storage/stockpile locations will be prepared and managed;
 - g. Describe how potential air quality impacts such creation of dust particulates and vapors will be minimized to protect air quality within, adjacent to or downwind from the project;
 - h. Describe air monitoring procedures to be used during work, define action levels, and explain the response if action levels are exceeded; The protocol and procedures shall consider action levels for both work personnel and also perimeter/community action levels based on the nature of the contamination and activities conducted;
 - i. Hazardous substance evaluation - types of chemicals associated with the waste to be generated;
 - j. Hazard assessment - physical and toxic effects associated with the waste to be generated; Personal protective clothing (PPC) and personal protective equipment (PPE) to be used or available on-site;
 - k. Names of key personnel, emergency contacts and phone numbers;
 - l. List the OSHA training each worker has received. At least one worker must have completed supervisor training per 29 CFR 1910.120(E)(4);
 - m. General and site-specific safety rules, with emergency response procedures and directions to the nearest hospital (with map);
 - n. Decontamination procedures for personnel and equipment; and
 - o. Disposal of contaminated PPC and PPE.
2. Field Sampling Plan (FSP): The FSP must be prepared and submitted to the Engineer for approval prior to mobilization for any sampling activities. The FSP shall include protocols for the collection and analysis of samples that represent all soils to be excavated and stockpiled. The Engineer will approve the FSP only if it clearly provides the information to allow for classification of all material proposed for excavation. No sampling shall be conducted until the Engineer has reviewed and formally approved the FSP in writing. At a minimum, the following information shall be included in the FSP:
 - a. Name and address of the plan preparer;
 - b. Name, telephone number, and ELAP certification number of the proposed NYSDOH ELAP accredited laboratory;

- c. Name, address, experience, and qualifications of each individual who will collect soil samples. Each individual shall be thoroughly trained in sampling protocols, handling and chain of custody procedures, and laboratory requirements;
- d. For materials destined for offsite disposal at a permitted facility, the FSP shall include a detailed outline of the disposal facility requirements for sampling, testing and analysis including specific number and types of samples per unit volume of soil to be excavated;
- e. For all materials to be disposed, the sampling frequency shall be, at a minimum, in accordance with NYSDEC DER-10 Table 5.4(e)10, unless otherwise specified by the disposal facility:

Table 5.4(e)10 Recommended Number of Soil Samples for Soil Imported To or Exported From a Site			
Contaminant	VOCs	SVOCs, Inorganics & PCBs/Pesticides	
Soil Quantity (cubic yards)	Discrete Samples	Composite	Discrete Samples/Composite
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
➤ 1000	Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER		

- f. Description of QA/QC samples required by the reuse or disposal facilities;
 - g. Description of additional reuse or disposal facility requirements;
 - h. A scaled map of the site showing existing fixed landmarks and the proposed excavation limits. The map shall contain specific sampling locations that will conform to the applicable sampling frequency requirements;
 - i. Proposed sampling, handling, preservation, and storage of equipment and procedures, including transfer procedures, and sampling equipment decontamination procedures;
 - j. Analytical Methods: proposed analytical methods shall be in accordance with EPA SW-846, latest edition;
 - k. Data Quality Objectives: Procedures for assessing precision, accuracy, degree of representation, comparability and completeness of samples and data, including performance audits and proposed protocols for corrective measures where problems are identified shall be defined and meet standards set forth in this Specification;
 - l. Schedule of field inspections;
 - m. Planned preparation of daily and project summary quality control reports; and
 - n. Manufacturer, catalog data and calibration records of all analytical equipment to be used on-site.
3. Field Sampling Summary Report (FSSR): The FSSR shall contain all laboratory analytical results obtained from the field sampling event(s). A detailed account of any field procedures used which deviated from those established in the FSP shall be included, as well as a complete set of field notes. The Contractor shall submit

hard copies of the FSSR which shall include a Summary Table listing the analytical results with highlighted exceedances of RCRA Characteristics, BUD, or applicable parameters of 6NYCRR Part 375 and all disposal facility limits, including any alternate acceptance criteria. Detailed field notes shall be maintained by the Contractor during sampling to allow identification of sample analysis results with the respective areas / volumes of soil that the data represent, and to verify quantities of materials to be beneficially reused or disposed of as regulated solid waste. The field notes shall be made available to the Engineer during the sampling program and included in the FSSR and shall consist of:

- a. Boring and/or test pit logs from each sampling location containing a continuous stratigraphic description of all material encountered. Descriptions of material shall include, but not be limited to, color, odor, staining, field screening measurement, relative grain size distribution, material composition, moisture content, and cohesive properties;
 - b. The location of each sampling point on a scaled map;
 - c. Depth intervals for each sample, whether a grab or composite, and any special notes, which are included on the laboratory chain-of-custody forms; and
 - d. Copies of all laboratory chain-of-custody forms for samples that are collected for analysis.
4. Disposal Plan:
The following information shall be included in the Disposal Plan:
- a. Name and address of plan preparer;
 - b. Name of disposal/treatment facility, address, telephone number and contact person;
 - c. Copy of applicable permits and/or licenses held by the disposal/treatment facility;
 - d. EPA Identification Number and/or State Facility Identification Number issued to the disposal/treatment facility;
 - e. Method(s) of disposal/treatment that will be used;
 - f. Signed letter from the disposal/treatment facility stating it is authorized under law to accept the type of waste being generated, their intent to accept the waste generated by this contract, and a list of the laboratory tests required by the facility;
 - g. Name of waste transporter, address, telephone number and contact person;
 - h. EPA Identification Number and/or State Transporter Identification Number issued to waste transporter; and
 - i. Copies of all waste transporter permits and/or license plate numbers for vehicles that will be used for transport of waste from the site to the intended disposal/treatment facility.

3.3 INSTALLATION

A. Handling

- a. The Contractor shall have an accepted Contaminated Material Handling Plan (CMHP) prior to commencing work within potentially contaminated soil areas. Soil determined to be contaminated by PID or Flame Ionization

Detector (FID) screening or observation shall be segregated from non-contaminated soil and stored pending sampling, analysis, and disposal. For the purposes of this project, contaminated versus non-contaminated soils are defined as follows:

- b. Non-Contaminated Soil: Soil with PID/FID head space readings less than 25 parts per million (ppm) and exhibiting no other evidence of contamination (visual or olfactory evidence) shall be considered non-contaminated. Unless further analysis is performed for confirmation of the non-contaminated soil, this soil will be considered uncontaminated.
- c. Contaminated Soil: Soil with PID/FID head space readings equal to or greater than 25 ppm and/or soil exhibiting other evidence of contamination (visual or olfactory evidence) shall be considered contaminated. This soil shall be segregated from non-contaminated soil and placed in stockpiles or containers. The results of laboratory analysis will be used to determine its regulatory classification. If feasible, soil with significantly higher PID/FID head space readings and soil exhibiting unusual visual or odor characteristics shall be segregated from other contaminated soil.
- d. If feasible, soil with significantly higher PID/FID head space readings and soil exhibiting unusual visual or odor characteristics shall be segregated from other contaminated soil. The Contractor shall notify the Engineer immediately if soil is discovered that appears to contain unknown contaminants or soil that varies significantly from the type of contamination identified in the contract documents. The Engineer will determine the preliminary regulatory classification of the suspect soil and will determine how the soil is to be managed.
- e. The Contractor shall not store contaminated soil for more than forty (40) calendar days, with this time limit beginning on the first day soil is placed in a stockpile, truck-bed or roll-off container. If the Engineer approves additional storage time for soil determined to be contaminated non-hazardous waste, the Contractor shall also request approval from NYSDEC for any storage greater than sixty (60) calendar days. If the Engineer approves additional storage time for soil determined to be RCRA regulated hazardous waste, the Contractor shall also obtain approval from NYSDEC for any storage greater than ninety (90) calendar days. Contaminated soil may be placed in stockpiles, trucks or roll-off containers as follows:

B. Stockpiles: The Contractor shall prepare and maintain stockpiles as follows:

- a. Preparation of Stockpile Areas
 - 1) The area shall be graded to provide positive drainage away from intended stockpile locations;
 - 2) All stones, roots, debris and other objects that may puncture polyethylene ground protection shall be removed;

- 3) The ground surface where soil will be stockpiled shall be covered with a minimum of 10-mil or two (2) layers of 6-mil polyethylene sheeting, or an equivalent material. All seams shall be overlapped and sealed to prevent the leaching of contaminants; and
- 4) Stockpile locations shall be accepted by the Engineer prior to use.

b. Stockpile Protection

- 1) At the end of each work day, contaminated soil stockpiles shall be completely covered with a minimum of 10-mil or two (2) layers of 6-mil polyethylene sheeting, or an equivalent material. All seams shall be overlapped and sealed to prevent the leaching of contaminants.
- 2) Stockpile covers shall be weighted or secured by appropriate means to prevent tearing or removal by weather conditions.
- 3) Stockpiles shall be labeled, signed, fenced or otherwise secured (as needed) at the end of each work day.
- 4) A partial containment berm made up of hay bales, silt fences, or timbers shall be utilized around stockpiled soils to direct runoff and minimize erosion.

c. Maintenance

- 1) Stockpile covers, site grading, signing and security measures shall be properly maintained for the duration of storage.
- 2) Damaged covers and other protections shall be repaired or replaced by the Contractor within 24-hours after notification. If this work is not satisfactorily completed within 24-hours, no further stockpiling shall be allowed until such work is completed.

C. Trucks or Roll-off Containers: The Contractor shall prepare and maintain trucks and roll-off containers as follows:

- a. The interior of truck-beds and roll-off containers shall be lined with 10-mil or two (2) layers of 6-mil polyethylene sheeting, or an equivalent material. All seams shall be overlapped and sealed to prevent the leaching of contaminants.
- b. At the end of each work day, trucks and roll-off containers storing soil shall be completely covered with waterproof tarpaulins. Tarpaulins shall be placed over the top of the truck bed or container (rather than over the soil inside) and shall extend over the sides to prevent water accumulation and the evaporation of contaminants.
- c. Tarpaulins shall be weighted or secured by appropriate means to prevent tearing or removal by climatic conditions.
- d. Trucks and roll-off containers shall be labeled, signed, fenced or otherwise secured (as needed) at the end of each work day.
- e. Trucks, roll-off containers and tarpaulins shall be properly maintained for the duration of soil storage.
- f. Damaged tarpaulins and protections shall be repaired or replaced by the Contractor within 24-hours after notification. If this work is not satisfactorily

completed within 24-hours, no further soil storage shall be allowed until such work is completed.

- g. Trucks and roll-off containers storing contaminated soil shall be located as described in CMHP.

3.4 SAMPLING AND ANALYSIS

- a. The Contractor shall have an accepted Field Sampling Plan (FSP) prior to commencing work. Sampling shall be conducted by individuals thoroughly trained in sampling protocols, handling and chain of custody procedures, and laboratory requirements. Accepted sampling practices shall be used to obtain representative composite sample(s) and/or grab sample(s) as required for the specific analyses to be completed. Representative samples shall be collected from stored soil as soon as possible after excavation. Soil shall be taken from a depth greater than one (1) foot within the stockpile. Each composite sample shall include a minimum of three (3) to five (5) sample points. Grab samples shall be collected in a manner so as to best characterize the extent of contamination of the soil in question and best characterize the extent of contamination of the stockpile. If any soil areas are present with field indications of contamination discretely different than the other areas (i.e., significantly elevated PID/FID readings, staining, etc.), the area may require a separate sample and the Engineer shall be alerted to approve additional sample and analysis. Analyses shall be completed at a NYSDOH ELAP accredited laboratory that is certified to perform the required tests. Analyses shall be completed within ten (10) work days of sample collection. The Contractor shall provide the Engineer with a copy of all reports within two (2) work days of their receipt from the laboratory.
- b. All material shall be sampled and analyzed in accordance with the proposed disposal facility(ies) requirements or as required by a site-specific NYSDEC or applicable Out-of-State Regulatory Agency BUD.
- c. Soil shall not be added to any stockpile, truck or roll-off container after its contents have been sampled. If soil is added after sampling, or sampled soil is otherwise tampered with, the Contractor shall re-sample the soil at no additional cost to the Town.
- d. All sampling equipment shall be certified clean or precleaned prior to the collection of each sample, by the following method:
 - 1. Wash all sampling equipment and secondary containers with non-phosphate laboratory grade detergent and distilled water.
 - 2. Triple rinse with distilled water.
 - 3. Rinse with isopropyl alcohol, or if samples are visibly contaminated with petroleum use a solvent, such as hexane or other alternate approved by the Engineer.
 - 4. Triple rinse with analyte free water.
- e. All samples shall be identified with a sample label in addition to an entry on a chain-of-custody record. The label shall be identified upon receipt by the laboratory and cross-referenced to the chain-of-custody record. Any inconsistencies shall be

noted on the custody record. Laboratory personnel shall notify the Contractor's sampling and analysis representative immediately if any inconsistencies exist in the paperwork associated with the samples, and the Contractor shall be responsible for collecting new samples to replace those with inconsistencies that cannot be rectified.

- f. Custody of samples shall be maintained through the shipment of samples to the selected laboratory. All samples shall be packaged and shipped daily to ensure that no sample is held at the site for more than 24-hours. Samples shall be delivered directly to the laboratory.
- g. Conduct specified analyses as follows:
 1. Petroleum Contamination Parameter Analysis: Samples shall be analyzed for petroleum contamination constituents (total constituent analysis) in accordance with CP – 51/Soil Cleanup Guidance, Gasoline and Fuel oil, Tables 2 and 3 using USEPA Method 8260 for volatile organics and methyl t-butyl ether (MTBE) and USEPA Method 8270 for base/neutrals.
 2. Hazardous Waste RCRA Toxicity Characteristic Analysis: Samples shall be analyzed for Hazardous Waste RCRA Toxicity Characteristics Leaching Procedure (TCLP) constituents. Analysis shall be for full TCLP constituents on the sample extract as prepared by USEPA Method 1311.
Ignitability of Solids Analysis: Samples shall be analyzed for ignitability by USEPA Method 1030.
 3. pH of Soil and Waste: Samples shall be analyzed for pH measurement by USEPA Method 9045.
 4. Polychlorinated Biphenyls (PCB) Analysis: Samples shall be analyzed for PCBs by USEPA Method 8082.
 5. Total Petroleum Hydrocarbons (TPH) Analysis: Samples shall be analyzed for petroleum hydrocarbons, USEPA Method 8015, gasoline range organics (GROs) and/or diesel range organics (DROs).

3.5 TRANSPORTATION AND DISPOSAL

1. The Contractor shall have an accepted Disposal Plan prior to the transportation and disposal of soils. Soils shall not be transported until all sampling and analysis, as required by the Engineer or by the Disposal facility, have been performed and laboratory reports have been provided and accepted by the Engineer and/or Client.
2. Disposal Facility Selection Requirements
 - a. The Contractor shall submit the name(s) of the selected offsite soil disposal facilities and their location(s) to the Engineer for approval. Note that some companies may have multiple disposal facilities, each possessing differing requirements regarding the types of materials accepted, the specific analytical testing parameters that must be performed for each material, and the frequency of sampling required for each material. It is the Contractor's responsibility to determine the specific waste acceptance criteria and testing requirements for each of its proposed facilities. If the Contractor chooses to use a facility that has not previously been approved by the Engineer or the Town, the Contractor must seek approval from the Engineer to use the facility, and all additional sampling and testing procedures associated with the facility shall be provided at no additional expense to the Client.

- b. The Contractor shall confirm the permit status, types of materials accepted, as well as check for outstanding violations and enforcement actions at each selected disposal facility. The Engineer shall verify the information provided by the Contractor for each facility prior to approval.
- c. The Contractor shall verify the location(s) of the selected disposal facility(ies), as well as the types of materials accepted, the specific analytical testing parameters that must be performed for each material, and the frequency of sampling required for each material, at each of the selected facilities. The analytical testing parameters and the frequency of sampling required for each material are subject to change. It shall be the Contractor's responsibility to confirm and comply with all requirements of the selected facility(ies) prior to submittal to the Engineer for review and approval.
- d. If an approved facility is not available during construction, the Contractor shall be fully responsible for procuring alternate approved facilities at no additional expense to the Town. Any additional sampling and analysis required, and labor involved in selecting new facilities after the initial reuse or disposal facilities are accepted shall be the responsibility of the Contractor.

3. Transportation Off Site

- a. For the duration of transportation, roll-off containers and truck beds shall be completely covered with secured waterproof tarpaulins to prevent water infiltration, evaporation of contaminants and spillage of soil.
- b. The Contractor shall take immediate action to remedy any situation involving a release of soil during loading or while in transit.
- c. Soil shall not be combined with material from any other source.
- d. Soil shall be transported in vehicles with valid Waste Transporter permits for New York State (and other required permits/licenses from any other states as applicable). The Contractor shall provide a copy to the Engineer of the waste transporter permit documenting that the transporter is authorized to transport waste to the intended disposal/treatment facility. The Contractor shall complete any required shipping papers, labeling, placarding, and weighing/load measurements and shall provide copies of required documentation to the Engineer.
- e. Soil that is determined to be a regulated hazardous waste per the criteria of 6 NYCRR Part 371 shall be shipped with a hazardous waste manifest to a treatment/disposal facility permitted to accept the waste. The Contractor shall complete all required manifests, labeling, placarding, land disposal restriction notifications, and other requirements for shipping and tracking hazardous wastes and shall provide copies of required documentation to the Engineer. The Engineer will provide the Contractor with the EPA Identification Number(s) issued to the Town as the hazardous waste generator and will sign the generator certification statements.

4. Disposal / Treatment

- a. Soil shall be disposed of by the methods and procedures described in the accepted Disposal Plan. Soil characterization information, field identification and confirmation laboratory analyses will be used to

determine appropriate classification and category of soil for disposal. Each category of surplus or waste soil shall be handled and disposed of based upon its characterization in accordance with applicable regulatory requirements.

- b. Soil shall be transported to a disposal/treatment facility within forty (40) calendar days from the start of storage. The Contractor shall complete under this item any soil sampling and analysis required by the disposal/treatment facility that is not specifically included in the contract.
5. Documentation
- a. The Contractor shall provide the Engineer with copies of all receipts from the disposal/treatment facility which indicate the actual quantity of waste received within two (2) work days of receipt from the facility. For soil determined to be RCRA regulated hazardous waste, the Contractor shall also provide the Engineer with the appropriate copies of each signed manifest within two (2) work days of receipt. Any manifest discrepancies, including the need for exception reporting, shall be reported immediately to the Engineer and shall be resolved by the Contractor.

3.6 REUSE OF SOILS

- a. The Contractor shall place soil as embankment, fill or other appropriate on-site use as determined and approved by the Engineer and/or municipality, and in accordance with the contract documents. Only appropriate soils placed in appropriate locations as included in the contract documents shall be reused.
- b. If fill material exhibits historical or visual evidence of contamination (including odors) and will be used in an area with public access, the relocated fill material must be covered with a minimum of 12 inches of soil or fill material that meets the criteria for general fill as defined previously.
- c. A demarcation layer will be installed for soil covers. Material meeting the criteria for general fill as defined above will be placed over a demarcation layer (i.e., an identifiable barrier between reused soils and the soil cap). Where existing soil meets the applicable soil cleanup objectives (SCOs) and where no reused soil exists, there will not be a need to install a demarcation layer.

END OF SECTION 026100

SECTION 028200 - ASBESTOS REMOVAL

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. This asbestos abatement Project will consist of the removal and disposal of asbestos containing materials (ACM) and presumed asbestos containing materials (PACM) at the:

1. Twin Towers Middle School – 233 Wisner Ave., Middletown, New York 10940

- B. The work shall include but not be limited to the removal of the following materials:

1. Remove existing carpet, floor tile and underlying mastic. Typ. for 4,100 sq. ft
2. Remove floor tile and underlying mastic. Typ. for 12,000 sq. ft.
3. Remove existing window glazing and associated ACM containing compound. Typ. for 550 lin. ft. / 30 sq. ft. of glazing compound
4. Remove and dispose of electrical panels and associated components after the same have been disconnected from their power source by a licensed electrician. Typ. for 3 panels.
5. Remove and dispose of window and all caulking / sealants at exterior of windows. Typ. for 2,500 lin. ft. / 100 sq. ft.

All as indicated on the drawings and as contained within the Renovation Survey for Asbestos Containing Materials attached as Appendix 'A' to the end of this section.

- C. The Contractor shall be aware of all conditions of the Project and is responsible for verifying quantities and locations of all Work to be performed. Failure to do so shall not relieve the Contractor of its obligation to furnish all labor and materials necessary to perform the Work.
- D. All Work shall be performed in strict accordance with the Project Documents and all governing codes, rules, and regulations. Where conflicts occur between the Project Documents and applicable codes, rules, and regulations, the more stringent shall apply.
- E. Working hours shall be as required and approved by the Owner. Asbestos abatement activities including, but not limited to, work area preparation, gross removal activities, cleaning activities, waste removal, etc. may need to be performed during 'off-hours' (including nights and weekends). In addition, multiple mobilizations may be required to perform the work identified in this project. The Contractor shall coordinate and schedule all Work with the facility and Owner's representative.

1.2 SPECIAL JOB CONDITIONS

- A. All final air clearances associated with this project must be run by TEM, as described in 40 CFR Part 763 Asbestos, Subpart E, 763.90 and as per New York State Education Department Requirements.

1.3 PERMITS AND COMPLIANCE

- A. The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State, and local laws, rules, and regulations pertaining to Work practices, protection of Workers, authorized visitors to the site, persons, and property adjacent to the Work.

- B. Perform asbestos related Work in accordance with New York State Industrial Code Rule 56 (herein referred to as Code Rule 56), 40 CFR 61, and 29 CFR 1926. Where more stringent requirements are specified, adhere to the more stringent requirements.
- C. The Contractor must maintain current licenses, permits and certifications pursuant to New York State Department of Labor and Department of Environmental Conservation for all Work related to this Project, including the removal, handling, transport, and disposal of asbestos containing materials.
- D. The Contractor must have and submit proof upon request that any persons employed by the Contractor to engage in or supervise Work on any asbestos Project have a valid NYS asbestos handling certificate pursuant to Code Rule 56.
- E. The Contractor shall comply fully with any Variance secured from regulatory agencies by the Owner in the performance of the Work. Any Variance applications previously submitted are included as an appendix of this specification.
- F. The Contractor shall be responsible for obtaining all Variances as may be required for the Project or as requested by the Owner. Approval of the Owner is required prior to submission of a Variance application to any regulatory agency. Failure to obtain Owner approval may result in Owner not permitting variance to be used on the project.
- G. The Contractor shall be responsible for compliance with The New York State Uniform Fire Prevention and Building Code, or its successor during all Work at the site.
- H. Failure to adhere to the Project Documents shall constitute a breach of the Contract and the Owner shall have the right to and may terminate the Contract provided, however, the failure of the Owner to so terminate shall not relieve the Contractor from future compliance.

1.4 SUBMITTALS

- A. Pre-Work Submittals: Within 7 days prior to the pre-construction conference, the Contractor shall submit 3 copies of the documents listed below, with 1 copy going directly to the Owner for review and approval prior to the commencement of asbestos abatement activities:
 - 1. Contractor license issued by New York State Department of Labor.
 - 2. A list of Projects performed within the past two (2) years including the dollar value of all Projects. Provide Project references to include Owner, consultant, and air monitoring firm's name, contact persons, address, and phone number.
 - 3. Progress Schedule:
 - a. Show the complete sequence of abatement activities and the sequencing of Work within each building or building section.
 - b. Show the dates for the beginning and completion of each major element of Work including substantial completion dates for each Work Area, building, or phase.
 - 4. Project Notifications: As required by Federal and State regulatory agencies together with proof of transmittal (i.e. certified mail return receipt).
 - 5. Building Occupant Notification: As required by regulatory agencies.
 - 6. Abatement Work Plan: Provide plans that clearly indicate the following:
 - a. All Work Areas/containments numbered sequentially.

- b. Locations and types of all decontamination enclosures.
 - c. Entrances and exits to the Work Areas/containments.
 - d. Type of abatement activity/technique for each Work Area/containment.
 - e. Number and location of negative air units and exhaust. Also provide calculations for determining number of negative air pressure units.
 - f. Location of water and electrical connections to building services.
 - g. Waste transport routes through the building to the waste storage container.
 7. Disposal Site/Landfill Permit from applicable regulatory agency.
 8. NYS Department of Environmental Conservation Waste Transporter Permit.
 - B. On-Site Submittals: Refer to Part 3.1.C & D for all submittals, documentation, and postings required to be maintained on-site during abatement activities.
 - C. Project Close-out Submittals: Within 30 days of the completion of each abatement phase, the Contractor shall submit one copy of the documents listed below to Owner and one copy to the environmental consultant for review and approval prior to Contractor's final payment. Once Owner approves the close-out submittal, the Contractor shall provide three sets of the approved close-out documents (double-sided and bound) to Owner Project Management, including one set to be distributed to the facility.
 1. All waste disposal manifests and disposal logs
 2. OSHA compliance air monitoring records conducted during the Work.
 3. Daily progress log, including the entry/exit log.
 4. Provide the Contractor's Acknowledgement Statement that lists all Workers used in the performance of the Project, including name and NYS DOL certification number. The Statement shall be notarized (Original notarized statement shall be sent to Owner).
 5. Disposal Site/Landfill Permit from applicable regulatory agency.
 6. Project notifications, amended notifications, Variances.
- 1.5 PRE-CONSTRUCTION CONFERENCE
- A. Prior to start of preparatory Work under this Contract, the Contractor shall attend a pre-construction conference attended by Owner, Facility Personnel, and Environmental Consultant.
 - B. Agenda for this conference shall include but not necessarily be limited to:
 1. Contractor's scope of Work, Work plan, and schedule to include number of workers and shifts.
 2. Contractor's safety and health precautions including protective clothing and equipment and decontamination procedures.
 3. Environmental Consultant's duties, functions, and authority.
 4. Contractor's Work procedures including:
 - a. Methods of job site preparation and removal methods.
 - b. Respiratory protection.
 - c. Disposal procedures.
 - d. Cleanup procedures.
 - e. Fire exits and emergency procedures.
 5. Contractor's required pre-work and on-site submittals, documentation, and postings.
 6. Contractor's plan for twenty-four (24) hour Project security both for prevention of theft and for barring entry of unauthorized personnel into Work Areas.

7. Temporary utilities.
 8. Handling of furniture and other moveable objects.
 9. Storage of removed asbestos containing materials.
 10. Waste disposal requirements and procedures, including use of the Owner supplied waste manifest.
- C. In conjunction with the conference the Contractor shall accompany the Owner and Environmental Consultant on a pre-construction walk-through documenting existing condition of finishes and furnishings, reviewing overall Work plan, location of fire exits, fire protection equipment, water supply and temporary electric tie-in.

1.6 APPLICABLE STANDARDS AND REGULATIONS

- A. The Contractor shall comply with the following codes and standards, except where more stringent requirements are shown or specified:
- B. Federal Regulations:
1. 29 CFR 1910.1001, "Asbestos" (OSHA)
 2. 29 CFR 1910.1200, "Hazard Communication" (OSHA)
 3. 29 CFR 1910.134, "Respiratory Protection" (OSHA)
 4. 29 CFR 1910.145, "Specification for Accident Prevention Signs and Tags" (OSHA)
 5. 29 CFR 1926, "Construction Industry" (OSHA)
 6. 29 CFR 1926.1101, "Asbestos, Tremolite, Anthophyllite, and Actinolite" (OSHA)
 7. 29 CFR 1926.500 "Guardrails, Handrails and Covers" (OSHA)
 8. 40 CFR 61, Subpart A, "General Provisions" (EPA)
 9. 40 CFR 61, Subpart M, "National Emission Standard for Asbestos" (EPA)
 10. 49 CFR 171-172, Transportation Standards (DOT)
- C. New York State Regulations:
1. 12 NYCRR, Part 56, "Asbestos", Industrial Code Rule 56 (DOL)
 2. 6 NYCRR, Parts 360, 364, Disposal and Transportation (DEC)
 3. 10 NYCRR, Part 73, "Asbestos Safety Program Requirements" (DOH)
 4. "New York State Uniform Fire Prevention and Building Code"
 5. New York State Education Department – Manual of Planning Standards
- D. Standards and Guidance Documents:
1. American National Standard Institute (ANSI) Z88.2-80, Practices for Respiratory Protection
 2. ANSI Z9.2-79, Fundamentals Governing the Design and Operation of Local Exhaust Systems
 3. EPA 560/585-024, Guidance for Controlling Asbestos Containing Materials in Buildings (Purple Book)
 4. EPA 530-SW-85-007, Asbestos Waste Management Guidance
 5. ASTM Standard E1368 "Standard Practice for Visual Inspection of Asbestos Abatement Projects"

1.7 NOTICES

- A. The Contractor shall provide notification of intent to commence asbestos abatement activities as indicated below.
1. At least ten (10) Working days prior to beginning abatement activities, send written notification to:
U.S. Environmental Protection Agency

National Emissions Standards for Hazardous Air Pollutants (NESHAPS)
Coordinator
26 Federal Plaza
New York, NY 10007

2. At least ten (10) days prior to beginning abatement activities send written notification to:

New York State Department of Labor
Division of Safety and Health, Asbestos Control Program.
State Office Campus
Building 12 - Room 161B
Albany, NY 12240

- B. The Contractor is required to send notifications to regulatory agencies via electronic, mail, or package delivery service that will provide proof of delivery and receipt.
- C. The Contractor shall be responsible for maintaining current project filings with regulatory agencies for the duration of the project.
- D. The Contractor shall post and/or provide Building Occupant Notification at least 10 days prior to beginning abatement activities as required by Code Rule 56.

1.8 PROJECT MONITORING AND AIR SAMPLING

- A. The Owner shall engage the services of an Environmental Consultant (the Consultant) who shall serve as the Owner's Representative in regard to the performance of the asbestos abatement Project and provide direction as required throughout the entire abatement Project period. The consultant and all subconsultants shall not have any contractual relationship with the Contractor for the duration of the asbestos project.
- B. The Contractor is required to ensure cooperation of its personnel with the Consultant for the air sampling and Project monitoring functions described in this section. The Contractor shall comply with all direction given by the Consultant during the course of the Project.
- C. The Consultant shall provide the following administrative services:
 - 1. Review and approve or disapprove all submittals, shop drawings, schedules, and samples.
 - 2. Assure that all notifications to governmental agencies by the Contractor are submitted in a timely manner and are correct in content.
- D. The Consultant shall staff the Project with a trained and certified person(s) to act on the Owner's behalf at the job site. This individual shall be designated as the Abatement Project Monitor (APM).
 - 1. The APM shall be on-site at all times the Contractor is on-site. The Contractor shall not be permitted to conduct any Work unless the APM is on-site (except for inspection of barriers and negative air system during non-working days).
 - 2. The APM shall have the authority to direct the actions of the Contractor verbally and in writing to ensure compliance with the Project documents and all regulations. The APM shall have the authority to Stop Work when gross Work practice deficiencies or unsafe practices are observed, or when ambient fiber concentrations outside the removal area exceed .01 f/cc or background level.

- a. Such Stop Work order shall be effective immediately and remain in effect until corrective measures have been taken and the situation has been corrected.
- b. Standby time and air sample collection and analysis required to resolve the situation shall be at the Contractor's expense.
- 3. The APM shall provide the following services:
 - a. Inspection of the Contractor's Work, practices, and procedures, including temporary protection requirements, for compliance with all regulations and Project specifications.
 - b. Provide abatement Project air sampling as required by applicable regulations (NYS, AHERA) and the Owner. Sampling will include, but not be limited to background, work area preparation, asbestos handling, final cleaning, and clearance air sampling.
 - c. Verify daily that all Workers used in the performance of the Project are certified by the appropriate regulatory agency.
 - d. Monitor the progress of the Contractor's Work, and report any deviations from the schedule to the Owner.
 - e. Monitor, verify, and document all waste load-out operations including placement of generator and location labels on each waste container, as required by federal regulations.
 - f. Verify that the Contractor is performing personal air monitoring daily, and that results are being returned and posted at the site as required.
 - g. The APM shall maintain a log on site that documents all project related and Consultant and Contractor actions, activities, and occurrences.
 - h. Verify landfill to be used for waste disposal with waste transporter(driver) and Contractor prior to waste trailer/dumpster leaving site. Confirm the waste transporter firm and landfill are listed on the regulatory notifications for the project and the waste transport vehicle license number is listed on the current NYS DEC Waste Transporter permit.
- 4. The following minimum inspections shall be conducted by the APM, accompanied by the Contractor's supervisor. Additional inspections shall be conducted as required by Project conditions and/or the Owner's direction. Progression from one phase of Work to the next by the Contractor is only permitted with the written approval of the APM.
 - a. Pre-Construction Inspection: The purpose of this inspection is to verify the existing conditions of the Work Areas and to document these conditions.
 - b. Pre-Commencement Inspection: The purpose of this inspection is to verify the integrity of each containment system prior to disturbance of any asbestos containing material. This inspection shall take place only after the Work Area is fully prepped for removal.
 - c. Work Inspections: The purpose of this inspection is to monitor the Work practices and procedures employed on the Project and to monitor the continued integrity of the containment system. Inspections within the removal areas shall be conducted by the APM during all preparation, removal, and cleaning activities at least twice every Work shift. Additional inspections shall be conducted as warranted.
 - d. Pre-Encapsulation Inspection: The purpose of this inspection is to ensure the complete removal of Asbestos Containing Material (ACM), from all surfaces in the Work Area prior to encapsulation.
 - e. Visual Clearance Inspection: The purpose of this inspection is to verify that: all materials in the scope of work have been properly removed; no visible

- asbestos debris/residue remains; no pools of liquid or condensation remains; and all required cleanings are complete. This inspection shall be conducted before final air clearance testing.
- f. Post-Clearance Inspection: The purpose of this inspection is to ensure the complete removal of ACM, including debris, from the Work Area after satisfactory final clearance sampling and removal of all isolation and critical barriers and equipment from the Work Area.
 - g. Punch List Inspection: The purpose of this inspection is to verify the Contractor's certification that all Work has been completed as contracted and the existing condition of the area prior to its release to the Owner.
- E. The Consultant shall provide abatement Project air sampling and analysis as required by applicable regulations (New York State and/or AHERA). Sampling will include but is not limited to, background, work area preparation, asbestos handling, and final cleaning and clearance air sampling.
- 1. Unless otherwise required by applicable regulations, the Consultant shall have samples analyzed by Phase Contrast Microscopy (PCM). Results shall be available within 24 hours of completion of sampling.
 - 2. Samples shall be collected as required by applicable regulations (New York State and/or AHERA) and these specifications. If Transmission Electron Microscopy (TEM) clearance air sampling is utilized by the owner, the clearance criteria and sampling protocols must be in compliance with AHERA. If PCM air sample analysis results exceed the satisfactory clearance criteria, then TEM analysis of the entire set of clearance air samples may be used, provided that a standard NIOSH/ELAP accepted laboratory analysis method is utilized that shall report each air sample result in fibers per cubic centimeter.
 - 3. If the air sampling during any phase of the abatement project reveals airborne fiber levels at or above .01 fibers/cc or the established background level, whichever is greater, outside the regulated Work Area, Work shall stop immediately and corrective measures required by Code Rule 56 shall be initiated. Notify all employers and occupants in adjacent areas. The Contractor shall bear the burden of any and all costs incurred by this delay.
 - 4. The Environmental Consultant shall submit copies of all elevated air sampling results collected during abatement and all final air clearance results to the Commissioner of Labor, as required by regulation.
 - 5. All final air clearances associated with this project must be run by TEM, as described in 40 CFR Part 763 Asbestos, Subpart E, 763.90 and as per New York State Education Department Requirements.
- 1.9 CONTRACTOR AIR SAMPLING
- A. In addition to the requirements of OSHA 1926.1101, the Contractor shall be required to perform personal air monitoring every Work shift in each Work Area during which abatement activities occur in order to determine that appropriate respiratory protection is being worn and utilized.
 - B. The Contractor shall conduct air sampling that is representative of both the 8-hour time weighted average and 30-minute short-term exposures to indicate compliance with the permissible exposure and excursion limits.

- C. The Contractor's laboratory analysis of air samples shall be conducted by an NYS DOH ELAP approved laboratory. The consultant shall not collect or analyze the Contractor's air samples.
- D. Results of personnel air sample analyses shall be available, verbally, within twenty-four (24) hours of sampling and shall be posted upon receipt. Written laboratory reports shall be delivered and posted at the Work site within five (5) days. Failure to comply with these requirements may result in all work being stopped until compliance is achieved.

1.10 PROJECT SUPERVISOR

- A. The Contractor shall designate a full-time Project Supervisor who shall meet the following qualifications:
 - 1. The Project Supervisor shall hold New York State certification as an Asbestos Supervisor.
 - 2. The Project Supervisor shall meet the requirements of a "Competent Person" as defined by OSHA 1926.1101 and shall have a minimum of one year experience as a supervisor.
 - 3. The Project Supervisor must be able to speak, read, and write English fluently, as well as communicate in the primary language of the Workers.
- B. If the Project Supervisor is not on-site at any time whatsoever, all Work shall be stopped. The Project Supervisor shall remain on-site until the Project is complete. The Contractor may not remove the Project Supervisor from the Project without the written consent of the Owner and the Environmental Consultant; however the Project Supervisor shall be removed from the Project if so requested by the Owner.
- C. The Project Supervisor shall maintain the bound Daily Project Log and the entry/exit logs as required by New York State Department of Labor and section 2.3 of the specifications and the Waste Disposal Log (Appendix B) required by section 4.3 of the specifications.
- D. The Project Supervisor shall be responsible for the performance of the Work and shall represent the Contractor in all respects at the Project site. The Supervisor shall be the primary point of contact for the Asbestos Project Monitor.

1.11 MEDICAL REQUIREMENTS

- A. Before exposure to airborne asbestos fibers, provide Workers with a comprehensive medical examination as required by 29 CFR 1910.1001, and 29 CFR 1926.1101.
 - 1. This examination is not required if adequate records show the employee has been examined as required by 29 CFR 1910.1001, and 29 CFR 1926.1101 within the past year.
 - 2. The same medical examination shall be given on an annual basis to employees engaged in an occupation involving potential disturbance of asbestos fibers.

1.12 TRAINING

- A. As required by applicable regulations, prior to assignment to asbestos Work instruct each employee with regard to the hazards of asbestos, safety and health precautions, and the use and requirements of protective clothing and equipment.
- B. Establish a respirator program as required by ANSI Z88.2 and 29 CFR 1910.134, and 29 CFR 1926.1101. Provide respirator training and fit testing.

1.13 RESPIRATORY PROTECTION

- A. Select respirators from those approved by the National Institute for Occupational Safety and Health (NIOSH).
- B. Respirators shall be individually fit-tested to personnel under the direction of an Industrial Hygienist on a yearly basis. Fit-tested respirators shall be permanently marked to identify the individual fitted, and use shall be limited to that individual.
- C. Where fiber levels permit, and in compliance with regulatory requirements, Powered Air Purifying Respirators (PAPR) are the minimum allowable respiratory protection permitted to be utilized during gross removal operations of OSHA Class I or OSHA Class II friable ACM.
- D. No respirators shall be issued to personnel without such personnel participating in a respirator training program.
- E. High Efficiency Particulate Air (HEPA) respirator filters shall be approved by NIOSH and shall conform to the OSHA requirements in 29 CFR 1910.134 and 29 CFR 1926.1101.
- F. A storage area for respirators shall be provided by the Contractor in the clean room side of the personnel decontamination enclosure where they will be kept in a clean environment.
- G. The Contractor shall provide and make available a sufficient quantity of respirator filters so that filter changes can be made as necessary during the work day.
- H. Filters used with negative pressure air purifying respirators shall not be used any longer than one eight (8) hour work day. Any loose respirator filters found within the regulated area, must be disposed of as asbestos waste.
- I. Any authorized visitor, Worker, or supervisor found in the Work Area not wearing the required respiratory protection shall be removed from the Project site and not be permitted to return.
- J. The Contractor shall have at least two (2) Powered Air Purifying Respirators stored on site designated for authorized visitors use. Appropriate respirator filters for authorized visitors shall be made available by the Contractor.

1.14 DELIVERY AND STORAGE

- A. Deliver all materials to the job site in original packages with containers bearing manufacturer's name and label.
- B. Store all materials at the job site in a suitable and designated area.
 - 1. Store materials subject to deterioration or damage away from wet or damp surfaces and under cover.
 - 2. Protect materials from unintended contamination and theft.
 - 3. Storage areas shall be kept clean and organized.
- C. Remove damaged or deteriorated materials from the job site. Materials contaminated with asbestos shall be disposed of as asbestos debris as herein specified. This includes unused Contractor supplies located in the regulated work area.

1.15 TEMPORARY UTILITIES

- A. Shut down and lock out all electrical power to the asbestos Work Areas, including lighting circuits. Any electrical power passing through the Work Areas that can't be shut down due to health and safety reasons, shall be protected as per the requirements of Industrial Code Rule 56.
- B. Provide temporary 120-240 volt, single phase, three wire, 100 amp electric service with Ground Fault Circuit Interrupters (GFCI) for all electric requirements within the asbestos Work Area.
 - 1. Where available, obtain from Owner's existing system. Otherwise provide power from other sources (i.e. generator).
 - 2. Provide temporary wiring and "weatherproof" receptacles in sufficient quantity and location to serve all HEPA equipment and tools.
 - 3. Provide wiring and receptacles as required by the Environmental Consultant for project monitoring and air sampling equipment (pumps, fans, leaf blowers, etc.).
 - 4. All power to the Work Area shall be brought in from outside the area through GFCI's at the source.
- C. Provide temporary lighting with "weatherproof" fixtures for all Work Areas including decontamination chambers.
 - 1. The entire Work Area shall be kept illuminated at all times.
 - 2. Provide lighting as required by the Environmental Consultant for the purposes of performing required inspections.
- D. All temporary devices and wiring used in the Work Area shall be capable of decontamination procedures including HEPA vacuuming and wet-wiping.
- E. Utilize domestic water service, if available, from Owner's existing system. Provide hot water heaters with sufficient capacity to meet Project demands.

PART 2 PRODUCTS

2.1 PROTECTIVE CLOTHING

- A. Provide personnel utilized during the Project with disposable protective whole body clothing, head coverings, gloves and foot coverings. Provide disposable plastic or rubber gloves to protect hands. Cloth gloves may be worn inside the plastic or rubber for comfort, but shall not be used alone. Make sleeves secure at the wrists and make foot coverings secure at the ankles by the use of tape, or provide disposable coverings with elastic wrists or tops.
- B. Provide sufficient quantities of protective clothing to assure a minimum of four (4) complete disposable outfits per day for each individual performing abatement Work.
- C. Eye protection and hard hats shall be provided and made available for all personnel entering any Work Area.
- D. Authorized visitors shall be provided with suitable protective clothing, headgear, eye protection, and footwear whenever they enter the Work Area.

2.2 SIGNS AND LABELS

- A. Provide warning signs and barrier tapes at all approaches to asbestos Work Areas. Locate signs at such distance that personnel may read the sign and take the necessary protective steps required before entering the area.

1. Provide danger signs in vertical format conforming to 29 CFR 1926.1101, minimum 20" x 14" displaying the following legend.

DANGER
ASBESTOS CANCER AND LUNG DISEASE
HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

2. Provide 3" wide yellow barrier tape printed with black lettered, "DANGER ASBESTOS REMOVAL". Locate barrier tape across all corridors, entrances and access routes to asbestos Work Area. Install tape 3' to 4' AFF.

- B. Provide asbestos danger labels affixed to all asbestos materials, scrap, waste, debris and other products contaminated with asbestos.

1. Provide asbestos danger labels of sufficient size to be clearly legible, displaying the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

2. Provide the following asbestos labels, of sufficient size to be clearly legible, for display on waste containers (bags or drums) which will be used to transport asbestos contaminated material in accordance with United States Department of Transportation 49 CFR Parts 171 and 172: (Note: Include "RQ" for friable asbestos waste only.)

RQ, NA2212, (WASTE) ASBESTOS, 9, PGIII

4. Generator identification information shall be affixed to each waste container or any packaging used to containerize asbestos waste indicating the following printed in indelible ink:

Generator Name; Facility Name; Facility Address; Date

2.3 DAILY PROJECT LOG & WORK AREA ENTRY/EXIT LOG

- A. Provide a bound Daily Project Log. The log shall contain on title page the Project name; name, address and phone number of Owner; name, address and phone number of Environmental Consultant; name, address and phone number of Abatement Contractor; emergency numbers including, but not limited to local Fire/Rescue department and all other New York State Department of Labor requirements.

- B. All entries into the log shall be made in non-washable, permanent ink and such pen shall be strung to or otherwise attached to the log to prevent removal from the log-in area. Under no circumstances shall pencil entries be permitted.

- C. All persons entering and exiting the Work Area shall sign the entry/exit log and include name, certification number, and time.
- D. The Project Supervisor shall document all Work performed daily and note all inspections required by Code Rule 56, i.e. testing and inspection of barriers and enclosures.

2.4 SCAFFOLDING AND LADDERS

- A. Provide all scaffolding and/or staging as necessary to accomplish the Work of this Contract. Scaffolding may be of suspension type or standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection and use of all scaffolding and ladders shall comply with all applicable OSHA construction industry standards.
- B. Provide scaffolding and ladders as required by the Environmental Consultant for the purposes of performing required inspections.

2.5 SURFACTANT (AMENDED WATER)

- A. Wet all asbestos-containing materials prior to removal with surfactant mixed and applied in accordance with manufacturer's printed instructions.

2.6 ENCAPSULANT

- A. Encapsulant shall be tinted or pigmented so that application when dry is readily discernible.
- B. The encapsulant solvent or vehicle shall not contain a volatile hydrocarbon.

2.7 WASTE DISPOSAL BAGS, DRUMS, AND CONTAINERS

- A. Provide 6 mil polyethylene disposal bags printed with asbestos caution labels. Bags shall also be imprinted with U.S. Department of Transportation required markings.
- B. Provide 30 or 55 gallon capacity fiber, plastic, or metal drums capable of being sealed air and water tight if asbestos waste has the potential to damage or puncture disposal bags. Affix asbestos caution labels on lids and at one-third points around drum circumference to assure ready identification.
- C. Containers and bags must be labeled accordance with 40 CFR Part 61 NESHAPS and Code Rule 56. When the bags/containers are moved to the holding area, lockable trailer, or lockable hardtop dumpster from the waste decontamination system washroom, each bag/container must also be appropriately labeled with the date moved in waterproof markings.
- D. Labeled ACM waste containers or bags shall not be used for non-ACM waste or trash. Any material placed in labeled containers or bags, whether turned inside out or not shall be handled and disposed of as ACM waste.

2.8 HEPA VACUUM EQUIPMENT

- A. All vacuuming performed under this contract shall be performed with High Efficiency Particulate Air (HEPA) filter equipped industrial vacuums conforming to ANSI Z9.2.

2.9 POWER TOOLS

- A. Any power tools used to drill, cut into, or otherwise disturb asbestos material shall be manufacturer equipped with HEPA filtered local exhaust ventilation.

2.10 FIRE RETARDANT PLASTIC SHEETING

- A. All polyethylene (plastic) sheeting used on the Project (including but not limited to sheeting used for critical and isolation barriers, fixed objects, walls, floors, ceilings, waste container) shall be at least 6 mil fire retardant sheeting.
- B. Decontamination enclosure systems shall utilize at least 6 mil opaque fire retardant plastic sheeting. At least 2 layers of 6 mil reinforced fire retardant plastic sheeting shall be used for the flooring.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Should visible emissions or water leaks be observed outside the Work Area, immediately stop Work and institute emergency procedures per Code Rule 56. Should there be elevated fiber levels outside the Work Area, immediately stop Work, institute emergency procedures per Code Rule 56, and notify all employers and occupants in adjacent areas. All costs incurred in decontaminating such non-Work Areas and the contents thereof shall be borne by the Contractor, at no additional cost to the Owner.
- B. Valid NYS DOL Asbestos Handler certification cards shall be on site prior to admittance of any Contractor's employees to the asbestos Work Area.
- C. The following submittals, documentation, and postings shall be maintained on-site by the Contractor during abatement activities at a location approved by the Abatement Project Monitor:
 - 1. Valid Contractor handling license issued by New York State Department of Labor.
 - 2. NYS DOL Asbestos Handler certification cards for each person employed in the removal, handling, or disturbance of asbestos.
 - 3. Daily OSHA personal air monitoring results.
 - 4. NYS Department of Health ELAP certification for the laboratory that will be analyzing the OSHA personnel air samples.
 - 5. NYS Department of Environmental Conservation Waste Transporter Permit.
 - 6. Project documents (specifications and drawings.)
 - 7. Notifications, Variances, Approved Work Plan. Ensure that the most up-to-date notifications and Variances are on-site.
 - 8. Applicable regulations.
 - 9. Material Safety Data Sheets of supplies/chemicals used on the Project.
 - 10. Disposal Site/Landfill Permit from applicable regulatory agency.
 - 11. List of emergency telephone numbers.
 - 12. Magnahelic manometer semi-annual calibration certification.
 - 13. Waste Disposal Log.
 - 14. Daily Project Log.
 - 15. Entry/Exit Logs.
- D. The following documentation shall be maintained on-site by the Abatement Project Monitor during abatement activities:
 - 1. Valid Contractor handling license issued by New York State Department of Labor.

2. Air Sample Log.
 3. Air sample results.
 4. Project Monitor Daily Log
 5. Asbestos Survey Report.
 6. A copy of ASTM Standard E1368 "Standard Practice for Visual Inspection of Asbestos Abatement Projects."
 7. Calibration chart for rotometer(s) used on-site.
- E. The Work Area must be vacated by building occupants prior to decontamination enclosure construction and Work Area preparation.
- F. All demolition necessary to access asbestos containing materials for removal must be conducted within negative pressure enclosures by licensed asbestos handlers. Demolition debris may be disposed of as construction and demolition debris provided the Abatement Project Monitor determines that it is not contaminated with asbestos and there has been no disturbance of ACM within the enclosure. If the demolition debris is determined to be contaminated or ACM has been disturbed, it must be disposed of as asbestos waste.

3.2 PERSONNEL DECONTAMINATION ENCLOSURE

- A. Provide personnel decontamination enclosure contiguous to the Work Area or as per Variance. The decontamination enclosure shall be attached to the Work Area and not located within it unless isolation barriers are installed. If the decontamination chamber is accessible to the public it shall be fully framed, sheathed, and lockable to prevent unauthorized entry.
- B. Access to the Work Area will be from the clean room through an air-lock to the shower and through an air lock to the equipment room. Each airlock shall be a minimum of three feet from door to door. Additional air locks shall be provided as required by Code Rule 56 for remote decontamination enclosures.
- C. The decontamination enclosure ceiling and walls shall be covered with one layer of opaque 6 mil fire retardant plastic sheeting. Two layers of reinforced fire retardant plastic sheeting shall be used to cover the floor.
- D. The entrance to the clean room shall have a lockable door with adequate small openings for Work Area make-up air. Provide suitable lockers for storage of Worker's street clothes. Storage for respirators along with replacement filters and disposable towels shall also be provided.
- E. Provide a temporary shower with individual hot and cold water supplies and faucets. Provide a sufficient supply of soap and shampoo. There shall be one shower for every six Workers. The shower room shall be constructed in such a way so that travel through the shower chamber shall be through the shower. The shower shall not be able to be bypassed.
- F. Shower water shall be drained, collected and filtered through a system with at least a 5.0 micron particle size collection capability containing a series of several filters with progressively smaller pore sizes to avoid rapid clogging of the system. The filtered waste water shall then be discharged in accordance with applicable codes and the contaminated filters disposed of as asbestos waste.

- G. The equipment room shall be used for the storage of tools and equipment. A walk-off pan filled with water shall be located in the Work Area outside the equipment room for Workers to clean foot coverings when leaving the Work Area. A labeled 6 mil plastic ACM waste bag for collection of contaminated clothing shall be located in this room.
- H. The personal decontamination enclosure shall be cleaned and disinfected minimally at the end of each Work shift and as otherwise directed by the Asbestos Project Monitor.

3.3 WASTE DECONTAMINATION ENCLOSURE

- A. Provide a waste decontamination enclosure contiguous to the Work area. The decontamination enclosure shall be attached to the Work Area and not located within it unless isolation barriers are installed. If the decontamination chamber is accessible to the public it shall be fully framed, sheathed, and lockable to prevent unauthorized entry.
- B. The waste decontamination enclosure system shall consist of a holding area, air lock and washroom. The airlock shall be a minimum of three feet from door to door. The entrance to the holding area shall have a lockable door.
- C. The decontamination enclosure ceiling and walls shall be covered with one layer of opaque 6 mil fire retardant plastic sheeting on walls and ceiling. Two layers of reinforced fire retardant plastic sheeting shall be used to cover the floor.
- D. Where there is only one egress from the Work Area, the holding area of the waste decontamination enclosure system may branch off from the personnel decontamination enclosure equipment room, which then serves as the waste wash room.
- E. The waste wash room water shall be drained, collected, and filtered through a system with at least a 5.0 micron particle size collection capability containing a series of several filters with progressively smaller pore sizes to avoid rapid clogging of the system. The filtered waste water shall then be discharged in accordance with applicable codes and the contaminated filters disposed of as asbestos waste.
- F. In small asbestos Projects where only one egress from the Work Area exists, the shower room may be used as a waste washroom. In this instance, the clean room shall not be used for waste storage, but shall be used for waste transfer to carts, which shall immediately be removed from this enclosure.

3.4 WORK AREA ENTRY AND EXIT PROCEDURES

- A. Access to and from the asbestos Work Area is permitted only through the personnel decontamination enclosure unless otherwise stipulated in a Site Specific Variance.
- B. Workers shall sign the entry/exit log upon every entry and exit.
- C. The following procedures shall be followed when entering the Work Area:
 - 1. Before entering the Work Area, Workers shall proceed to the clean room, remove all street clothes, and don protective clothing, equipment, and respirators.
 - 2. Workers shall proceed from the clean room through the shower room and the equipment room and into the Work Area.
- D. The following procedures shall be followed when exiting the Work Area:

1. Before leaving the Work Area, gross asbestos contamination will be removed by brushing, wet cleaning and/or HEPA vacuuming, followed by use of the walk-off pan.
 2. In the equipment room, Workers shall remove disposable clothing, but not respirators, and shall place clothing in plastic disposal bags for disposal as contaminated debris prior to entering the shower room. Reusable equipment shall be removed and stored in the equipment room (e.g, work boots).
 3. Workers shall shower thoroughly while wearing respirators, then wash respirator with soap and water prior to removal.
 4. Upon exiting the shower, Workers shall enter the clean room and don new disposable clothing if the Work shift is to continue or street clothes to exit area. Under no circumstances shall Workers enter public non-Work Areas in disposable protective clothing.
- E. If remote decontamination enclosures are permitted by Code Rule 56 or a Site Specific Variance, workers shall wear two disposable suits for all phases of Work. Workers exiting the work area shall HEPA vacuum the outer suit, enter the airlock, remove the outer suit and then place it back into the Work Area. A clean second suit shall be donned before exiting the airlock and proceeding to the decontamination enclosure or another work area via the designated pathway required by Code Rule 56.

3.5 WORK AREA PREPARATION

- A. Asbestos danger signs shall be posted at all approaches to the asbestos Work Area. Post all emergency exits as emergency exits only on the Work Area side, post with asbestos caution signs on the non-Work Area side. Provide all non-Work Area stairs and corridors accessible to the asbestos Work Area with warning tapes at the base of stairs and beginning of corridors. Warning tapes shall be in addition to caution signs.
- B. Shut down and lock out the building heating, ventilating, and air conditioning systems. Electrical systems and circuits shall also be shut down unless permitted to remain active per Code Rule 56 and appropriately protected and labeled. Existing lighting sources shall not be utilized. Provide temporary electric power and lighting as specified herein.
- C. All non-ACM surfaces and objects within the Work Area shall be pre-cleaned using HEPA vacuuming and/or wet-wiping methods. Dry sweeping and any other methods that raise dust shall be prohibited. ACM shall not be disturbed during pre-cleaning.
- D. Movable objects within the Work Area shall be HEPA vacuumed and/or wet-wiped and removed from the Work Area.
- E. All non-movable equipment in the Work Area shall be completely covered with 2 layers of fire retardant plastic sheeting, at least 6 mil in thickness, and secured in place with duct tape and/or spray adhesive. Active Fire Protection System components in the Work Area shall not be covered with fire retardant plastic sheeting or any other obstruction.
- F. Provide enclosure of the asbestos Work Area necessary to isolate it from unsealed areas of the building in accordance with the approved asbestos Work plan and as specified herein.

- G. Provide critical barriers by sealing off all openings including but not limited to operable windows and skylights, doorways, diffusers, grills, electrical outlets and boxes, doors, floor drains, and any other penetrations to surfaces in the Work Area enclosure, using 2 layers of at least 6 mil fire retardant plastic sheeting.
- H. Provide isolation barriers by installing temporary framing and sheathing at openings larger than 32 square feet forming the limits of the asbestos Work Area. Sheathing thickness must be a minimum of 3/8 inch and all sheathing shall be caulked and the Work Area side sealed with two layers of 6 mil fire retardant plastic sheeting. Isolation barriers in stairwells and at work area egress locations shall not be covered with sheathing, only two layers of 6 mil fire retardant plastic sheeting.
- I. Isolation barriers shall be installed at all elevator openings in the Work Area. Elevators running through the regulated abatement work area shall be shut down or isolated as per Code Rule 56. Elevator controls shall be modified so that elevators bypass the Work Area
- J. Provide two independent layers of 6 mil fire retardant plastic sheeting over all floor, wall, and ceiling surfaces. Isolation barriers shall also be covered with two independent layers (for a total of four layers). Sheeting shall be secured with duct tape. All joints in fire retardant plastic sheeting shall overlap 12" minimum. Carpeting left in place shall be covered with 3/8 inch plywood sheathing prior to plasticizing.
- K. Unless otherwise specified for removal, the Contractor shall either protect all fiberglass insulation on piping, ductwork, tanks, etc. in the Work Area using two layers of six mil fire retardant plastic sheeting or remove the insulation as asbestos containing waste. If the Contractor elects to remove the fiberglass insulation as asbestos-contaminated, he/she shall be responsible for reinsulation if reinsulation of removed insulations is part of the Contract or Project.
- L. Frame out emergency exits from Work Area. Provide double layer 6 mil fire retardant plastic sheeting and tape seal opening. Post as emergency exits only and tape utility knife to the Work Area side of each exit. Within the Work Area, mark the locations and directions of emergency exits throughout the Work Area using exit signs and/or duct tape.
- M. Remove all items attached to or in contact with ACM only after the Work Area enclosure is in place. HEPA vacuum and wet wipe with amended water all items prior to their removal from the Work Area and before the start of asbestos removal operations.
- N. Suspended ceiling tiles shall only be removed after Work Area preparation is complete. If possible, non-contaminated ceiling tiles shall be HEPA vacuumed and removed from the Work Area before asbestos removals begin. Contaminated ceiling tiles shall be disposed of as asbestos waste.

3.6 NEGATIVE AIR PRESSURE FILTRATION SYSTEM

- A. Provide a portable asbestos filtration system that develops a minimum pressure differential of negative 0.02 in. of water column within all full enclosure areas relative to adjacent unsealed areas and that provides a minimum of 4 air changes per hour in the Work Area during abatement and 6 air changes for non-friable flooring and/or mastic removal.

- B. Such filtration systems must be made operational after critical and isolation barriers are installed but before wall, floor, and ceilings are plasticized and shall be operated 24 hours per day during the entire Project until the final cleanup is completed and satisfactory results of the final air samples are received from the laboratory.
- C. The system shall include a series of pre-filters and filters to provide High Efficiency Particulate Air (HEPA) filtration of particles down to 0.3 microns at 100% efficiency and below 0.3 microns at 99.9% efficiency. Provide sufficient replacement filters to replace pre-filters every 2 hours, secondary pre-filters every 24 hours, and primary HEPA filters every 600 hours (25 continuous days) of operation. HEPA filter sides shall be marked with installation date during all new HEPA filter installations on project.
- D. A minimum of one additional filtration unit of at least the same capacity as the primary unit(s) shall be installed and fully functional to be used during primary unit (s) filter changing and in case of primary failure.
- E. At no time will the unit exhaust indoors, within 15 feet of a receptor, including but not limited to windows and doors, or adversely affect the air intake of the building. Exhaust ducting shall not exceed 25' in length, except as allowed by Industrial Code Rule 56. Provide construction fencing at ground level exhaust termination locations per Code Rule 56.
- F. Upon electric power failure or shut-down of any filtration unit, all abatement activities shall stop immediately and only resume after power is restored and all filtration units are fully operating. For shut-downs longer than one hour, all openings into the Work Area, including the decontamination enclosures, shall be sealed.
- G. For all OSHA Class I removal Work Areas, the Contractor shall provide a manometer to verify negative air pressure. Manometers shall be read twice daily and recorded within the Daily Project Log.
- H. There shall be at least a 4 hour settling period after the Work Area is fully prepared and the negative filtration units have been started to ensure integrity of the barriers.
- I. Once installed and operational, the Contractor's Supervisor shall conduct daily inspections of the Work Area to insure the airtight integrity of the enclosure and operation of the negative air system. Findings shall be recorded within the Daily Project Log. Inspections shall also be conducted on days when no abatement activities are in progress per Code Rule 56 (i.e. weekends).

3.7 REMOVAL OF ASBESTOS CONTAINING MATERIALS

- A. Asbestos-containing materials shall be removed in accordance with the Contract Documents and the approved Asbestos Work Plan. Only one type of ACM shall be abated at a time within a Work Area. Where there are multiple types of ACM requiring abatement, Code Rule 56 procedures for sequential abatement shall be followed.
- B. Sufficiently wet asbestos materials with a low pressure, airless fine spray of surfactant to ensure full penetration prior to material removal. Re-wet material that does not display evidence of saturation.

- C. One Worker shall continuously apply amended water while ACM is being removed.
- D. Perform cutting, drilling, abrading, or any penetration or disturbance of asbestos containing material in a manner to minimize the dispersal of asbestos fibers into the air. Use equipment and methods specifically designed to limit generation of airborne asbestos particles. All power operated tools used shall be provided with manufacturer HEPA equipped filtered local exhaust ventilation, as required by regulation.
- E. Upon removal of ACM from the substrate, the newly exposed surfaces shall be HEPA vacuumed and/or wet cleaned. Surfaces must be thoroughly cleaned using necessary methods and any required solvents to completely remove any adhesive, mastic, etc.
- F. All removed material shall be placed into 6 mil plastic disposal bags or other suitable container upon detachment from the substrate. Cleanup of accumulations of loose debris or waste shall be performed whenever there is enough accumulation to fill a single bag or container and minimally at the end of each workshift.
- G. Large components shall be wrapped in two layers of 6 mil fire retardant plastic sheeting. Sharp components likely to tear disposal bags shall be placed in fiber drums or boxes and then wrapped with sheeting.
- H. Power or pressure washers are not permitted for asbestos removal or clean-up procedures unless approved in a Site Specific Variance and allowed by owner.
- I. All open ends of pipe and duct insulation not scheduled for removal shall be encapsulated using lag cloth.
- J. All construction and demolition debris determined by the Environmental Consultant to be contaminated with asbestos shall be handled and disposed of as asbestos waste.
- K. The use of metal shovels, metal dust pans, etc. are not permitted inside the work area.

3.8 EQUIPMENT AND WASTE CONTAINER DECONTAMINATION AND REMOVAL PROCEDURES

- A. External surfaces of contaminated containers and equipment shall be cleaned by wet cleaning and/or HEPA vacuuming in the Work Area before moving such items into the waste decontamination enclosure system airlock by persons assigned to this duty. The persons in the Work Area shall not enter the airlock. No gross removal operations are permitted when waste transfer is in progress.
- B. The containers and equipment shall be removed from the airlock by persons stationed in the washroom during waste removal operations. The external surfaces of containers and equipment shall be cleaned a second time by wet cleaning.
- C. The cleaned containers of asbestos material and equipment are to be dried of any excessive pooled or beaded liquid, placed in uncontaminated 6 mil plastic bags or sheeting, as the item's physical characteristics demand, and sealed airtight.
- D. The clean recontainerized items shall be moved into the airlock that leads to the holding area. Workers in the washroom shall not enter this airlock.

- E. Containers and equipment shall be moved from the airlock and into the holding area by persons dressed in clean personal protective equipment, who have entered from the holding area.
- F. The cleaned containers of asbestos material and equipment shall be placed in water tight carts with doors or tops that shall be closed and secured. These carts shall be held in the holding until transfer to the waste container. The carts shall be wet cleaned and/or HEPA vacuumed at least once each day.
- G. The exit from the decontamination enclosure system shall be secured to prevent unauthorized entry.
- H. Where the waste removal enclosure is part of the personnel decontamination enclosure, waste removal shall not occur during shift changes or when otherwise occupied. Precautions shall be taken to prevent short circuiting and cycling of air outward through the shower and clean room.

3.9 WORK AREA DECONTAMINATION, CLEANING, AND CLEARANCE PROCEDURES

- A. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, the following decontamination procedures shall be followed unless modified by a Site Specific Variance.
- B. First Cleaning:
 - 1. All bagged asbestos waste and unnecessary equipment shall be decontaminated and removed from the Work Area.
 - 2. All surfaces in the Work Area shall be wet cleaned, except active fire protection system components that may be damaged by water. A wet-purpose shop vacuum may be used to pick up excess liquid, and may either be decontaminated prior to removal from the Work Area or disposed of as asbestos waste.
 - 3. The Abatement Project Monitor (APM) shall conduct a visual inspection of the Work Area for cleanliness and completion of abatement.
 - 4. The Contractor shall then apply a thin coat of encapsulant to all surfaces in the Work Area that were not the subject of removal. In no event shall encapsulant be applied to any surface that was the subject of removal prior to obtaining satisfactory air monitoring results. Encapsulants shall be pigmented or tinted to provide an indication for completeness of coverage. The APM shall determine adequacy of coverage.
 - 5. After the encapsulant has been applied and the required waiting/settling / drying time has elapsed, the first layer of fire retardant plastic sheeting shall then be removed and bagged as asbestos waste.
- C. Second Cleaning
 - 1. All surfaces in the Work Area shall be HEPA vacuumed and then wet cleaned. Wet cleaning of active fire protection system components is not necessary if damage may occur.
 - 2. The APM shall conduct a second visual inspection of the Work Area for cleanliness.
 - 3. After the required waiting/settling/drying time has elapsed, the second layer of fire retardant plastic sheeting shall be removed and bagged as asbestos waste.

D. Third Cleaning

1. All surfaces in the Work Area shall be HEPA vacuumed and then wet cleaned. Wet cleaning of active fire protection system components is not necessary if damage may occur.
2. After the required waiting/settling/drying time has elapsed, the APM shall conduct a third visual inspection of the Work Area for completeness of abatement and cleanliness. The APM shall document the results of the visual inspection in the Project Monitor Log and Contractor's Daily Project Log.
3. After satisfactory APM visual inspection, aggressive final clearance air sampling shall then be conducted by the Environmental Consultant provided no visible asbestos debris/residue; pools of liquid, or condensation remains. NOTE: TEM samples should be used vs. PCM if demolition or other dust-generating evolutions are taking place in adjacent areas, as evident from excessive loading.
4. Upon receipt of satisfactory final clearance air sampling results, the negative air pressure equipment can then be shut down, and the isolation and critical barriers removed and bagged as asbestos waste. Following this and satisfactory inspections by the project supervisor and the APM for cleanliness, the decontamination enclosures shall be removed.

- E. As a result of any visual inspection by the APM or should air sampling results indicate high fiber levels, the Contractor will reclean the affected areas at no additional expense to the Owner.

3.10 TENT ENCLOSURES

- A. Tent enclosures may only be used where specifically permitted by Code Rule 56 or a Site Specific Variance issued by the NYS Department of Labor.
- B. The Contractor shall restrict access to the immediate area where tent removal procedures are taking place using barrier tape and/or construction barriers. Caution signs shall be posted.
- C. Remote personnel decontamination enclosures shall be constructed. Configuration shall be as required by Project size and a washroom with attached airlock shall be constructed contiguous to the tent enclosure for small and large size tent enclosure work areas. For tent enclosures with gross abatement of friable materials, a contiguous decontamination system shall be constructed, maintained and utilized, except for minor size tent enclosure work areas where an adjacent decontamination room or area is permitted by Code Rule 56.
- D. The Work Area shall be precleaned. All objects and equipment that will remain in the restricted area during abatement shall be sealed with two layers of six mil polyethylene and tape.
- E. The tent shall be a single use barrier constructed with a rigid frame and at least two layers of six mil polyethylene unless one layer of six mil polyethylene is otherwise permitted by Code Rule 56. Tents with twenty (20) square feet or less of floor space or no gross removal of friable ACM shall be constructed of one (1) layer of six mil polyethylene and shall include walls, ceilings and a floor (except portions of walls, floors and ceilings that are the removal surface) with double folded seams. All seams shall be sealed airtight using duct tape and/or spray adhesive.

- F. The tent shall be constructed with at least one airlock for worker/waste egress.
- G. A manometer shall be used for all OSHA Class I abatement.
- H. Negative air shall be maintained at four (4) air changes per hour for non-friable and glovebag abatement tent enclosure work areas. Eight (8) air changes shall be maintained for friable gross removal tent enclosure work areas. In a Minor size abatement tent enclosure work area a HEPA vacuum may be used to maintain the required air changes.
- I. OSHA compliance air monitoring is required per section 1.9.
- J. ACM removal shall follow procedures defined in section 3.7.
- K. Waste material shall be placed in properly labeled 6 mil plastic bags or other appropriate containers. The outside of the bags or containers shall be wet wiped and/or HEPA vacuumed in the washroom and shall then be placed in a second bag/container before being transferred to the waste storage container. All transportation of waste bags and containers outside the Work Area shall be in watertight carts. These carts shall be held in the holding area until transfer to the waste container. The carts shall be wet cleaned and/or HEPA vacuumed at least once each day.
- L. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, the following decontamination procedures shall be followed.
 - 1. All bagged asbestos waste and unnecessary equipment shall be decontaminated and removed from the Work Area.
 - 2. All surfaces in the Work Area shall be wet cleaned. A wet-purpose shop vacuum may be used to pick up excess liquid, and shall be decontaminated prior to removal from the Work Area.
 - 3. The Contractor shall then apply a thin coat of encapsulant to all non-removal surfaces covered with plastic in the Work Area. In no event shall encapsulant be applied to any surface that was the subject of removal prior to obtaining satisfactory air monitoring results. Encapsulants shall be pigmented or tinted to provide an indication for completeness of coverage. The APM shall determine adequacy of coverage.
 - 3. After the waiting/settling/drying time requirements have elapsed, the Asbestos Project Monitor shall conduct a visual inspection of the Work Area for cleanliness and completion of abatement. The APM shall document the results of the visual inspection in the Project Monitor Log and Contractor's Daily Project Log.
 - 4. After satisfactory APM visual inspection, aggressive final clearance air sampling shall then be conducted by the Environmental Consultant.
 - 5. Upon receipt of satisfactory final clearance air sampling results, the tent shall be collapsed into itself, placed in suitable disposal bags, and transferred through the washroom to the waste decontamination enclosure. Isolation and critical barriers shall then be removed and bagged as asbestos waste followed by satisfactory visual inspections by the project supervisor and the APM for cleanliness.

3.11 GLOVEBAG REMOVAL

- A. Glovebag removals may only be used as specifically permitted by Code Rule 56 or a Site Specific Variance issued by the NYS Department of Labor. Glovebags may only be used on pipe or duct insulation.
- B. In addition to conformance with applicable regulations and variances, glovebag removals are only permitted to be conducted within tent enclosures complying with these specifications.
- C. The Contractor shall restrict access to the immediate area where tent/glovebag removal procedures are taking place using barrier tape and/or construction barriers. Caution signs shall be posted.
- D. Remote personnel decontamination enclosures shall be constructed. Configuration shall be as required by Project size and a washroom with attached airlock shall be constructed contiguous to the tent enclosure.
- E. Glovebag removals shall utilize commercially available glovebags of at least six mil thickness. Use shall be in accordance with the manufacturer's instructions and the following minimum requirements:
 - 1. The sides of the glovebag shall be cut to fit the size pipe being removed. Tools shall be inserted into the attached tool pocket.
 - 2. The glovebag shall be placed around the pipe and the open edges shall be folded and sealed with staples and duct tape. The glovebag shall also be sealed at the pipe to form a tight seal.
 - 3. Openings shall be made in the glovebag for the wetting tube and HEPA vacuum hose. The opening shall be sealed to form a tight seal.
 - 4. All glovebags shall be smoke tested by the Asbestos Project Monitor under negative pressure using the HEPA vacuum before removal operations commence. Glovebags that do not pass the smoke test shall be resealed and then retested.
 - 5. After first wetting the materials to be removed, removal may commence. ACM shall be continuously wetted. After removal of the ACM, the piping shall be scrubbed or brushed so that no visible ACM remains. Open ends of pipe insulation shall be encapsulated.
 - 6. After the piping is cleaned, the inside of the glovebag shall be washed down and the wetting tube removed. Using the HEPA vacuum, the glovebag shall be collapsed and then twisted and sealed with tape with the ACM at the bottom of the bag.
 - 7. A disposal bag shall be placed around the glovebag that is then detached from the pipe. The disposal bag is then sealed and transferred through the washroom to the waste storage container.
- F. After glovebag removals are complete, tent decontamination procedures shall be followed.

3.12 REMOVALS OF EXTERIOR NON-FRIABLE ACM

- A. Except as modified by this section, removal of exterior non-friable ACM (i.e. roof flashings, built-up roofing, siding, caulking, glazing compound, transite, tars, sealers, coatings, and other NOB ACM) shall conform to all provisions of this specification.

- B. Unless Site Specific Variances have been otherwise obtained, removals shall be conducted in accordance with the provisions of Code Rule 56.
- C. The Work Area shall be the area from which ACM materials are being removed and shall extend 25 feet from the perimeter of the removal area.
- D. Non-certified Workers are not allowed in the Work Area until the Work Area is cleared by the Asbestos Project Monitor (APM).
- E. Remote personnel decontamination enclosures shall be constructed at a location in accordance with the approved Work Plan. Unless located outside the Work Area, decontamination enclosures are not permitted to be constructed on the roof. Decontamination enclosures shall be constructed as close to the regulated abatement work area as physically possible, but no greater than 50 feet from the building. It shall be cordoned off at a distance of 25 feet to separate it from public areas.
- F. All openings (including but not limited to operable windows, doors, hatches, vents, ducts, and grilles) one story above, one story below, and within 25 feet of the work area shall be sealed with two layers of six mil polyethylene. Alternately, a polyethylene drape may be used instead of sealing windows individually where permitted by Code Rule 56.
- G. The removal of the ACM may require the use of scrapers, solvents, mastic removal chemicals, or other methods/procedures to ensure complete removal.
- H. The Contractor is required to provide temporary protection of the building (i.e. roof, window openings, construction joints, etc.) at the end of each Work shift so as to maintain the building in a watertight condition.
- I. Dumpsters used for waste storage shall be lined with two layers of six mil polyethylene and shall have a hard top. Where open-top dumpsters are permitted by ICR 56 or a Site Specific Variance, the top shall be closed with polyethylene flaps that are sealed at the end of each work shift.
- J. Personal protective equipment, including respirators, shall be utilized and worn during all removal operations until the Work Area is cleared by the APM.
- K. The Owner may, at his discretion, choose to conduct air sampling. If air samples collected during abatement indicate any airborne asbestos fiber concentration(s) at or above 0.01 f/cc, Work shall be stopped immediately and Work methods shall be altered to reduce the airborne asbestos fiber concentration(s).
- L. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, the following decontamination procedures shall be followed:
 - 1. All surfaces in the Work Area shall be HEPA vacuumed and then wet cleaned.
 - 2. The APM shall conduct a visual inspection of the Work Area for cleanliness and completeness of abatement. The APM shall document the results of the visual inspection in the Project Monitor Log and Contractor's Daily Project Log.

3. Upon satisfactory visual inspection results, the isolation and critical barriers shall be removed and bagged as asbestos waste. Following this, the decontamination enclosures shall be removed.

3.13 NON-FRIABLE FLOORING AND/OR MASTIC REMOVALS

- A. The following procedures may only be used for the removal of non-friable flooring and/or mastic materials using manual and chemical methods. These procedures shall not apply to beadblaster use or other abrasive abatement methods.
- B. The Contractor shall restrict access to the immediate Work Area where non-friable ACM removal procedures are taking place using barrier tape and/or construction barriers. Caution signs shall be posted.
- C. Remote personnel decontamination enclosures may be utilized and shall be constructed at a location in accordance with the approved Work Plan. A washroom with attached airlock shall be constructed contiguous to each Work area enclosure.
- D. The Work Area shall be prepared per section 3.5, except that ceilings, walls, and floors need not be fully plasticized. However, a four-foot high single layer of 6-mil fire retardant plastic sheeting shall be installed as a splashguard at all walls adjoining mastic removal portions of the work area, to prevent damage to the existing walls.
- E. Negative air shall be maintained at six (6) air changes per hour.
- F. OSHA compliance air monitoring is required per section 1.9.
- G. ACM removal shall follow procedures defined in section 3.7.
- H. Waste material shall be placed in properly labeled 6 mil plastic bags or other appropriate containers. The outside of the bags or containers shall be wet wiped and/or HEPA vacuumed in the washroom and double-bagged before being passed into the airlock. The bags or containers shall then be transported to the waste storage container. All transportation of waste bags and containers outside the Work Area shall be in watertight carts.
- I. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, the following decontamination procedures shall be followed.
 1. All bagged asbestos waste and unnecessary equipment shall be decontaminated and removed from the Work Area.
 2. All plastic sheeting splashguards shall be removed and containerized, followed by all surfaces in the Work Area being wet cleaned. A wet-purpose shop vacuum may be used to pick up excess liquid, and shall be decontaminated prior to removal from the Work Area.
 3. The Contractor shall then apply a thin coat of encapsulant to all non-removal surfaces in the Work Area. In no event shall encapsulant be applied to any surface that was the subject of removal prior to obtaining satisfactory air monitoring results. Encapsulants shall be pigmented or tinted to provide an indication for completeness of coverage. The APM shall determine adequacy of coverage.

4. After the waiting/settling/drying time requirements have elapsed, the Asbestos Project Monitor (APM) shall conduct a visual inspection of the Work Area for cleanliness and completion of abatement. The APM shall document the results of the visual inspection in the Project Monitor Log and Contractor's Daily Project Log.
5. After satisfactory APM visual inspection, aggressive final clearance air sampling shall then be conducted by the Environmental Consultant.
6. Upon receipt of satisfactory final clearance air sampling results, the isolation and critical barriers shall be removed and bagged as asbestos waste. Following this and satisfactory inspections by the project supervisor and the APM for cleanliness the decontamination enclosures shall be removed.

3.14 RESTORATION OF UTILITIES, FIRESTOPPING, AND FINISHES

- A. After final clearance, remove locks and restore electrical and HVAC systems. All temporary power shall be disconnected, power lockouts removed and power restored. All temporary plumbing shall be removed.
- B. Finishes damaged by asbestos abatement activities including, but not limited to, plaster/paint damage due to duct tape, staples, and spray adhesives, and floor tile lifted due to wet or humid conditions, shall be restored prior to final payment.
 1. Finishes unable to be restored shall be replaced under this Contract at the Contractor's expense.
 2. All foam and expandable foam products and materials used to seal Work Area openings shall be completely removed upon completion of abatement activities.
- C. All penetrations (including, but not limited to, pipes, ducts, etc.) through fire rated construction shall be firestopped using materials and systems tested in accordance with ASTM E814 on Projects where reinsulation is part of the required work.

PART 4 DISPOSAL OF ASBESTOS WASTE

4.1 TRANSPORTATION AND DISPOSAL SITE

- A. The Contractor's Hauler and Disposal Site shall be approved by the Owner. All waste generated during the asbestos project shall be disposed of as RACM asbestos waste.
- B. The Contractor shall give twenty-four (24) hour notification prior to removing any waste from the site. Waste shall be removed from the site only during normal working hours unless otherwise specified. No waste may be taken from the site unless the Contractor and Environmental Consultant are present and the Environmental Consultant authorizes the release of the waste as described herein.
- C. All waste generated as part of the asbestos project shall be removed from the site within ten (10) calendar days after successful completion of all asbestos abatement work.
- D. Upon arrival at the Project Site, the Hauler must possess and present to the Environmental Consultant a valid New York State Department of Environmental Conservation Part 364 Asbestos Hauler's Permit. The Environmental Consultant may verify the authenticity of the hauler's permit with the proper authority.

- E. The Hauler, with the Contractor and the Environmental Consultant, shall inspect all material in the transport container prior to taking possession and signing the Asbestos Waste Manifests.

4.2 WASTE STORAGE CONTAINERS

- A. All waste containers shall be fully enclosed and lockable (i.e. enclosed dumpster, trailer, etc.). No open containers will be permitted on-site (i.e. open dumpster with canvas cover, etc.) unless specifically permitted by applicable regulation or a Site Specific Variance. When asbestos contaminated waste must be kept on the work site overnight or longer, it shall be double bagged and stored in accordance with Federal, State, and local laws.
- B. The Environmental Consultant shall verify that the waste storage container and/or truck tags (license plates) match that listed on the New York State Department of Environmental Conservation Part 364 permit. Any container not listed on the permit shall be removed from the site immediately.
- C. The container shall be plasticized and sealed with two (2) layers of 6 mil polyethylene. Once on site, it shall be kept locked at all times, except during load out. The waste container shall not be used for storage of equipment or contractor supplies.
- D. While on-site, the container shall be labeled with EPA Danger signage:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

- E. The New York State Department of Environmental Conservation Asbestos Hauler's Permit number shall be stenciled on both sides and back of the container.
- F. The container is not permitted to be loaded unless it is properly plasticized, has the appropriate danger signage affixed, and has the permit number appropriately stenciled on the container.
- G. Waste generated off-site is not permitted to be brought onto the Project site and loaded into the waste container.
- H. All asbestos waste removed from the project site shall be transported directly to the disposal site without any additional waste being added to the container during transport.

4.3 OWNER'S AND HAULER'S ASBESTOS WASTE MANIFESTS

- A. An Asbestos Waste Manifest shall be provided to the Owner and shall be utilized in conjunction with the Asbestos Hauler's Manifest.
- B. The Owner's Manifest and the Hauler's Manifest shall be completed by the Contractor and verified by the Environmental Consultant that all the information and amounts are accurate and the proper signatures are in place.

- C. The Manifests shall have the appropriate signatures of the Environmental Consultant, the Contractor, and the Hauler representatives prior to any waste being removed from the site.
- D. Copies of the completed Owner's Manifest and the Hauler's Manifest shall be retained by the Environmental Consultant and the Contractor and shall remain on site for inspection.
- E. Upon arrival at the Disposal Site, the Owner's Manifest and the Hauler's Manifest shall be signed by the Disposal Facility operator to certify receipt of ACM covered by the manifest.
- F. The Disposal Facility operator shall return the original Owner's Manifest and the Hauler's Manifest to the Contractor.
- G. The Contractor shall forward copies of the Owner's Manifest and the Hauler's Manifest to the Environmental Consultant within 14 days of the waste container being removed from the site. Failure to do so may result in payment being withheld from the Contractor.
- H. The Contractor shall utilize the Waste Disposal Log. This log shall be maintained by the Project Supervisor and shall be kept on site at all times.
- I. All waste disposal manifests and disposal logs shall be submitted by the Contractor to the Owner with the final close-out documentation.

END OF SECTION 028200

SECTION 02 83 00 - HANDLING OF LEAD-CONTAINING MATERIALS

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. This Section specifies the requirements for protection of workers; prevention of contamination of adjacent areas; performing removals, pre-disposal testing of removed materials; and appropriate disposal of removed materials.

B. Lead-Based Paint

The requirements of this specification apply to the management of lead-based paint (LBP) materials at the following school in the Enlarged City School District of Middletown:

1. Twin Towers Middle School – 233 Wisner Ave., Middletown, New York 10940

According to the New York Renovation Survey for Asbestos, Lead & PCB's (Attachment 'A' at the end of Section 02 82 00) lead based paint was found on painted and/or glazed surfaces at concentrations reported on said attachment.

Housing and Urban Development (HUD) Guidelines indicate a concentration of 5,000 ppm (or 1.0 mg/cm²) is the maximum allowable lead concentration for dry paint surfaces scheduled for disturbance. Work activities in LBP areas that exceed the limit for dry paint on surfaces shall be performed in accordance with Occupational Safety and Health Act (OSHA) regulations as identified or inferred herein, and as indicated below.

1.2 RELATED WORK SPECIFIED ELSEWHERE - Entire project specification with specific attention to:

- A. New York Renovation Survey for Asbestos, Lead Based Paint & PCB's: Attached to end of Section 02 82 00
- B. 02 82 00 – Asbestos Abatement

1.3 REFERENCES

- A. New York State Department of Environmental Conservation (DEC) 6NYCRR:
1. Part 360 Solid Waste Management Facilities.
 2. Part 364 Waste Transporter Permits.
 3. Part 370 Hazardous Waste Management System-General.
 4. Part 371 Identification and Listing of Hazardous Wastes.
 5. Part 372 Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities.
 6. Part 373 Hazardous Waste Management Facilities.
- B. Occupational Safety and Health Administration (OSHA): Lead Exposure in Construction: Interim Final Rule 29 CFR 1926.62.
- C. U.S. Environmental Protection Agency (EPA): Resource Conservation and Recovery Act (RCRA) Section 3004 Hazardous and Solid Waste Amendments.

- D. U.S. Environmental Protection Agency (EPA): Toxicity Characteristics Leaching Procedure EPA Method 1311.
- E. NYS DOH NYCRR 10 Part 67 Sub-part 67-2 Environmental Assessment and Abatement
- F. HUD Technical Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing
- G. U.S. Environmental Protection Agency (EPA): 40 CFR Part 745 Lead - Fees for Accreditation of Training Programs and Certification of Lead-based Paint Activities

1.4 DEFINITIONS

- A. Lead Control Area: An enclosed area or structure with containment to prevent the spread of lead dust, paint chips, or debris from lead-containing paint abatement operations.
- B. The term "Trim" means all base, wall trim systems, standing and or running trim systems and the like.
- C. The term "Encapsulation" - A method of abatement that makes lead paint inaccessible by covering or sealing surfaces with durable coatings specifically formulated to be elastomeric, long lasting, and resistant to cracking, peeling, algae and fungus.
- D. The term "Lead Paint" - Paint, plaster or other surface coating material containing more than one half of one percent of metallic lead based on the total weight of the contained solids or dried film of the paint or plaster or other similar surface coating material. - NYS DOH NYCRR 10 Section 67-2.2

1.5 SUBMITTALS

- A. Quality Control Submittals:
 - 1. Worker's Qualifications Data:
 - a. Name of each person who will be performing the Work and their employer's name, business address and telephone number.
 - b. Names and addresses of 3 similar projects that each person has worked on during the past 3 years.
 - 2. Work Plan: Submit one copy of the work plan required under Quality Assurance Article.
 - 3. Waste Transporter Permit: One copy of transporter's current waste transporter permit.
 - 4. U.S. Environmental Protection Agency (EPA) Notification of Lead Based Paint Activities.
 - 5. U.S. Environmental Protection Agency (EPA) - Lead Based Paint Activities - Training Notification.
 - 6. U.S. Environmental Protection Agency (EPA) - Lead Based Paint Activities – Post Training Notification.

1.6 QUALITY ASSURANCE

- A. Worker Exposure to LBP: Contractor shall inform workers of the presence of LBP
Contractor shall assure that workers employed in LBP-areas are trained and

certified as required in USEPA-approved state-of-the-art LBP abatement practices, prior to the start of work.

Worker exposure to LBP shall be minimized through complete compliance with procedures and respirator protection described herein, and by following precautionary measures described in the HUD document "Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing", OSHA 29 CFR 1910.1025, "Lead Standard for General Industry, and OSHA 29 CFR 1926.62, "Lead Construction Standard," and other applicable Federal, State and Local regulations, whichever is more stringent and as applicable.

- B. Regulatory Requirements: Comply with the referenced standards.
- C. All laborers, workers and mechanics working on the site must be certified as having successfully completed the OSHA 10-hour construction safety and health course.

1.7 PROJECT CONDITIONS

- A. Shut-down of Air Handling System: Complete the Work of this Section within the time limitation allowed for shut-down of the air handling system serving the work area. The air handling system will not be restarted until approval following the final cleaning.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 INSPECTION AND ACCEPTANCE

- A. Examine all surfaces and contiguous elements to receive work of this section and correct, as part of the Work of this Contract, any defects affecting installation.

Commencement of work will be construed as complete acceptability of surfaces and contiguous elements.

3.2 PRE-ABATEMENT TESTING AND NOTIFICATION

- A. Notify the Owner's representative a minimum of 5 working days prior to the start of any removal work.

3.3 PREPARATION OF EXISTING SURFACES

- A. Protection:
 - 1. Prior to removals, cover or otherwise protect finished Work of other trades and surfaces not being removed or not to be coated.

3.4 EMPLOYEE PROTECTION

- A. Comply with all applicable Occupational Safety and Health Administration (OSHA) Requirements.

3.5 PROTECTION

- A. Lead Control Area Requirements: Provide a lead control area where lead-containing paint removal operations will be performed in accordance with the approved Work Plan.

- B. Protection of Existing Work to Remain: Perform removal work without damage or contamination of adjacent areas.
- 3.6 LEAD-CONTAINING MATERIAL REMOVAL
- A. All air vents in the work area shall be closed and covered with plastic. All mechanical systems shall be powered off prior to removal work and shall not be powered on until removal and cleaning work has been completed.
 - B. Loose and peeling paint or plaster shall be removed wet, using water misting to reduce dust caused by the removal. Lead paint shall not be scraped or sanded when dry.
 - C. When renovation work is completed, adjacent surfaces shall be washed with detergent.
- 3.7 PRE-DISPOSAL TESTING
- A. Prior to disposal, test the removed materials for toxicity in accordance with EPA Method 1311, Toxicity Characteristic Leaching Procedure (TCLP).
 - 1. Test results indicating a value greater than 5 ppm lead classifies the removed material as Hazardous Waste.
- 3.8 DISPOSAL OF LEAD-CONTAINING MATERIAL AND RELATED DEBRIS
- A. Transport and dispose of lead-containing material classified as Hazardous Waste in accordance with the standards referenced in Part 1 of this Section.
 - B. Transport and dispose of lead-containing material classified as Non-Hazardous Waste in accordance with standards referenced in Part 1 of this Section.
- 3.9 RESTORATION
- A. Where existing work is damaged or contaminated, restore work to its original condition or better.

END OF SECTION 02 83 00

SECTION 030130 - MAINTENANCE OF CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Removal of deteriorated concrete and subsequent replacement and patching.
 - 2. Floor joint repair.

1.3 UNIT PRICES

- A. Work of this Section is affected by unit prices specified in Section 012200 "Unit Prices."
 - 1. Unit prices apply to authorized work covered by estimated quantities.
 - 2. Unit prices apply to authorized additions to and deletions from the Work as authorized by Change Orders.
- B. General: Unit prices include the cost of preparing existing construction to receive the work indicated and costs of field quality control required for units of work completed.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, chemical composition, physical properties, test data, and mixing, preparation, and application instructions.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's written instructions for minimum and maximum temperature requirements and other conditions for storage.
- B. Store cementitious materials off the ground, under cover, and in a dry location.

1.6 FIELD CONDITIONS

- A. Cold-Weather Requirements for Cementitious Materials: Do not apply unless concrete-surface and air temperatures are above 40 deg F and will remain so for at least 48 hours after completion of Work.
- B. Cold-Weather Requirements for Cementitious Materials: Comply with the following procedures:
 - 1. When air temperature is below 40 deg F, heat patching-material ingredients and existing concrete to produce temperatures between 40 and 90 deg F.
 - 2. When mean daily air temperature is between 25 and 40 deg F, cover completed Work with weather-resistant insulating blankets for 48 hours after repair or provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after repair.
 - 3. When mean daily air temperature is below 25 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after repair.
- C. Hot-Weather Requirements for Cementitious Materials: Protect repair work when temperature and humidity conditions produce excessive evaporation of water from patching materials. Provide artificial shade and wind breaks, and use cooled materials as required. Do not apply to substrates with temperatures of 90 deg F and above.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: For repair products, obtain each color, grade, finish, type, and variety of product from single source and from single manufacturer with resources to provide products of consistent quality in appearance and physical properties.

2.2 PATCHING MORTAR

- A. Patching Mortar Requirements:
 - 1. Only use patching mortars that are recommended by manufacturer for each applicable horizontal, vertical, or overhead use orientation.
- B. Cementitious Patching Mortar: Packaged, dry mix for repair of concrete.
 - 1. MasterEmaco OneMix Concrete Repair System by Master Builders as basis of design.
- C. Rapid-Strengthening, Cementitious Patching Mortar: Packaged, dry mix for repair of concrete.

1. MasterEmaco® T 1060 by Master Builders as basis of design.

2.3 JOINT FILLER

- A. Polyurea Joint Filler: Two-component, semirigid, 100 percent solids, polyurea resin with a Type A Shore durometer hardness of at least 80 according to ASTM D2240.
 1. Euco Qwikjoint 200 by Euclid Chemical as basis of design.

2.4 MIXES

- A. General: Mix products, in clean containers, according to manufacturer's written instructions.
 1. Do not add water, thinners, or additives unless recommended by the manufacturer.
 2. Do not mix more materials than can be used within time limits recommended by the manufacturer. Discard materials that have begun to set.
- B. Mortar Scrub Coat: Mix dry ingredients with enough water to provide consistency of thick cream.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Notify Architect seven days in advance of dates when areas of deteriorated or delaminated concrete and deteriorated reinforcing bars will be located.
- B. Locate areas of deteriorated or delaminated concrete using hammer or chain-drag sounding and mark boundaries. Mark areas for removal by simplifying and squaring off boundaries. At columns and walls make boundaries level and plumb unless otherwise indicated.

3.2 PREPARATION

- A. Protect persons, motor vehicles, surrounding surfaces of building being repaired, building site, plants, and surrounding buildings from harm resulting from concrete maintenance work.
 1. Comply with each product manufacturer's written instructions for protection and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.
 2. Use only proven protection methods appropriate to each area and surface being protected.

3. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where concrete maintenance work is being performed.
 4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of concrete maintenance work.
 5. Contain dust and debris generated by concrete maintenance work and prevent it from reaching the public or adjacent surfaces.
 6. Use water-mist sprinkling and other wet methods to control dust only with adequate, approved procedures and equipment that ensure that such water will not create a hazard or adversely affect other building areas or materials.
 7. Protect floors and other surfaces along haul routes from damage, wear, and staining.
- B. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is in working order.
1. Prevent solids such as aggregate or mortar residue from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from concrete maintenance work.
 2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.
- C. Preparation for Concrete Removal: Examine construction to be repaired to determine best methods to safely and effectively perform concrete maintenance work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine the condition of construction to be removed during repair.
1. Provide and maintain shoring, bracing, and temporary structural supports as required to preserve stability and prevent unexpected or uncontrolled movement, settlement, or collapse of construction being demolished and construction and finishes to remain. Strengthen or add new supports when required during progress of removal work.
- D. Reinforcing-Bar Preparation: Remove loose and flaking rust from exposed reinforcing bars by abrasive blast cleaning until only tightly adhered light rust remains.
1. Where section loss of reinforcing bar is more than 25 percent, or 20 percent in two or more adjacent bars, cut bars and remove and replace as indicated on Drawings.
 2. Remove additional concrete as necessary to provide at least 3/4-inch clearance at existing and replacement bars.
 3. Splice replacement bars to existing bars according to ACI 318 by lapping or using mechanical couplings.
- E. Preparation of Floor Joints for Repair: Saw-cut joints full width to edges and depth of spalls, but not less than 1 inch deep. Clean out debris and loose concrete; vacuum or blow clear with compressed air.

3.3 REMOVAL OF CONCRETE

- A. Do not overload structural elements with debris.
- B. Saw-cut perimeter of areas indicated for removal to a depth of at least 1/2 inch. Make cuts perpendicular to concrete surfaces and no deeper than cover on reinforcement.
- C. Remove deteriorated and delaminated concrete by breaking up and dislodging from reinforcement.
- D. Remove additional concrete if necessary to provide a depth of removal of at least 1/2 inch over the entire removal area.
- E. Where half or more of the perimeter of reinforcing bar is exposed, bond between reinforcing bar and surrounding concrete is broken, or reinforcing bar is corroded, remove concrete from entire perimeter of bar and to provide at least 3/4-inch clearance around bar.
- F. Test areas where concrete has been removed by tapping with hammer and remove additional concrete until unsound and debonded concrete is completely removed.
- G. Provide surfaces with a fractured profile of at least 1/8 inch that are approximately perpendicular or parallel to original concrete surfaces. At columns and walls, make top and bottom surfaces level unless otherwise directed.
- H. Thoroughly clean removal areas of loose concrete, dust, and debris.

3.4 APPLICATION OF BONDING AGENT

- A. Mortar Scrub Coat for Patching Mortar: Dampen repair area and surrounding concrete 6 inches beyond repair area. Remove standing water and apply scrub coat with a brush, scrubbing it into surface and thoroughly coating repair area. If scrub coat dries, recoat before placing patching mortar or concrete.

3.5 INSTALLATION OF PATCHING MORTAR

- A. Place patching mortar as specified in this article unless otherwise recommended in writing by manufacturer.
 - 1. Provide forms where necessary to confine patch to required shape.
 - 2. Wet substrate and forms thoroughly and then remove standing water.
- B. Pretreatment: Apply specified mortar scrub coat.
- C. General Placement: Place patching mortar by troweling toward edges of patch to force intimate contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch. At fully exposed reinforcing

bars, force patching mortar to fill space behind bars by compacting with trowel from sides of bars.

- D. Vertical Patching: Place material in lifts of not more than manufacturer's recommendations. Do not feather edge.
- E. Overhead Patching: Place material in lifts of not more than manufacturer's recommendations. Do not feather edge.
- F. Consolidation: After each lift is placed, consolidate material and screed surface.
- G. Multiple Lifts: Where multiple lifts are used, score the surface of lifts to provide a rough surface for placing subsequent lifts. Allow each lift to reach the final set before placing subsequent lifts.
- H. Finishing: Allow surfaces of lifts to remain exposed to become firm and then finish to a surface matching adjacent concrete.
- I. Curing: Wet-cure cementitious patching materials, including polymer-modified cementitious patching materials, for not less than seven days by water-fog spray or water-saturated absorptive cover.

3.6 CONCRETE PLACEMENT

- A. Place concrete according as specified in this article.
- B. Pretreatment: Apply mortar scrub coat to concrete substrate.
- C. Standard Placement: Place concrete by form-and-pump method unless otherwise indicated.
 - 1. Use vibrators to consolidate concrete as it is placed.
 - 2. On unformed surfaces, screed concrete to produce a surface that when finished with patching mortar will match the required profile and surrounding concrete.
- D. Form-and-Pump Placement: Place concrete by form-and-pump method where indicated.
 - 1. Design and construct forms to resist pumping pressure in addition to the weight of wet concrete. Seal joints and seams in forms and where forms abut existing concrete.
 - 2. Pump concrete into place from bottom to top, releasing air from forms as concrete is introduced. When formed space is full, close air vents and pressurize to 14 psi.
- E. Wet-cure concrete for not less than seven days by leaving forms in place or keeping surfaces continuously wet by water-fog spray or water-saturated absorptive cover.

- F. Fill placement cavities and repair voids with patching mortar. Finish to match surrounding concrete.

3.7 FLOOR-JOINT REPAIR

- A. Cut out deteriorated concrete and reconstruct sides of joint with patching mortar as indicated on Drawings. Install joint filler in nonmoving floor joints where indicated and as specified in this article.
- B. Depth: Install joint filler to a depth of at least 3/4 inch. Use fine silica sand no more than 1/4 inch deep to close the base of joint. Do not use sealant backer rods or compressible fillers below joint filler.
- C. Top Surface: Install joint filler so that when cured, it is flush at top surface of adjacent concrete. If necessary, overfill joint and remove excess when filler has cured.

END OF SECTION 030130

SECTION 033000 - CAST-IN-PLACE CONCRETE -- STRUCTURAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 031000 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.
2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.
3. Section 033300 "Architectural Concrete" for general building applications of specially finished formed concrete.
4. Section 033543 "Polished Concrete Finishing" for concrete floors scheduled to receive a polished concrete finish.
5. Section 035300 "Concrete Topping" for emery- and iron-aggregate concrete floor toppings.
6. Section 312000 "Earth Moving" for drainage fill under slabs-on-ground.
7. Section 321313 "Concrete Paving" for concrete pavement and walks.
8. Section 321316 "Decorative Concrete Paving" for decorative concrete pavement and walks.

1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.

- d. Concrete Subcontractor.
 - e. Special concrete finish Subcontractor.
2. Review the following:
- a. Special inspection and testing and inspecting agency procedures for field quality control.
 - b. Construction joints, control joints, isolation joints, and joint-filler strips.
 - c. Semirigid joint fillers.
 - d. Vapor-retarder installation.
 - e. Anchor rod and anchorage device installation tolerances.
 - f. Cold and hot weather concreting procedures.
 - g. Concrete finishes and finishing.
 - h. Curing procedures.
 - i. Forms and form-removal limitations.
 - j. Shoring and reshoring procedures.
 - k. Methods for achieving specified floor and slab flatness and levelness.
 - l. Floor and slab flatness and levelness measurements.
 - m. Concrete repair procedures.
 - n. Concrete protection.
 - o. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
 - p. Protection of field cured field test cylinders.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following.

- 1. Portland cement.
- 2. Fly ash.
- 3. Slag cement.
- 4. Blended hydraulic cement.
- 5. Silica fume.
- 6. Performance-based hydraulic cement
- 7. Aggregates.
- 8. Admixtures:
 - a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
- 9. Color pigments.
- 10. Fiber reinforcement.
- 11. Vapor retarders.
- 12. Floor and slab treatments.
- 13. Liquid floor treatments.
- 14. Curing materials.
 - a. Include documentation from color pigment manufacturer, indicating that proposed methods of curing are recommended by color pigment

manufacturer.

15. Joint fillers.
16. Repair materials.

B. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
2. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.
3. Environmental Product Declaration (EPD): For each product.
4. Product Certificates: For indigenous materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each indigenous material.
5. Environmental Product Declaration: For each product.
6. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each regional material.
7. Environmental Product Declaration: For each product.
8. Environmental Product Declaration: For each product.
9. Third-Party Certifications: For each product.
10. Third-Party Certified Life Cycle Assessment: For each product.
11. Laboratory Test Reports: For liquid floor treatments and curing and sealing compounds, indicating compliance with requirements for low-emitting materials.
12. Health Product Declaration (HPD): Provide documentation confirming product compliance with one of the following:
 - a. Inventory or HPD to at least 0.01 percent by weight with no GreenScreen LT-1 or GHS Category 1 hazards.
 - b. Inventory or HPD to at least 0.01 percent by weight, with at least 75 percent assessed using GreenScreen Benchmark assessment.
 - c. Third-party-verified Declare product label, designated "Red List Free."
 - d. Material Health Certificate or Cradle to Cradle certification with minimum Bronze level of Material Health.

C. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Durability exposure class.
4. Maximum w/cm.
5. Calculated equilibrium unit weight, for lightweight concrete.
6. Slump limit.
7. Air content.
8. Nominal maximum aggregate size.
9. Steel-fiber reinforcement content.

10. Synthetic micro-fiber content.
11. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
12. Include manufacturer's certification that permeability-reducing admixture is compatible with mix design.
13. Include certification that dosage rate for permeability-reducing admixture matches dosage rate used in performance compliance test.
14. Intended placement method.
15. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

D. Shop Drawings:

1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - a. Location of construction joints is subject to approval of the Architect.

E. Samples: For manufacturer's standard colors for color pigment.

F. Concrete Schedule: For each location of each Class of concrete indicated in "Concrete Mixtures" Article, including the following:

1. Concrete Class designation.
2. Location within Project.
3. Exposure Class designation.
4. Formed Surface Finish designation and final finish.
5. Final finish for floors.
6. Curing process.
7. Floor treatment if any.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Installer: Include copies of applicable ACI certificates.
2. Ready-mixed concrete manufacturer.
3. Testing agency: Include copies of applicable ACI certificates.

B. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Fiber reinforcement.
4. Curing compounds.
5. Floor and slab treatments.
6. Bonding agents.
7. Adhesives.
8. Vapor retarders.
9. Semirigid joint filler.

10. Joint-filler strips.
11. Repair materials.

C. Material Test Reports: For the following, from a qualified testing agency:

1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Blended hydraulic cement.
5. Silica fume.
6. Performance-based hydraulic cement.
7. Aggregates.
8. Admixtures:
 - a. Permeability-Reducing Admixture: Include independent test reports, indicating compliance with specified requirements, including dosage rate used in test.

D. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances.

E. Research Reports:

1. For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.
2. For sheet vapor retarder/termite barrier, showing compliance with ICC AC380.

F. Preconstruction Test Reports: For each mix design.

G. Field quality-control reports.

H. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician with experience installing and finishing concrete, incorporating permeability-reducing admixtures.

1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.

B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

- C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.
 - 1. Personnel performing laboratory tests to be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor to be an ACI-certified Concrete Laboratory Testing Technician, Grade II.
- D. Field Quality-Control Testing Agency Qualifications: An independent agency, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
 - 1. Personnel conducting field tests to be qualified as an ACI Concrete Field Testing Technician, Grade 1, in accordance with ACI CPP 610.1 or an equivalent certification program.
- E. Mockups: Cast concrete slab-on-ground and formed-surface panels to demonstrate typical joints, surface finish, texture, tolerances, floor treatments, and standard of workmanship.
 - 1. Slab-On-Ground: Build panel approximately 5 feet by 5 feet in the location indicated or, if not indicated, as directed by Architect.
 - a. Divide panel into four equal panels to demonstrate saw joint cutting.
 - 2. Formed Surfaces: Build panel approximately 25 sq. ft. in the location indicated or, if not indicated, as directed by Architect.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.
 - 1. Include the following information in each test report:
 - a. Admixture dosage rates.
 - b. Slump.
 - c. Air content.
 - d. Seven-day compressive strength.
 - e. 28-day compressive strength.
 - f. Permeability.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and ACI 301.

1.9 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.
1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 2. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 3. Do not use frozen materials or materials containing ice or snow.
 4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
 5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

1.10 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement sheet vapor retarder/termite barrier material and accessories for sheet vapor retarder/ termite barrier and accessories that do not comply with requirements or that fail to resist penetration by termites within specified warranty period.
1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

- A. Source Limitations:
1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
 2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
 3. Obtain aggregate from single source.

4. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I/II.
2. Fly Ash: ASTM C618, Class C or F.
3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
4. Blended Hydraulic Cement: ASTM C595/C595M, Type IS, portland blast-furnace slag cement.
5. Silica Fume: ASTM C1240 amorphous silica.
6. Performance-Based Hydraulic Cement: ASTM C1157/C1157M: Type GU, general use.

C. Normal-Weight Aggregates: ASTM C33/C33M, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.

1. Alkali-Silica Reaction: Comply with one of the following:
 - a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.
 - b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
 - c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. for moderately reactive aggregate or 3 lb./cu. yd. for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301.
2. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Water and Water Used to Make Ice: ASTM C94/C94M, potable.

2.3 ADMIXTURES

A. Air-Entraining Admixture: ASTM C260/C260M.

B. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.

2.4 FLOOR AND SLAB TREATMENTS

- A. Emery Dry-Shake Floor Hardener: Pigmented, factory-packaged, dry combination of portland cement, graded emery aggregate, and plasticizing admixture; with emery aggregate consisting of no less than 60 percent of total aggregate content.
 - 1. Color: As selected by Architect from manufacturer's full range.
- B. Metallic Dry-Shake Floor Hardener: Pigmented, factory-packaged, dry combination of portland cement, graded metallic aggregate, rust inhibitors, and plasticizing admixture; with metallic aggregate consisting of no less than 65 percent of total aggregate content.
 - 1. Color: As selected by Architect from manufacturer's full range.

2.5 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- B. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
 - 1. Color:
 - a. Ambient Temperature Below 50 deg F: Black.
 - b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
 - c. Ambient Temperature Above 85 deg F: White.
- C. Water: Potable or complying with ASTM C1602/C1602M.

2.6 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 in accordance with ASTM D2240.
- C. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.7 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 4000 psi at 28 days when tested in accordance with ASTM C109/C109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.

2.8 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
 - 1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash or Other Pozzolans: 25 percent by mass.
 - 2. Slag Cement: 50 percent by mass.
 - 3. Silica Fume: 10 percent by mass.
 - 4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
 - 5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

1. Use water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 3. Use water-reducing admixture in pumped concrete, and concrete with a w/cm below 0.50.
 4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.
 5. Use permeability-reducing admixture in concrete mixtures where indicated.
- D. Color: Add color pigment to concrete mixture in accordance with manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.9 CONCRETE MIXTURES

- A. Class A: Normal-weight concrete used for footings, grade beams, and tie beams.
1. Exposure Class: ACI 318 F2.
 2. Minimum Compressive Strength: As indicated at 28 days.
 3. Maximum w/cm: 0.55.
 4. Slump Limit: 4 inches, plus or minus 1 inch.
 5. Slump Flow Limit: 22 inches, plus or minus 1.5 inches.
 6. Air Content:
 - a. Exposure Classes F2 and F3: 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch nominal maximum aggregate size.
 7. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
- B. Class B: Normal-weight concrete used for foundation walls.
1. Exposure Class: ACI 318 F2/F3.
 2. Minimum Compressive Strength: As indicated at 28 days.
 3. Maximum w/cm: As indicated.
 4. Slump Limit: 4 inches, plus or minus 1 inch.
 5. Slump Flow Limit: 22 inches, plus or minus 1.5 inches.
 6. Air Content:
 - a. Exposure Classes F2 and F3: 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch nominal maximum aggregate size.
 7. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
- C. Class C: Normal-weight concrete used for interior slabs-on-ground.
1. Exposure Class: ACI 318 F0.

2. Minimum Compressive Strength: 4000 psi at 28 days.
 3. Maximum w/cm: 0.45.
 4. Minimum Cementitious Materials Content: See Structural General Notes
 5. Slump Limit: 4 inches, plus or minus 1 inch.
 6. Slump Flow Limit: 22 inches, plus or minus 1.5 inches.
 7. Air Content:
 - a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
 8. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.
 9. Steel-Fiber Reinforcement: Submit mix design for EOR's review.
 10. Synthetic Micro-Fiber: Submit mix design for EOR's review.
 11. Synthetic Macro-Fiber: Submit mix design for EOR's review.
- D. Class D: Normal-weight concrete used for interior suspended slabs.
1. Exposure Class: ACI 318 F0.
 2. Minimum Compressive Strength: 3500 psi at 28 days.
 3. Maximum w/cm: 0.45.
 4. Minimum Cementitious Materials Content: See Structural General Notes.
 5. Slump Limit: 4 inches, plus or minus 1 inch.
 6. Slump Flow Limit: 22 inches, plus or minus 1.5 inches.
 7. Air Content:
 - a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
 8. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.
 9. Steel-Fiber Reinforcement: Submit mix design for EOR's review.
 10. Synthetic Micro-Fiber: Submit mix design for EOR's review.
 11. Synthetic Macro-Fiber: Submit mix design for EOR's review.
- E. Normal-weight concrete used for concrete toppings.
1. See Class D above.
- F. Normal-weight concrete used for interior metal pan stairs and landings:
1. See Class D above.
- G. Normal-weight concrete used for exterior retaining walls.
1. See Class B above.
- H. Normal-weight concrete used for foundation underpinning.
1. See Structural General Notes.

2.10 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 - 1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
 - 2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
 - 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
 - 1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
 - 2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
 - 1. Daily access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
 - 4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.
3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.4 INSTALLATION OF VAPOR RETARDER

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
 1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
 2. Face laps away from exposed direction of concrete pour.
 3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
 4. Lap joints 6 inches and seal with manufacturer's recommended tape.
 5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
 6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
 7. Protect vapor retarder during placement of reinforcement and concrete.
 - a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.
- B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder in accordance with manufacturer's written instructions.

3.5 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
 1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
 2. Place joints perpendicular to main reinforcement.
 - a. Continue reinforcement across construction joints unless otherwise indicated.
 - b. Do not continue reinforcement through sides of strip placements of floors and slabs.
 3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.

4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 6. Space vertical joints in walls [as indicated on Drawings] <Insert spacing>. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
 7. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 8. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
- D. Isolation Joints in Slabs-on-Ground: 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 on Drawings.
 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface, where joint sealants, specified in Section 079200 "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.
- E. Doweled Joints:
1. Install dowel bars and support assemblies at joints where indicated on Drawings.
 2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.
- F. Dowel Plates: Install dowel plates at joints where indicated on Drawings.
- 3.6 CONCRETE PLACEMENT
- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.

1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
 2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301, but not to exceed the amount indicated on the concrete delivery ticket.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
1. If a section cannot be placed continuously, provide construction joints as indicated.
 2. Deposit concrete to avoid segregation.
 3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
 - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- F. 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. Do not place concrete floors and slabs in a checkerboard sequence.
 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 3. Maintain reinforcement in position on chairs during concrete placement.
 4. Screed slab surfaces with a straightedge and strike off to correct elevations.

5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
 - a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
 - b. Remove projections larger than 1 inch.
 - c. Tie holes do not require patching.
 - d. Surface Tolerance: ACI 117 Class D.
 - e. Apply to concrete surfaces not exposed to public view.
2. ACI 301 Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
 - a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
 - b. Remove projections larger than 1/4 inch.
 - c. Patch tie holes.
 - d. Surface Tolerance: ACI 117 Class B.
 - e. Locations: Apply to concrete surfaces exposed to public view, or to be covered with a coating or covering material applied directly to concrete.
3. ACI 301 Surface Finish SF-3.0:
 - a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
 - b. Remove projections larger than 1/8 inch.
 - c. Patch tie holes.
 - d. Surface Tolerance: ACI 117 Class A.
 - e. Locations: Apply to concrete surfaces exposed to public view, or to be covered with a coating or covering material applied directly to concrete.

B. Rubbed Finish: Apply the following to as cast surface finishes where indicated on Drawings:

1. Smooth-Rubbed Finish:
 - a. Perform no later than one day after form removal.
 - b. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture.
 - c. If sufficient cement paste cannot be drawn from the concrete by the rubbing process, use a grout made from the same cementitious materials used in the in-place concrete.

- d. Maintain required patterns or variances as shown on Drawings or to match mockups.
2. Grout-Cleaned Rubbed Finish:
- a. Clean concrete surfaces after contiguous surfaces are completed and accessible.
 - b. Do not clean concrete surfaces as Work progresses.
 - c. Mix 1 part portland cement to 1-1/2 parts fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.
 - d. Wet concrete surfaces.
 - e. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap, and keep surface damp by fog spray for at least 36 hours.
 - f. Maintain required patterns or variances as shown on Drawings or to match mockups.
3. Cork-Floated Finish:
- a. Mix 1 part portland cement to 1 part fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint.
 - b. Mix 1 part portland cement and 1 part fine sand with sufficient water to produce a mixture of stiff grout. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.
 - c. Wet concrete surfaces.
 - d. Compress grout into voids by grinding surface.
 - e. In a swirling motion, finish surface with a cork float.
 - f. Maintain required patterns or variances as shown on Drawings or to match mockups.
4. Scrubbed Finish: After concrete has achieved a compressive strength of from 1000 to 1500 psi, apply scrubbed finish.
- a. Wet concrete surfaces thoroughly and scrub with stiff fiber or wire brushes, using water freely, until top mortar surface is removed and aggregate is uniformly exposed.
 - b. Rinse scrubbed surfaces with clean water.
 - c. Maintain continuity of finish on each surface or area of Work.
 - d. Remove only enough concrete mortar from surfaces to match mockups.
- C. Abrasive-Blast Finish: Apply the following to as-cast surface finishes where indicated on Drawings:
- 1. Perform abrasive blasting after compressive strength of concrete exceeds 2000 psi.
 - 2. Coordinate with formwork removal to ensure that surfaces to be abrasive blasted

- are treated at the same age.
- 3. Surface Continuity:
 - a. Perform abrasive-blast finishing as continuous operation, maintaining continuity of finish on each surface or area of Work.
 - b. Maintain required patterns or variances in depths of blast to match mockups.
- 4. Abrasive Blasting:
 - a. Abrasive-blast corners and edges of patterns carefully, using backup boards to maintain uniform corner and edge lines.
 - b. Determine type of nozzle pressure and blasting techniques required to match field sample.
 - c. Depth of Cut: Use an abrasive grit of proper type and gradation to expose aggregate and surrounding matrix surfaces to match field sample, as follows:
 - 1) Brush Texture: Remove cement matrix to dull surface sheen and expose face of fine aggregate, with no significant reveal.
 - 2) Light Texture: Expose fine aggregate with occasional exposure of coarse aggregate and uniform color, with maximum reveal of 1/16 inch.
 - 3) Medium Texture: Generally, expose coarse aggregate with slight reveal and with a maximum reveal of 1/4 inch.
 - 4) Heavy Texture: Expose and reveal coarse aggregate to a maximum projection of one-third its diameter, with reveal range of 1/4 to 1/2 inch.
 - d. Maintain required patterns or variances in reveal projection to match mockups.
- D. High-Pressure Water-Jet Finish: Apply the following to as-cast surface finishes where indicated on Drawings:
 - 1. Perform high-pressure water jetting on concrete that has achieved a minimum compressive strength of 4500 psi.
 - 2. Coordinate with formwork removal to ensure that surfaces to be high-pressure water-jet finished are treated at same age for uniform results.
 - 3. Surface Continuity: Perform high-pressure water-jet finishing in as continuous an operation as possible, maintaining continuity of finish on each surface or area of Work.
 - 4. Maintain required patterns or variances in reveal projection to match mockups.
- E. Bushhammer Finish: Apply the following to as-cast surface finishes where indicated on Drawings:
 - 1. Perform bushhammer finish to concrete that has achieved a minimum compressive strength of 4500 psi.
 - 2. Surface Continuity:

- a. Perform bushhammer finishing in as continuous an operation as possible, maintaining continuity of finish on each surface or area of Work.
 - 3. Surface Cut:
 - a. Maintain required depth of cut and general aggregate exposure.
 - b. Use power tool with hammer attachments for large, flat surfaces, and use hand hammers for small areas, at corners and edges, and for restricted locations where power tools cannot reach.
 - 4. Remove impressions of formwork and form facings with exception of tie holes.
 - 5. Maintain required patterns or variances of cut as shown on Drawings or to match mockups.
 - 6. Maintain control of concrete chips, dust, and debris in each Work area, limiting migration of airborne materials and dust by use of tarpaulins, wind-breaks, or similar devices.
- F. Related Unformed Surfaces:
- 1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
 - 2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

- A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish:
 - 1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
 - 2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch in one direction.
 - 3. Apply scratch finish to surfaces to receive concrete floor toppings.
- C. Float Finish:
 - 1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
 - 2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
 - 3. Apply float finish to surfaces to receive trowel finish.
- D. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
 2. Continue troweling passes and restraighthen until surface is free of trowel marks and uniform in texture and appearance.
 3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 4. Do not add water to concrete surface.
 5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
 6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:
 - a. Slabs on Ground:
 - 1) Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.
 - b. Suspended Slabs:
 - 1) Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated on Drawings. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.
1. Coordinate required final finish with Architect before application.
 2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
 2. Coordinate required final finish with Architect before application.
- G. Slip-Resistive Finish: Before final floating, apply slip-resistive aggregate finish to concrete stair treads, platforms, ramps as indicated on Drawings
1. Apply in accordance with manufacturer's written instructions and as follows:
 - a. Uniformly spread 25 lb/100 sq. ft. of dampened slip-resistive aggregate over surface in one or two applications.
 - b. Tamp aggregate flush with surface, but do not force below surface.

- c. After broadcasting and tamping, apply float finish.
 - d. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aggregate.
- H. Dry-Shake Floor Hardener Finish: After initial floating, apply dry-shake floor hardener to surfaces in accordance with manufacturer's written instructions and as follows:
 - 1. Uniformly apply dry-shake floor hardener at a rate of 100 lb/100 sq. ft. unless greater amount is recommended by manufacturer.
 - 2. Uniformly distribute approximately two-thirds of dry-shake floor hardener over surface by hand or with mechanical spreader, and embed by power floating.
 - 3. Follow power floating with a second dry-shake floor hardener application, uniformly distributing remainder of material, and embed by power floating.
 - 4. After final floating, apply a trowel finish.
 - 5. Cure concrete with curing compound recommended by dry-shake floor hardener manufacturer and apply immediately after final finishing.

3.9 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

- A. Filling In:
 - 1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
 - 2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
 - 3. 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.
- C. Equipment Bases and Foundations:
 - 1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 - 2. Construct concrete bases 4 inches high unless otherwise indicated on Drawings, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
 - 3. Minimum Compressive Strength: 4000 psi at 28 days.
 - 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
 - 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
 - 6. Prior to pouring concrete, place and secure anchorage devices.
 - a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - b. Cast anchor-bolt insert into bases.

- c. Install anchor bolts to elevations required for proper attachment to supported equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items.
 - 1. Cast-in inserts and accessories, as shown on Drawings.
 - 2. Screed, tamp, and trowel finish concrete surfaces.

3.10 CONCRETE CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
 - 1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
 - 2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
 - 3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h before and during finishing operations.
- B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:
 - 1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
 - 2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
 - 3. If forms remain during curing period, moist cure after loosening forms.
 - 4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
 - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
 - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
 - c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
 - d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
 - e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 1) Recoat areas subject to heavy rainfall within three hours after initial application.
 - 2) Maintain continuity of coating and repair damage during curing period.
- C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:
 - 1. Begin curing immediately after finishing concrete.
 - 2. Interior Concrete Floors:

- a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 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.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
- b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 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.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one,

or a combination of, the following:

- a) Water.
 - b) Continuous water-fog spray.
- c. Floors to Receive Polished Finish: Contractor has option of the following:
- 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
- d. Floors to Receive Chemical Stain:
- 1) As soon as concrete has sufficient set to permit application without marring concrete surface, install curing paper over entire area of floor.
 - 2) Install curing paper square to building lines, without wrinkles, and in a single length without end joints.
 - 3) Butt sides of curing paper tight; do not overlap sides of curing paper.
 - 4) Leave curing paper in place for duration of curing period, but not less than 28 days.
- e. Floors to Receive Urethane Flooring:
- 1) As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - 2) Rewet absorptive cover, and cover immediately with polyethylene moisture-retaining cover with edges lapped 6 inches and sealed in place.
 - 3) Secure polyethylene moisture-retaining cover in place to prohibit air from circulating under polyethylene moisture-retaining cover.
 - 4) Leave absorptive cover and polyethylene moisture-retaining cover in place for duration of curing period, but not less than 28 days.
- f. Floors to Receive Curing Compound:
- 1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.

- 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
- 3) Maintain continuity of coating, and repair damage during curing period.
- 4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

g. Floors to Receive Curing and Sealing Compound:

- 1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
- 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
- 3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.11 TOLERANCES

- A. Conform to ACI 117.

3.12 JOINT FILLING

- A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
1. Defer joint filling until concrete has aged at least [one] [six] month(s).
 2. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints.
- D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.13 CONCRETE SURFACE REPAIRS

- A. Defective Concrete:
1. Repair and patch defective areas when approved by Architect.
 2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.
 - a. Limit cut depth to 3/4 inch.
 - b. Make edges of cuts perpendicular to concrete surface.
 - c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
 - d. Fill and compact with patching mortar before bonding agent has dried.
 - e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.
 - a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
 - b. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces:
 - 1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
 - a. Correct low and high areas.
 - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 3. After concrete has cured at least 14 days, correct high areas by grinding.
 - 4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
 - a. Finish repaired areas to blend into adjacent concrete.
 - 5. Correct other low areas scheduled to receive floor coverings with a repair

underlayment.

- a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - b. Feather edges to match adjacent floor elevations.
6. Correct other low areas scheduled to remain exposed with repair topping.
 - a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
 - b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.
 - a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
 - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
 - c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
 - d. Place, compact, and finish to blend with adjacent finished concrete.
 - e. Cure in same manner as adjacent concrete.
8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.
 - a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
 - b. Dampen cleaned concrete surfaces and apply bonding agent.
 - c. Place patching mortar before bonding agent has dried.
 - d. Compact patching mortar and finish to match adjacent concrete.
 - e. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.14 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.
- B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

1. Testing agency to be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
 2. Testing agency to immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
 3. Testing agency to report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
 - a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
 - 1) Project name.
 - 2) Name of testing agency.
 - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
 - 4) Name of concrete manufacturer.
 - 5) Date and time of inspection, sampling, and field testing.
 - 6) Date and time of concrete placement.
 - 7) Location in Work of concrete represented by samples.
 - 8) Date and time sample was obtained.
 - 9) Truck and batch ticket numbers.
 - 10) Design compressive strength at 28 days.
 - 11) Concrete mixture designation, proportions, and materials.
 - 12) Field test results.
 - 13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
 - 14) Type of fracture and compressive break strengths at seven days and 28 days.
- C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.
- D. Inspections:
1. Headed bolts and studs.
 2. Verification of use of required design mixture.
 3. Concrete placement, including conveying and depositing.
 4. Curing procedures and maintenance of curing temperature.
 5. Verification of concrete strength before removal of shores and forms from beams and slabs.
 6. Batch Plant Inspections: On a random basis, as determined by Architect.
- E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M to be performed in accordance with the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C143/C143M:
 - a. 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.
 - b. Perform additional tests when concrete consistency appears to change.
3. Slump Flow: ASTM C1611/C1611M:
 - a. 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.
 - b. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete;.
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C1064/C1064M:
 - a. 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.
6. Unit Weight: ASTM C567/C567M fresh unit weight of structural lightweight concrete.
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C31/C31M:
 - a. Cast and laboratory cure two sets of four 6-inch by 12-inch or 4-inch by 8-inch cylinder specimens for each composite sample.
 - b. Cast, initial cure, and field cure two sets of four standard cylinder specimens for each composite sample.
8. Compressive-Strength Tests: ASTM C39/C39M.
 - a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days.
 - b. Test one set of two field-cured specimens at seven days and one set of two specimens at 28 days.
 - c. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at

age indicated.

9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor to evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
 10. Strength of each concrete mixture will be satisfactory if every 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 if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
 11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
 12. Additional Tests:
 - a. Testing and inspecting agency to make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
 - b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
 - 1) Acceptance criteria for concrete strength to be in accordance with ACI 301, Section 1.6.6.3.
 13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- F. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 48 hours of completion of floor finishing and promptly report test results to Architect.

3.15 PROTECTION

- A. Protect concrete surfaces as follows:
1. Protect from petroleum stains.
 2. Diaper hydraulic equipment used over concrete surfaces.
 3. Prohibit vehicles from interior concrete slabs.
 4. Prohibit use of pipe-cutting machinery over concrete surfaces.
 5. Prohibit placement of steel items on concrete surfaces.
 6. Prohibit use of acids or acidic detergents over concrete surfaces.
 7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
 8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

December 14, 2023
Construction Documents
SED No. 44-10-00-01-0-001-041

Enlarged City School District of Middletown
Twin Towers Middle School
Additions and Alterations

END OF SECTION 033000

SECTION 033000 – CAST IN PLACE CONCRETE -- SITE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and Division 01 General Requirements apply to this section.

1.2 SUMMARY

- A. This Section includes exterior cement concrete pavement the following:
 - 1. Curbs.
 - 2. Walkways.
 - 3. Watermain concrete encasement.
- B. Related Sections include other Division 2 Sections.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:
 - 1. Cementitious materials.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Fiber reinforcement.
 - 4. Admixtures.
 - 5. Curing compounds.
 - 6. Applied finish materials.
 - 7. Bonding agent or epoxy adhesive.
 - 8. Joint fillers.
 - 9. Detectable warning strips.

- D. Field quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
- C. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.
- D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.6 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 - 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
 - 1. Use flexible or curved forms for curves with a radius 100 feet (30.5 m) or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
- C. Hook Bolts: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), internally and externally threaded. Design hook-bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.
- D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete, and as follows:
 - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:
 - 1. Portland Cement: ASTM C 150, Type I or II gray.
- B. Normal-Weight Aggregates: ASTM C 33, Class [4S] [4M] coarse aggregate, uniformly graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar pavement applications and service conditions using similar aggregates and cementitious materials.
 - 1. Maximum Coarse-Aggregate Size: 1 inch (25 mm) nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

- C. Water: ASTM C 94/C 94M.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Provide IPANEX concrete waterproofing admixture (or approved equal) in all exterior concrete flatwork.

2.5 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.
 - 1. Available Products:
 - a. Axim Concrete Technologies; Cimfilm.
 - b. Burke by Edeco; BurkeFilm.
 - c. ChemMasters; Spray-Film.
 - d. Conspec Marketing & Manufacturing Co., Inc.; Aquafilm.
 - e. Dayton Superior Corporation; Sure Film.
 - f. Euclid Chemical Company (The); Eucobar.
 - g. Kaufman Products, Inc.; Vapor Aid.
 - h. Lambert Corporation; Lambco Skin.
 - i. L&M Construction Chemicals, Inc.; E-Con.
 - j. MBT Protection and Repair, ChemRex Inc.; Confilm.
 - k. Meadows, W. R., Inc.; Sealtight Evapre.
 - l. Metalcrete Industries; Waterhold.
 - m. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
 - n. Sika Corporation, Inc.; SikaFilm.
 - o. Symons Corporation; Finishing Aid.
 - p. Vexcon Chemicals, Inc.; Certi-Vex EnviroAssist.
- E. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

1. Available Products:

- a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
- b. Burke by Edoko; Aqua Resin Cure.
- c. ChemMasters; Safe-Cure Clear.
- d. Conspec Marketing & Manufacturing Co., Inc.; W.B. Resin Cure.
- e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
- f. Euclid Chemical Company (The); Kurez DR VOX.
- g. Kaufman Products, Inc.; Thinfilm 420.
- h. Lambert Corporation; Aqua Kure-Clear.
- i. L&M Construction Chemicals, Inc.; L&M Cure R.
- j. Meadows, W. R., Inc.; 1100 Clear.
- k. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.
- l. Symons Corporation; Resi-Chem Clear.
- m. Tamms Industries Inc.; Horncure WB 30.
- n. Unitex; Hydro Cure 309.
- o. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.
- p. Tamms Industries, Inc.; Horncure 200-W.
- q. Unitex; Hydro White.
- r. Vexcon Chemicals, Inc.; Certi-Vex Enviocure White 100.

2.6 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to requirements, and as follows:
 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.7 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
 1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
 1. Compressive Strength (28 Days): 4,000 psi (20.7 MPa).

2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45
 3. Slump Limit: 4" (100 mm) plus or minus 1 inch (25 mm).
- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
1. Air Content: 6 percent plus or minus 1.5 percent for 3/4-inch (19-mm) nominal maximum aggregate size.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use plasticizing and retarding admixture in concrete, as required, for placement and workability.
 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116. Furnish batch certificates for each batch discharged and used in the Work.
1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
1. For concrete mixes of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 2. For concrete mixes larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.
 - 1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph (5 km/h).
 - 2. Subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch (13 mm) require correction according to requirements in Section 31 20 00 "Earth Moving."
- C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

- D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch (50-mm) overlap of adjacent mats.

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
 - 1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.
 - 1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
 - 2. Provide tie bars at sides of pavement strips where indicated.
 - 3. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
 - 5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
 - 1. Locate expansion joints at intervals of 30 feet, unless otherwise indicated.
 - 2. Extend joint fillers full width and depth of joint.
 - 3. Terminate joint filler not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished surface if joint sealant is indicated.
 - 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 - 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.

6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch (6-mm) radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
- E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 1/4-inch (6-mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site.
- F. Do not add water to fresh concrete after testing.
- G. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- H. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side

forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

- I. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.
 - 1. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer, or use bonding agent if approved by Engineer.
- J. Screed pavement surfaces with a straightedge and strike off.
- K. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- L. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.
- M. Slip-Form Pavers: When automatic machine placement is used for pavement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce pavement to required thickness, lines, grades, finish, and jointing as required for formed pavement.
 - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations.
- N. When adjoining pavement sections are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.
- O. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.
- P. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
 2. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m 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.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
 1. Moist 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 (300-mm) 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 (300 mm), and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.9 PAVEMENT TOLERANCES

- A. Comply with tolerances of ACI 117 and as follows:
 - 1. Elevation: 1/4 inch (6 mm).
 - 2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
 - 3. Surface: Gap below 10-foot- (3-m-) long, unlevelled straightedge not to exceed 1/4 inch (6 mm).
 - 4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch (25 mm).
 - 5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch (6 mm).
 - 6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch (13 mm).
 - 7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches (6 mm per 300 mm).
 - 8. Joint Spacing: 3 inches (75 mm).
 - 9. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
 - 10. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports at contractor's expense.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain at least 1 composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mix placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
- D. 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.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer.
- G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.11 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.

- B. Drill test cores, where directed by Engineer, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.
- C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 033000

SECTION 035416 - HYDRAULIC CEMENT UNDERLAYMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes hydraulic-cement-based underlayment for use below interior floor coverings.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Plans indicating substrates, locations, and average depths of underlayment based on survey of substrate conditions.
- C. Manufacturer Certificates: Signed by manufacturers of both underlayment and floor covering system certifying that products are compatible.
- D. Qualification Data: For Installer.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.
- B. Product Compatibility: Manufacturers of both underlayment and floor covering system certify in writing that products are compatible.
- C. Mockups: Apply hydraulic-cement-based underlayment mockups to demonstrate surface finish, bonding, texture, tolerances, and standard of workmanship.
 - 1. Apply mockups approximately 100 sq. ft. (9 sq. m) in area in location indicated or, if not indicated, as directed by Architect.
 - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 00.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature and humidity, ventilation, and other conditions affecting underlayment performance.
 - 1. Place hydraulic-cement-based underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F (10 and 27 deg C).

1.6 COORDINATION

- A. Coordinate application of underlayment with requirements of floor covering products, including adhesives, specified in Division 09 Sections, to ensure compatibility of products.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Ardex, Inc.; K-15 Self-Leveling Underlayment Concrete.
 - 2. Dayton Superior Specialty Chemical Corp.; Level Layer I
 - 3. Mapei Corporation; Ultraplan I Plus

2.2 HYDRAULIC-CEMENT-BASED UNDERLAYMENTS

- A. Underlayment: Hydraulic-cement-based, polymer-modified, self-leveling product that can be applied in minimum uniform thicknesses of 1/8 inch (3 mm) and that can be feathered at edges to match adjacent floor elevations. Product shall also be capable of being poured/pumped monolithically (rather than room-by-room).
 - 1. Cement Binder: ASTM C 150, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C 219.
 - 2. Compressive Strength: Not less than 4100 psi (28 MPa) at 28 days when tested according to ASTM C 109/C 109M.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm); or coarse sand as recommended by underlayment manufacturer.
 - a. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required
 - 4. Water: Potable and at a temperature of not more than 70 deg F (21 deg C).
- B. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for conditions affecting performance.
 - 1. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Prepare and clean substrate according to manufacturer's written instructions.
 - 1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
 - 2. Fill substrate voids to prevent underlayment from leaking.
- B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond. Perform moisture tests recommended by manufacturer and as follows.
 - 1. Moisture Testing: Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates do not exceed a maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/100 sq. m) in 24 hours.
 - 2. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have relative humidity level measurement acceptable to manufacturer.
- C. Nonporous Substrates: For ceramic tile, quarry tile, and terrazzo substrates, remove waxes, sealants, and other contaminants that might impair underlayment bond, and prepare surfaces according to manufacturer's written instructions.
- D. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.3 APPLICATION

- A. General: Mix and apply underlayment components according to manufacturer's written instructions.
 - 1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
 - 2. Coordinate application of components to provide optimum underlayment-to-substrate and intercoat adhesion.
 - 3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
 - 4. Install perimeter isolation strip along the base of partitions prior to installation of topping. Cut isolation strip flush with finished floor.
 - 5. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- B. Apply underlayment to produce uniform, level surface.

1. Apply a final layer without aggregate to produce surface.
 2. Feather edges to match adjacent floor elevations.
- C. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- D. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.
- E. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 PROTECTION

- A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION 035416

SECTION 040120 - MASONRY RESTORATION

PART I - GENERAL

1.1 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.
- B. Architectural Cast Stone is specified in Section 047200.

1.2 DESCRIPTION OF WORK

- A. Extent of masonry restoration work is indicated in Drawings.
- B. Masonry restoration work includes repointing, patching damaged stone, infilling mechanical grille openings with brick masonry and cast stone veneer pieces.

1.3 QUALITY ASSURANCE

- A. Comply with the latest editions of the following reference standards:
 - 1. National Park Service (NPS), "National Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings."
 - 2. National Park Service (NPS) TPS Brief 1, "Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings."
 - 3. National Park Service (NPS) TPS Brief 2, "Repointing Mortar Joints in Historic Masonry Buildings."
- B. Masonry Specialist: Work shall be performed by a firm with minimum 5 years successful experience in comparable masonry restoration projects and employing skilled personnel in restoration processes and operations indicated.
- C. Field Supervision: Retain an experienced full-time supervisor on the project site at all times when masonry restoration is in progress. A single individual shall be responsible for supervising masonry restoration work throughout the duration of project.
- D. Mortar Sampling and Trial Mix Testing: Prior to beginning Work, sample existing mortar and prepare trial mortar mixes. Allow for a minimum of one month to sample and prepare trial mixes, test mixes for color match, and make necessary revisions.
 - 1. Remove four samples, approximately 4 inches long, of each type of mortar to be matched with a hand chisel at locations selected by Engineer. Set aside one sample for trial mix comparison.
 - 2. Examine aggregate samples for material type, size, grading, and color. Match existing aggregate to closest extent possible.
 - 3. Develop trial mixes and test until mortar meets criteria in these specifications.

4. Contractor shall take samples and pay for all testing prior to Engineer accepting mortar mix. Owner shall pay for testing after mortar mix is accepted; however, if test results are unacceptable, Contractor shall be responsible for associated costs of additional testing, engineering, and corrective work.
- E. Field-Constructed Mock-Ups: Prior to beginning masonry restoration, prepare test samples on existing building to further verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Sample areas to be selected by Engineer and will be close to grade to allow observations by Engineer and Owner's Representative. Do not proceed further with work of this section until test sample has been approved by Engineer and Owner's Representative. Approved test samples will be used as quality standards for remaining work. Use materials indicated for work:
 1. Removals: One grille removal at brick veneer location and one grille removal from existing cast stone surround to demonstrate removal techniques. Samples shall constitute a standard for acceptance or rejection of completed work.
 2. Rebuilding: Brick backup installation at one grille opening and installation of a stone veneer and mortar unit to demonstrate rebuilding.
 3. Repointing: Minimum 3-foot by 3-foot sample area, half demonstrating raking out of joints and half repointed. Locate sample adjacent to existing, cleaned mortar. Clean existing adjacent surface and allow to dry prior to mockup review. Cure mortar per methods outlined in Part 3.
 4. Cleaning: Test clean one-half of mortar repointing sample and existing 3-foot by 3-foot area of similar masonry to remain (for comparison). Cleaning samples to be dry prior to review and approval.
 5. Stone Patching: One 6-inch by 6-inch sample area for demonstrating proper mixing of materials, material installation, finishing, curing, and color match.
- F. Source of Materials: Obtain materials for masonry restoration from single source for each type of material required (brick, stone, cement, sand, etc.) to ensure match of quality, color, pattern, and texture.

1.4 SUBMITTALS

A. Qualifications:

1. Submit descriptions of projects completed within last ten years of similar scope and cost. Include project location and reference contact information.
2. Submit project experience for field supervisor responsible for work to be performed under this section.

B. Product Data: Submit manufacturer's technical data for each product indicated, including recommendations for its application and installation instructions. Include test reports and certifications substantiating product complies with requirements.

C. Material Test Data: Prior to construction, submit test data for materials indicated to verify compliance with these specifications.

- D. Restoration Program: Submit written program for each phase of restoration process, including protection of surrounding materials on building and site during operations. Describe in detail materials, methods, and equipment to be used for each phase of restoration and reconstruction work.
- E. Samples: Submit for verification prior to construction:
 - 1. Face Brick: Eight units of brick for color verification.
 - 2. Stone: See Specification Section 047200.
 - 3. Mortar: For each trial mix, showing color and finish.
- F. Shop Drawings: See Specification Section 047200.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Carefully pack, handle, and ship masonry units and accessories strapped together in suitable packs or pallets or heavy cartons. Carefully unload and handle to prevent chipping and breakage.
- B. Deliver other materials to site in manufacturer's original, unopened containers and packaging, bearing labels as to types and names of products and manufacturers.
- C. Protect masonry materials during storage and construction from wetting by rain, snow, or ground water and from staining or intermixture with earth or other types of materials.
- D. Protect mortar and other materials from deterioration by moisture and temperature. Store in dry location or in waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

1.6 PROJECT CONDITIONS

- A. Only clean masonry surfaces when air temperature is 40 degrees F (4 degrees C) or above and will remain so until masonry has dried out. Temperature must remain above 40 degrees F (4 degrees C) for minimum seven days after completing cleaning.
- B. Unless temporary protection is provided, do not repoint mortar joints, rebuild masonry, or repair masonry unless air temperature is between 40 degrees F (4 degrees C) and 90 degrees F (32 degrees C) and will remain so for at least 48 hours after completion of work.
 - 1. If temperature exceeds 90 degrees F (32 degrees C), comply with Hot-Weather Masonry Construction Requirements in the drawings.
 - 2. If temperature falls below 40 degrees F (4 degrees C), follow Cold-Weather Masonry Construction Requirements in the drawings.

- C. Prevent mortar used in repointing and repair work from staining face of surrounding masonry or other surfaces. Immediately remove grout and mortar in contact with exposed masonry or other surfaces.
- D. Protect sills, ledges, and projections from mortar droppings.

PART 2 - PRODUCTS

2.1 MASONRY MATERIALS

- A. Face Brick: Provide units with color, texture, and size to match existing. Units shall comply with ASTM C 216, Grade SW. Do not reuse existing brick unless noted otherwise.
- B. Cast Stone: Specification Section 047200.

2.2 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II , white or gray or both where required for color matching mortar. Type III may be used for cold-weather construction. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C114.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Aggregate for Mortar: ASTM C 144 unless otherwise indicated.
 - 1. For pointing mortar, provide sand with rounded edges.
 - 2. Match size, texture, and gradation of aggregate in existing mortar as closely as possible.
- D. Water: Clean, free of oils, acids, alkalis, and organic matter.
- E. Mortar Pigments: ASTM C979/C979M, compounded for use in mortar mixes, and having a record of satisfactory performance in masonry mortars.
- F. Admixtures: Do not use unless proposed, tested, and accepted in Preconstruction Testing Phase prior to beginning work.

2.3 PROGRESS CLEANING MATERIALS AND EQUIPMENT

- A. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.
- B. Brushes: Stiff mylar or fiber bristle only.
- C. Acidic, Alkali, and Detergent Cleaning Agents: Do not use unless proposed, tested, and accepted in Preconstruction Testing Phase prior to beginning work.

2.4 CAST STONE PATCHING MATERIALS

- A. Cast Stone Patching Material: "Jahn M70", by Cathedral Stone Products Inc.; "Matrix", by Conproco Corp., "Custom System 45, Grade LC", by Edison Coatings, Inc.; or accepted equivalent. Custom match color of existing masonry.

2.5 MISCELLANEOUS MATERIALS

- A. Restoration Anchors: Stainless steel threaded rod, 3/8-inch-diameter for attachment to masonry (9-inch embedment, recess 1/2" to 1" from face and conceal with mortar) through mortar joints. Set with chemical adhesive per adhesive manufacturer's instructions.
- B. Spring-Loaded Dowel: Stainless steel, "Spring-loaded dowel #355" by Heckmann Building Products, Inc.; "Spring Loaded Dowel", by Masonpro, Inc.; or accepted equivalent.
- C. Brick Veneer Anchor: Type 304 stainless steel "No. 315-C Screw on Anchor Straps," 12-gauge, 7/8-inch-wide by 6 1/2-inch-long with 1/4-inch-diameter holes, by Heckmann Building Products, Inc.; "No. 362 Gripstay Anchor slot," 12-gauge, by Hohmann & Barnard, Inc., "No. 1004 Type III Screw on Veneer Anchor" 14-gauge, 1 1/4-inch-wide by 6-inch-long, by Masonpro, Inc.; or accepted equivalent. Attach using two 1/4-inch by 1 3/4-inch stainless steel screws.
- D. Brick Veneer Tie: One piece, 1/4-inch-diameter, stainless steel triangular wire tie for use with veneer anchor strap. Field verify length.
- E. Chemical Adhesive (Adhesive Grout):
 - 1. Anchoring to solid concrete:
 - a. Anchors for use when base material temperature is 0°F or greater: "HIT-Ice" by Hilti; "Epcon A7" by ITW Ramset/Red Head; "AC100+ GOLD" by Powers Fasteners; "AT-XP" by Simpson/Strong-Tie; or accepted equivalent.
 - b. Anchors for use when base material temperature is 40°F or greater; "HIT-HY 200 Safe Set System with HIT-Z Rod or Hollow Drill Bit System" or "HIT-RE 500-SD" by Hilti; "Epcon C6" by ITW Ramset/Red Head; "T308 Plus" by Powers Fasteners; "ET-HP" by Simpson/Strong-Tie; or accepted equivalent.
 - 2. Anchoring to hollow masonry (brick or hollow CMU), grouted CMU, solid brick, or stone:
 - a. Anchors for use when base material temperature is 0°F or greater: "Epcon A7" by ITW Ramset/Red Head; "AC 100 Plus" by Powers Fasteners; "AT Acrylic-Tie" by Simpson/Strong-Tie; or accepted equivalent.
 - b. Anchors for use when base material temperature is 40°F or greater: "HIT-HY 70" by Hilti; "Epcon C6" by ITW Ramset/Red Head; "T308 Plus" by Powers Fasteners; "ET-HP" by Simpson/Strong-Tie; or accepted equivalent.
 - c. Provide manufacturer's standard screen tubes for use with anchors.

PART 3 - EXECUTION

3.1 MASONRY REPOINTING, GENERAL

- A. Prevent mortar from staining face of surrounding masonry and other surfaces.
 - 1. Cover sills, ledges, and other projecting items to protect them from mortar droppings.
 - 2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
 - 3. Immediately remove mortar splatters in contact with exposed masonry and other surfaces.
- B. Appearance Standard: Repointed surfaces are to have a uniform appearance as viewed from 15 feet away by Engineer.

3.2 MORTAR MIXES

- A. General:
 - 1. Measurement and Mixing: Measure cementitious and aggregate material in dry conditions by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in clean mechanical batch mixer.
 - 2. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 1 to 2 hours. Add remaining water in small portions until desired consistency is reached. Use mortar within 30 minutes of final mixing. Do not retemper or use partially hardened material.
- B. Colored Mortar: Produce mortar of color required by use of selected ingredients. Do not adjust proportions without Engineer's acceptance.
- C. Do not use admixtures in mortar unless proposed, tested, and accepted in Preconstruction Testing Phase prior to beginning work.
- D. Mortar Proportions: Portland Cement-lime mix as follows (adjust per mortar analysis results for compatible mix):
 - 1. Pointing and Rebuilding Mortar, ASTM C270: One part Portland cement, two parts lime, and eight parts mortar aggregate.
- E. Trial Mix: Prepare trial mixes of pointing and rebuilding mortars.

3.3 REPOINTING

A. Rake out and repoint joints to the following extent:

1. All joints in areas indicated.
2. Joints at locations of the following defects:
 - a. Holes and missing mortar.
 - b. Cracks that can be penetrated $\frac{1}{4}$ inch or more by a knife blade 0.027 inch thick.
 - c. Cracks $\frac{1}{16}$ inch or more in width and of any depth.
 - d. Hollow-sounding joints when tapped by metal object.
 - e. Eroded surfaces $\frac{1}{4}$ inch or more deep.
 - f. Deterioration to point that mortar can be easily removed by hand, without tools.
 - g. Joints filled with substances other than mortar.

B. Do not rake out and repoint joints where not required.

C. Rake out joints as follows, according to procedures demonstrated in approved mockup:

1. Remove mortar from joints to depth of 2-1/2 times joint width and not less than that required to expose sound, unweathered mortar. Do not remove unsound mortar more than 2 inches deep; consult Engineer for direction.
2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
3. Do not spall edges of bricks or widen joints. Replace or patch damaged bricks as directed by Engineer.
 - a. Cut out center of mortar bed joints using angle grinders with diamond-impregnated metal blades. Remove remaining mortar in bed joints and mortar in head joints by hand with chisel and resilient mallet.

D. Notify Engineer of unforeseen detrimental conditions, including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.

E. Pointing with Mortar:

1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before painting.
2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than $\frac{3}{8}$ inch until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
3. After deep areas have been filled to same depth as remaining joints, point joints by placing mortar in layers not greater than $\frac{3}{8}$ inch. Fully compact each layer and allow it to become thumbprint hard before applying next layer. Where existing brick have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to featheredge the mortar.

4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing. Tool exposed mortar joints in repaired areas to match joints of surrounding existing masonry.
 5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.
 - a. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.
 - b. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.
 6. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Remove mortar and repoint.
- F. Where repointing work precedes cleaning of existing masonry, allow mortar to harden at least 30 days before beginning cleaning work.

3.4 BRICK AND STONE REMOVAL AND REBUILDING

A. Removals:

1. Install restoration anchors at 16 inches on center into mortar joints of masonry to remain above work area prior to beginning removals. Follow anchor manufacturer's installation instructions. Install in mortar joints and point over hole with mortar matching existing. For anchors installed in face of stone, countersink anchor a minimum of one inch below surface and install stone patching material.
2. Carefully remove bricks and stone in sections. Cut out full brick from joint to joint in manner to permit replacement with full-sized units.
3. Support and protect masonry indicated to remain that surrounds removal area.
4. Clean remaining edges of removal areas by removing mortar, dust, and loose debris in preparation for rebuilding.
5. Save sufficient removed brick to replace damaged brick where indicated in drawings. Clean bricks that are to be reused. Remove mortar from cores. Test bricks for bond strength when requested.

B. Brick Rebuilding:

1. Repoint exposed backup masonry prior to rebuilding brick veneer. Replace loose and deteriorated masonry units as required to provide solid back-up surface.
2. Install new brick backup in opening and brick veneer to replace removed brick. Fit replacement units into bonding and coursing pattern of existing brick. If cutting is required, use motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.
3. Lay replacement brick with completely filled bed and head joints and tooth with existing masonry. Completely fill collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet clay brick that have ASTM C 67 initial rates of absorption (suction) of more than 30 grams per square inch per minute. Use wetting methods that ensure units are nearly saturated but surface dry when laid. Maintain joint width for replacement units to match existing.

4. Tool exposed mortar joints in repaired areas to match joints of surrounding existing masonry.
5. Repoint new mortar joints in repaired area to comply with requirements for repointing existing masonry, except rake out joints before mortar sets.
6. Clean up as work proceeds. Avoid spillage onto existing building.

C. Cast Stone Installation:

1. Repoint exposed backup masonry prior to rebuilding. Replace loose and deteriorated masonry units as required to provide solid back-up surface.
2. Prepare stone units for new anchors. Install stone anchors and units. Lay units with completely filled bed and head joints. Use stainless steel setting buttons.
3. Wet stone with clean water prior to setting.
4. Do not use pry bars or other equipment in a manner that could damage Cast Stone components.
5. Fill dowel holes and anchor slots completely with mortar.
6. Tool exposed mortar joints in repaired areas to match joints of surrounding existing masonry.
7. Clean up as work proceeds. Avoid spillage onto existing building.

3.5 CAST STONE PATCHING

- A. Remove loose, weakened, or damaged masonry in areas indicated. Sound the remaining masonry substrate with a hammer to verify its integrity. Loose mortar, laitance, spalled, cracked, and/or debonded masonry shall be removed with hand tools unless otherwise indicated.
- B. Prepare surfaces as recommended by patch material manufacturer. Carefully remove additional material so patch does not have feathered edges but has square or slightly undercut edges on area to be patched and is at least 1/4 inch thick, but not less than as recommended by manufacturer. Clean surfaces of dust, debris, sealant residue, and other contaminants.
- C. Follow manufacturer's instructions for placement of patch material.
- D. Patches greater than 2 inches thick to incorporate stainless steel threaded rod pins, as shown in Drawings. Provide at least one stone repair pin per 4-inch square of repair surface area to ensure that patch is tied to the existing masonry. Drill holes for anchors with a diameter of 1/8 inch larger than anchor diameter. Drill holes with a minimum depth of 4 inches, unless noted otherwise. Set anchors back from face of masonry a minimum of 1 inch.
- E. Match patching material finish, color, texture, and surface detail with exposed surfaces of existing masonry. Finishing and texturing shall conceal bond lines between repaired area and adjacent surfaces. Texturing shall provide replication of all surface details, including tooling and machine marks.

- F. Cure by misting with water 2 to 3 times per day or use burlene as recommended by manufacturer. Do not use curing agents or allow polyethylene or burlap to touch surface of repair.

3.6 PROGRESS CLEANING MASONRY

- A. Each day, clean work surfaces to remove excess mortar and foreign matter on exposed masonry surfaces.
- B. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter using stiff nylon or bristle brushes and clean water sprayed at low pressure.
- C. Do not use metal scrapers or brushes.
- D. Use of acid or alkali cleaning agents shall not be permitted unless proposed, tested, and accepted in Preconstruction Testing Phase prior to beginning cleaning.

END OF SECTION

SECTION 042000 – UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes unit masonry assemblies consisting of the following:

1. Concrete masonry units. (CMU)
2. Face brick.
3. Mortar and grout.
4. Reinforcing steel.
5. Masonry joint reinforcement.
6. Ties and anchors.
7. Miscellaneous masonry accessories.
8. Prefabricated masonry lintels.
9. Embedded flashing.
10. Cavity-wall insulation.

B. Products furnished, but not installed, under this Section include the following:

1. Anchor sections of adjustable masonry anchors for connecting to cast-in-place concrete, installed under Division 03 Section "Cast-in-Place Concrete."
2. Mortar and grout for cast stone trim and panels installed under Division 04 Section "Cast Stone".
3. Anchor sections of adjustable masonry anchors for connecting to structural frame, installed under Division 05 Section "Structural Steel Framing."

C. Products installed, but not furnished, under this Section include the following:

1. Steel lintels and shelf angles for unit masonry, furnished under Division 05 Section "Metal Fabrications."
2. Manufactured reglets in masonry joints for metal flashing, furnished under Division 07 Section "Sheet Metal Flashing and Trim."
3. Hollow-metal frames in unit masonry openings, furnished under Division 08 Section "Hollow Metal Doors and Frames."

1.2 DEFINITIONS

A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops net-area compressive strengths (f'_m) at 28 days as indicated in unit masonry performance requirements on the Structural Drawings.

1.4 ACTION SUBMITTALS

- A. Product Data: For each different masonry unit, mortar material, accessory, and other manufactured product specified.
- B. Shop Drawings: Show fabrication and installation details for the following:
 - 1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.
- C. Samples for Initial Selection: For the following:
 - 1. Colored mortar samples in small-scale form showing the full range of colors and textures available for each different exposed mortar color required.
- D. Samples for Verification: For the following:
 - 1. Full-size units for each different exposed masonry unit required, showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.
 - 2. Colored mortar samples, for each mortar color required, showing the full range expected in the finished construction. Make samples using the same sand and mortar ingredients to be used on Project. Label samples to indicate type and amount of colorant used
 - 3. Weep holes/vents in color to match mortar color
 - 4. Accessories embedded in the masonry.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Article.
- B. Material Test Reports: From a qualified testing agency indicating and interpreting test results of the following for compliance with requirements indicated:
 - 1. Each type of masonry unit required. Include size-variation data for brick, verifying that actual range of sizes falls within specified tolerances.
 - 2. Mortar complying with property requirements of ASTM C 270.
 - 3. Grout mixes complying with compressive strength requirements of ASTM C 476. Include description of type and proportions of grout ingredients.
- C. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
 - 1. Each type of masonry unit required.
 - a. Include size-variation data for brick, verifying that actual range of sizes falls within specified tolerances.
 - 2. Each cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
 - 3. Each type and size of joint reinforcement.
 - 4. Each type and size of anchor, tie, and metal accessory.

1.6 QUALITY ASSURANCE

- A. Masonry Standard: Comply with requirements of "Specifications for Masonry Structures, ACI 530.1/ASCE 6/TSM 602" published by the American Concrete Institute, except when more stringent requirements are specified and as modified by the requirements of these Contract Documents.
 - 1. Revise ACI 530.1/ASCE 6/TSM 602 to exclude Article 1.5; Subparagraphs 1.1 C.1 through 4, and Subparagraphs 3.3 E.1 through 5.
- B. Installer Qualifications: Engage an experienced installer who has 10 years experience as a journeymen mason, and who has completed masonry similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
 - 1. A minimum of one skilled journeyman mason shall be present at all times during masonry erection and shall personally direct the work.
- C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1093 to conduct the testing indicated, as documented according to ASTM E 548.
- D. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
- E. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.
- F. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.
- G. Mockups: Before installing unit masonry, build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Final approval of brick bonding pattern, brick color and texture and mortar color and texture will be made based on acceptance of mock-up. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Locate mockup in the locations as directed by Architect.
 - 2. Build mockups containing the following types of masonry approximately 96 inches long by 48 inches high by full thickness, including face and backup wythes and accessories. Include a sealant-filled joint at least 16 inches long in the mockup.

- a. Typical exterior masonry-veneer wall complete with back-up, reinforcing/ties, insulation, flashing, and weep holes. Demonstrate all types of brick patterns to be used in the Work in the mock-up. Include cast stone trim units in the mock-up.
 3. Re-prepare mock-ups as required to obtain Architect's approval.
 4. Protect accepted mockups from the elements with weather-resistant membrane.
 5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 6. Remove and reconstruct mockups as required to obtain Architect's approval.
 7. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Coordination."
- I. Vertical and Lateral Fire Propagation Test Characteristics: The exterior wall assembly of the new Classroom Addition is required to comply with NFPA 285 "Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components." The base wall, stud cavity insulation, wall sheathing, air barrier, continuous wall rigid insulation and exterior cladding are components that are required to be evaluated as part of this specific assembly test. All unit masonry components shall be part of an assembly that has passed NFPA 285 testing.
- J. Reference Standards: Comply with Brick Institute of America (BIA) and Masonry Institute of America (MIA) handbooks/Manuals.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
 - B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
 - C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
 - D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
 - E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three (3) days after building masonry walls or columns
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in Part 1.8 C. of ACI 530.1/ASCE 6/TMS 602.
 - 1. Do not lay masonry units that are wet or frozen.
 - 2. Remove masonry damaged by freezing conditions.
- E. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- F. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Comply with cold-weather construction requirements contained in Part 1.8 D. of ACI 530.1/ASCE 6/TMS 602. Provide artificial shade and wind breaks and use cooled materials as required.
 - 1. When ambient temperature exceeds 100 deg F (38 deg C), or 90 deg F (32 deg C) with a wind velocity greater than 8 mph (13 km/h), do not spread mortar beds more than 48 inches (1200 mm) ahead of masonry. Set masonry units within one minute of spreading mortar.

1.9 SPECIAL INSPECTIONS

- A. The Owner will engage the services of a qualified Special Inspector for this project. The Special Inspector will provide and/or coordinate inspection and testing requirements as

necessary in accordance with the provisions of the Statement of Special Inspections Form contained in these Specifications.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. General: Provide shapes indicated and as follows:
 - 1. Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
 - 2. Provide bullnose units for outside corners that are exposed to view, unless otherwise indicated.
- B. Concrete Masonry Units (CMU): ASTM C 90 with minimum average net-area compressive strength of 1900 psi; lightweight; and as follows:
 - 1. Size: Manufactured to the following dimensions: 16 inches (407 mm) by 8 inches (203 mm) nominal; 7-5/8 inches (194 mm) by 15-5/8 inches (397 mm) actual; by thickness indicated.
 - 2. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.
 - 3. Provide U.L. classified units for rated walls, or units meeting the fire resistance ratings by equivalent concrete masonry thickness.

2.2 BRICK

- A. General: Provide shapes indicated and as follows for each form of brick required:
 - 1. Provide units without cores or frogs and with exposed surfaces finished for ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces.
 - 2. Provide lipped brick at steel relieving angles as indicated on drawings.
- B. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
 - 1. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
 - 2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- C. Salvaged Brick: Use salvaged brick for infilling and for all new required brickwork at existing buildings.
- D. Face Brick: ASTM C 216, Grade SW, Type FBX, and as follows:

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi.
2. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
3. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
4. Type: Extruded.
5. Size: Modular: 3-5/8" w x 2-1/4" h x 7-5/8" l
6. Colors: Brick blend to match existing:
 - a. 60% Belden Wheatfield Velour 21-30
 - b. 25% Sea Gray Velour 21-38
 - c. 15% Desert Sun Velour 22-42
7. Texture: Velour.

2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color cement.
 1. For concrete block work, provide natural color cement.
 2. For cast stone and brickwork, provide natural color or white cement as required to produce required mortar colors.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207.
- D. Masonry Cement: Not permitted.
- E. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch (6.5 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
 1. For colored mortar, provide natural sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar colors.
- F. Aggregate for Grout: ASTM C 404.
- G. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars
- H. Water: Potable.

2.4 REINFORCING STEEL

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M; ASTM A 616/A 616M, including Supplement 1; or ASTM A 617/A 617M, Grade 60 (Grade 400).

2.5 MASONRY JOINT REINFORCEMENT

A. General: ASTM A 951 and as follows:

1. Mill galvanized, carbon-steel wire for interior walls, unless noted below.
2. Hot-dip galvanized, carbon-steel wire for exterior walls and interior walls at Basement locations.
3. Wire Size for Side Rods: W1.7 or 0.148-inch (3.8-mm) diameter.
4. Wire Size for Cross Rods: W1.7 or 0.148-inch (3.8-mm) diameter.
5. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units where indicated.

B. For single-wythe masonry, provide ladder type with single pair of side rods and cross rods spaced not more than 16 inches (407 mm) o.c.

C. For multi wythe masonry, provide types as follows:

1. Adjustable (2-piece) type with single pair of side rods and cross ties spaced not more than 16 inches (407 mm) o.c. and with separate adjustable veneer ties engaging the cross ties. Cross ties are U-shaped with eyes. Space side rods for embedment within each face shell of backup wythe and size adjustable ties to extend at least halfway through outer wythe but with at least 5/8-inch (16-mm) cover on outside face

2.6 TIES AND ANCHORS, GENERAL

A. General: Provide ties and anchors, specified in subsequent articles, made from materials that comply with this Article, unless otherwise indicated.

B. Stainless Steel Wire: ASTM A580/A580M, Type 304.

C. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304.

D. Stainless Steel Bars: ASTM A276 or ASTM A666, Type 304.

E. Mill Galvanized Carbon-Steel Wire: ASTM A 82; with ASTM A 641 (ASTM A 641M), Class 1 coating.

F. Hot-Dip Galvanized Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.

G. Steel Sheet, Galvanized after Fabrication: ASTM A 366/A 366M cold-rolled, carbon-steel sheet hot-dip galvanized after fabrication to comply with ASTM A 153

H. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.7 JOINT STABILIZATION ANCHORS

A. General: Contractor's option to select between the two types listed below.

- B. Three-piece assemblies allowing movement at expansion, contraction or isolation joint while maintaining wall alignment in direction normal to the movement. Two 3/16-inch (4.8-mm) diameter wire rods with plastic sleeves separating two 1/32-inch (0.8-mm) sheet metal sleeves for embedding completely in mortar, zinc plated; Hohmann & Barnard "Slip-Set Stabilizer" or equivalent.
- C. Galvanized 3/8-inch (9-mm) by 6 inches (150 mm) steel dowel vertically welded to a 2-inch (50-mm) by 5-inch (125-mm) steel plate with slotted holes for mounting to the underside of beams or deck, and a plastic sleeve with compressible filler to prevent dowel from bonding with mortar; Hohmann & Barnard PTA-420 with tube or equivalent.

2.8 ADJUSTABLE ANCHORS FOR CONNECTING TO STEEL FRAME

- A. General: Provide two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
 - 1. Anchor Section: Crimped 1/4-inch- (6.4-mm-) diameter, stainless steel anchor section for welding to steel.
 - 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.1875-inch- (4.8-mm-) stainless steel.
 - 3. Basis of Design Product: Hohmann & Barnard 359-FH Weld On Tie with VBT Vee Byna-Tie or one of the following, or equal.
 - a. Type I Weld On Anchor and 1100 Tie by Wire Bond.
 - b. 315-B Weld On Anchor and 316 Triangle Tie by Heckmann Building Products

2.9 ANCHORS FOR CONNECTING TO CONCRETE

- A. General: Provide two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
 - 1. Anchor Section: Dovetail anchor section formed from minimum 0.0966-inch- (2.5-mm-) thick, stainless steel sheet.
 - 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.1875-inch- (4.8-mm-) stainless steel wire.
 - 3. Basis of Design Product: Hohmann & Barnard 305 Dovetail Slot with 315 Flexible Dovetail Brick Tie or one of the following, or equal:
 - a. 2102 Tie and 1304 Dovetail Slot by Wire Bond.
 - b. 103 Tie and 100 Dovetail Slot by Heckmann Building Products
 - 4. Use for stone veneer and brick.

2.10 ADJUSTABLE MASONRY-VENEER ANCHORS

- A. General: Provide two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing or insulation to wood or metal studs, and as follows:

1. Structural Performance Characteristics: Capable of withstanding a 100-lbf (445-N) load in both tension and compression without deforming or developing play in excess of 0.05 inch (1.3 mm).
- B. Screw-Attached, Masonry-Veneer Anchors for Metal Stud Back-up Construction: Units consisting of a wire tie section and a metal anchor section complying with the following requirements:
1. Anchor Section: Rib-stiffened, sheet metal plate with 9/32" diameter screw holes top and bottom; with projecting tabs having slotted holes for inserting vertical legs of wire tie specially formed to fit anchor section.
 2. Wire Tie Section: Rectangular- shaped wire tie sized to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face.
 3. Fabricate sheet metal anchor sections and other sheet metal parts from 14 gauge (1.9 mm) thick, stainless steel sheet.
 4. Fabricate wire tie sections from 3/16 inch- (4.8-mm-) diameter, stainless steel wire.
 5. Basis of Design Product: One of the following or equal:
 - a. RJ-711;. Wire-Bond
 - b. HB-213; Hohmann & Barnard, Inc.
 - c. #213 Anchor with #282 Tie; Heckmann Building Products
- C. Stainless-Steel Drill Screws for Steel Studs: Either made from Type 410 stainless steel or made with a carbon-steel drill point and 300 Series stainless-steel shank, complying with ASTM C 954 except manufactured with hex washer head and neoprene washer, No. 10 (4.8-mm) diameter by length required to penetrate steel stud flange by not less than three exposed threads
- D. Expansion Bolt-Attached, Masonry-Veneer Anchors for Existing Masonry or Concrete Back-up Construction (and where dovetail slots have not been installed in concrete): Units consisting of a wire tie section and a metal anchor section complying with the following requirements:
1. Anchor Section: Rib-stiffened, sheet metal plate with 7/16" diameter bolt hole in the center for use with brass expansion bolt; with projecting tabs having slotted holes for inserting vertical legs of wire tie specially formed to fit anchor section.
 2. Wire Tie Section: Rectangular- shaped wire tie sized to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face.
 3. Fabricate sheet metal anchor sections and other sheet metal parts from 14 gauge (1.9-mm-) thick, stainless steel sheet.
 4. Fabricate wire tie sections from 3/16-inch- (4.8-mm-) diameter, stainless steel wire.
 5. Basis of Design Product: HB-5213 by Hohmann & Barnard, Inc. or comparable system/product by one of the following:
 - a. Wire-Bond
 - b. Heckmann Building Products (Pos-I-Tie system)
 6. Use for brick.

- E. Brass Expansion Bolt for Existing Masonry or Concrete Back-up Construction: Masonry fastener for fastening anchors to concrete, block, brick and into mortar joints complying with the following requirements:

1. Internal Bolt: 1/4" diameter – 20, Type 304 stainless steel.
2. Stainless Steel Washer: 3/4" OD, Type 18-8 stainless steel.
3. Knurled Expansion Sleeve and Expander Cone: Brass 260 alloy.
4. Fixture Clearance Hole: 7/16" diameter
5. ANSI Drill Bit Size: 3/8" diameter
6. Basis of Design Product: 523 Brass Expansion Bolt by Hohmann & Barnard, Inc. or equal system/product by one of the following:
 - a. Wire-Bond
 - b. Heckmann Building Products

2.11 RIGID ANCHORS

- A. General: Fabricate from steel bars as follows:

1. 1-1/2 inches (38 mm) wide by 1/4 inch (6.4 mm) thick by 24 inches (600 mm) long, with ends turned up 2 inches (50 mm) or with cross pins.
2. Finish: Hot-dip galvanized to comply with ASTM A 153.

2.12 MISCELLANEOUS ANCHORS

- A. Anchor Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153, Class C; of diameter and length indicated and in the following configurations:

1. Headed bolts.

- B. Postinstalled Anchors: Anchors as described below, with capability to sustain, without failure, load imposed within factors of safety indicated, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

1. Type: Chemical anchors.
2. Type: Expansion anchors.
3. Corrosion Protection (Indoor): Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 service condition (mild).
4. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Alloy Group 1 or 4) for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or 316, for anchors.
5. For Postinstalled Anchors in Concrete: Capability to sustain, without failure, a load equal to four times the loads imposed.
6. For Postinstalled Anchors in Grouted Masonry Units: Capability to sustain, without failure, a load equal to six times the loads imposed.

2.13 EMBEDDED FLASHING MATERIALS

- A. Concealed Adhered Masonry Flashing: Provide stainless steel fabric laminated sheet flashing overlapping a full bed depth stainless steel drip as follows:
1. Basis of Design Product: Provide specified product of Hohmann & Barnard or equal products by York or Wire-Bond.
 2. Sheet-Metal Drip Flashing: Fabricate from 22 gage stainless steel with the drip edge hemmed approximately 3/16-inch and a 2 inch turn-up, as indicated on Drawings.
 3. Termination Bar: Stainless steel.
 4. Self-Adhering Stainless Steel Fabric Laminated Sheet Flashing: Manufacturer's standard composite membrane consisting of a polymeric film laminated to a .003 inch stainless steel sheet, with a pressure-sensitive, clear adhesive; non-asphaltic; Mighty-Flash – SA Self-Adhering Stainless Steel Fabric Flashing by Hohmann & Barnard or equal. Verify compatibility with air barrier system that sheet flashing contacts.
 - a. Primer: Flashing manufacturer's standard product or product recommended by flashing manufacturer for bonding flashing sheets to masonry and concrete; Primer – SA by Hohmann & Barnard or equal.
- B. Metal Flashing: Provide metal flashing complying with Section 076200 "Sheet Metal Flashing and Trim" and as follows:
1. Stainless Steel: ASTM A 240/A 240M, Type 304, 26 gauge 0.016 inch (0.40 mm) thick.
 2. Fabricate drip edge in one continuous length, 4 inches wide, with a hemmed outer edge condition held flush with face of finished masonry.
- C. Application: Unless otherwise indicated, use the following:
1. Where flashing is indicated to receive counterflashing, use metal flashing.
 2. Where flashing is partly exposed and is indicated to terminate at the wall face, use concealed flexible flashing with a metal drip edge.
 3. Where flashing is fully concealed, use flexible flashing.

2.14 CAVITY-WALL INSULATION

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type X, 15-psi (104-kPa) minimum compressive strength, with maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84. .
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. DiversiFoam Products; CertaFoam 15.
 - b. DuPont; Dow Styrofoam Brand Cavitymate.
 - c. Owens Corning; Foamular CW15 Square Edge.
 2. Thickness: As indicated on Drawings.

3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
4. Edges: Square edge.
- B. Tape for Sealing Joints in Insulation: Type recommended by insulation board manufacturer for application indicated.
- C. Adhesive: Type recommended by insulation board manufacturer for application indicated

2.15 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Preformed Control-Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated, or required.
 1. Styrene-Butadiene-Rubber Compound: ASTM D 2000, Designation M2AA-805.
 2. Product: Hohmann & Barnard, Inc., RS Series or equal.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Wicking Material: Absorbent rope, made from UV-resistant synthetic fiber, 1/4 to 3/8 inch (6 to 10 mm) in diameter, in length required to produce 2-inch (50-mm) exposure on exterior and 18 inches (450 mm) in cavity. Use only for weeps.
 1. Application: At cast stone panels and trim, and other locations as indicated
- E. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe.
 1. Color: Match mortar color.
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following or equivalent:
 - a. WeepVent by Mortar Net Solutions.
 - b. CavClear Weep Vents.
 - c. Weep Mesh by Advanced Building Products
 3. Application: At brick veneer.
- F. Cavity Drainage Material: 2-inch- (50-mm-) thick, reticulated, nonabsorbent mesh, made from polyethylene strands with 90% open plastic mesh configuration, and dovetail shape to maintain drainage at weep holes without being clogged by mortar droppings.

1. Basis of Design Product: Provide one of the following or equivalent:
 - a. Mortar Net by Mortar Net Solutions
 - b. Mortar Trap by Hohmann & Barnard, Inc.
 - c. ProNet by Masonpro
- G. Cavity Drainage Material: 3/4-inch- (50-mm-) thick, reticulated, nonabsorbent mesh, made from polyethylene strands with 90% open plastic mesh configuration.
 1. Use in cavities with masonry back up and with less than 1 1/8" clear cavity only.
 2. Product: Subject to compliance with requirements, provide CavClear Masonry Mat manufactured by CavClear.

2.16 MASONRY CLEANERS

- A. Job-Mixed Detergent Solution: Solution of 1/2-cup (0.14-L) dry measure tetrasodium polyphosphate and 1/2-cup (0.14-L) dry measure laundry detergent dissolved in 1 gal. (4 L) of water.
- B. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
 1. Products for Cleaning Unit Masonry: Subject to compliance with requirements, provide one of the following:
 - a. Cleaners for Red and Light-Colored Brick Not Subject to Metallic Staining with Mortar Not Subject to Bleaching: Sure Klean No. 600 Detergent; ProSoCo, Inc.
 - b. Cleaners for Red and Dark-Colored Brick Not Subject to Metallic Staining: Sure Klean No. 101 Lime Solvent; ProSoCo., Inc.
 - c. Cleaners for Brick Subject to Metallic Staining: Sure Klean Vana Trol; ProSoCo, Inc.

2.17 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 1. Do not use calcium chloride in mortar or grout.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Colored Mortar for Cast Stone and Brickwork: Produce mortar of color specified, and to match approved mock-ups by using selected ingredients. Do not alter specified proportions without Architect's approval.

1. Use naturally colored aggregates to produce required mortar color to greatest extent possible, before adding pigments.
 2. Pigments: Where mortar pigments are used, do not exceed a pigment-to-cement ratio of 1:10 by weight.
 3. Color: Match existing (Specmix Sandstone).
- D. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification.
1. Limit cementitious materials in mortar to portland cement and lime.
 2. For masonry below grade, in contact with earth, and where indicated, use Type M.
 3. For reinforced masonry, shear walls, exterior above-grade load-bearing and exterior above-grade non-load-bearing walls, interior load-bearing walls, parapet walls, and where indicated, use Type N.
 4. For interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
 5. For cast stone and brick units, use Type N.
- E. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 5 of ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 2. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
 2. Verify that foundations are within tolerances specified.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Before installation, examine rough-in and built-in construction to verify actual locations of piping connections.

3.2 INSTALLATION, GENERAL

- A. For cold-weather construction comply with requirements contained in ACI 530.1-05
- B. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual widths of masonry units, using units of widths indicated.

- C. Build chases and recesses to accommodate items specified in this Section and in other Sections of the Specifications.
- D. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to the opening.
- E. Cut masonry units with motor-driven saws to provide clean, sharp, un-chipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- F. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
 - 1. Mix units from several pallets or cubes as they are placed.
- G. Wetting of Brick: Wet brick before laying if the initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at the time of laying

3.3 CONSTRUCTION TOLERANCES

- A. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:
- B. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4 inch in 20 feet (6 mm in 6 m), nor 1/2 inch (12 mm) maximum.
- C. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), nor 1/2 inch (12 mm) maximum.
- D. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, the following tolerances will apply.
 - 1. Variation from Plumb: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m) or 1/4 inch in 20 feet (6 mm in 6 m) or more.
 - 2. Variation from Level: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 3/8 inch (9 mm) maximum.
 - 3. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches (3 mm in 900 mm) or one-fourth of nominal joint width, whichever is less.
 - 4. Variation in Plane between Adjacent Surfaces (Lipping): Do not exceed 1/16-inch (1.5-mm) difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.
- E. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm). Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).

- F. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm). Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Lay exposed masonry in running bond pattern unless otherwise indicated; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
 - 1. Provide running bond for brickwork.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches (50 mm). Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
- F. Fill space between hollow-metal frames and masonry solidly with mortar, unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
- H. Fill cores in hollow concrete masonry units with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated, and at all exterior wall locations.
- I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.
 - 1. Install compressible filler in joint between top of partition and underside of structure above.
 - 2. At fire-rated partitions, install firestopping in joint between top of partition and underside of structure above to comply with Division 07 Section "Firestopping."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow masonry units as follows:
 - 1. With full mortar coverage on horizontal and vertical face shells.
 - 2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.
 - 3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.
- B. Lay solid brick-size masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
 - 1. At cavity walls, bevel beds away from cavity, to minimize mortar protrusions into cavity. As work progresses, trowel mortar fins protruding into cavity flat against the cavity face of the brick.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated.
- D. Collar Joints in Masonry: Fill the vertical, longitudinal joint between wythes solidly with grout for exterior walls noted, do not fill insulated cavity walls.

3.6 CAVITIES

- A. Keep cavities clean of mortar droppings and other materials during construction. Strike joints facing cavities flush.
 - 1. Use wood strips temporarily placed in cavity to collect mortar droppings. As work progresses, remove strips, clean off mortar droppings, and replace in cavity.
- B. Apply air barrier to face of backup to comply with Section 072726 "Fluid-Applied Membrane Air Barriers."
- C. Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches (300 mm) o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
 - 1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.7 MASONRY JOINT REINFORCEMENT

- A. General: Provide continuous masonry joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).

1. Space reinforcement not more than 16 inches (406 mm) o.c.
 2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
 3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings.
 - a. Reinforcement above is in addition to continuous reinforcement.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 ANCHORING MASONRY TO STRUCTURAL MEMBERS

- A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:
1. Provide an open space not less than 1 inch (25 mm) in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar or other rigid materials.
 2. Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.
 3. Space anchors as indicated, but not more than 16 inches (406 mm) o.c. vertically and 16 inches (406 mm) o.c. horizontally, with not less than 1 anchor for each 1.77 sq. ft. (0.16 sq. m) of wall area.

3.9 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to wall framing or solid backup with masonry-veneer anchors to comply with the following requirements:
1. Fasten each anchor section through sheathing to metal wall framing with two metal screw fasteners of type indicated.
 2. Fasten each anchor section to CMU or concrete back-up with to expansion bolt anchors
 3. Embed tie sections in masonry joints. Provide not less than 2 inches (50 mm) of air space between back of masonry veneer and face of sheathing.
 4. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 5. Space anchors as indicated, but not more than 16 inches (406 mm) o.c. vertically and 16 inches (406 mm) o.c. horizontally, with not less than 1 anchor for each 1.77 sq. ft. (0.16 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 8 inches (203 mm), around the perimeter.

3.10 CONTROL AND EXPANSION JOINTS

- A. General: Install vertical control and expansion joints at one side of all doorways and at wall locations maximum 25 ft. o.c., and where indicated. Build-in related items as masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.
- B. Form control joints in concrete masonry with preformed control-joint gaskets designed to fit standard sash block.
- C. Form expansion joints in brick made from clay or shale by building in joint fillers not less than 3/8 inch (10 mm) for installation of sealant and backer rod specified in Division 07 Section "Joint Sealants." Keep joint free and clear of mortar.
- D. Build in horizontal, pressure-relieving joints where indicated; construct joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 07 Section "Joint Sealants."
 - 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry veneer and attached to structure behind masonry veneer.

3.11 LINTELS

- A. Install steel lintels where indicated.
- B. Provide masonry lintels where shown and where openings of more than 12 inches (305 mm) for brick-size units and 24 inches (610 mm) for block-size units are shown without structural steel or other supporting lintels.
 - 1. Provide prefabricated or built-in-place masonry lintels. Use specially formed bond beam units with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.
- C. Provide minimum bearing of 8 inches (200 mm) at each jamb, unless otherwise indicated.

3.12 FLASHING, WEEP HOLES, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Unless otherwise indicated, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
- C. Install flashing as follows:
 - 1. At masonry-veneer walls, apply flexible flashing over the air barrier to a height of 6" above the top of the cavity drainage material and secure flashing top edge

- with a termination bar to substrate. Apply sealant to top of termination bar. Install a 6" wide strip of compatible self-adhesive membrane over the installed termination bar and sealant, centered on the termination bar. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall, and adhere flexible flashing to top of metal drip edge
2. At lintels and shelf angles, extend flashing a minimum of 4 inches (100 mm) into masonry at each end. At heads and sills, extend flashing 4 inches (100 mm) at ends and turn flashing up not less than 2 inches (50 mm) to form a pan.
 3. Extend sheet metal flashing 1/2 inch (13 mm) beyond face of masonry at exterior and turn flashing down to form a drip.
 4. Install end dams at all window and door flashing locations.
- D. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:
1. Use mesh weep vents to form weep holes at brick.
 2. Use wicking material to form weep holes above flashing under cast stone sills. Turn wicking down at lip of sill to be as inconspicuous as possible
 3. Space weep holes 24 inches (600 mm) o.c.
 4. Place cavity drainage material immediately above flashing in cavities.
- E. Install vents in vertical head joints at the top of each continuous cavity at spacing indicated. Use plastic weep hole/vents to form vents.
- F. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- 3.13 REINFORCED UNIT MASONRY INSTALLATION
- A. General: Provide reinforced unit masonry walls at all walls as indicated.
- B. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- C. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- D. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.14 FIELD QUALITY CONTROL

- A. Inspectors: Owner will engage qualified certified testing agency to perform inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections.
 1. Place grout only after inspectors have verified compliance of grout spaces and grades, sizes, and locations of reinforcement.
 2. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.
- B. Testing Frequency: Tests and Evaluations listed in this Article will be performed during construction for each 5000 sq. ft. (465 sq. m) of wall area or portion thereof.
- C. Mortar Test (Property Specification): For each mix provided, per ASTM C 780 . Test mortar for mortar air content and compressive strength
- D. Grout Test (Compressive Strength): For each mix provided, per ASTM C 1019.

3.15 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.

5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain on exposed surfaces.
6. Clean brick masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 042000

SECTION 047200 – CAST STONE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Cast stone sills, copings, trim, caps, and other shapes indicated on drawings.
2. Cast stone wall panels.
3. Decorative cast stone wall panels to match existing adjacent.
4. Steel and stainless steel support and retention connections for cast stone, including all ties, anchors, and necessary shims to supporting structure.
5. Engineered anchoring designs and connections, by a professional engineer employed by the Contractor.

B. Related Sections:

1. Division 04 Section "Unit Masonry" for mortar and grout.

1.2 DEFINITIONS

A. Cast Stone: Architectural precast concrete building units intended to simulate natural cut stone.

B. Arris: The sharp edge of a Cast Stone Unit.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. General: Engineer, design, fabricate and erect the precast units and supports to withstand loads from winds, gravity, seismic, structural movement including movement thermally induced, and to resist in-service use conditions that the units will experience, including exposure to the weather, without failure.

1. Design each member to withstand stresses resulting from combinations of loads that produce the maximum allowable stresses in that member.
2. Design connection of precast units to structural backup. Refer to structural drawings and loads specified herein for minimum connection requirements.

B. Design Loads: Basic design loads include live loads, wind loads, and seismic load, in addition to the dead load.

1. Comply with requirements indicated on structural drawings.

1.4 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for cast stone units.

- B. Design Mixes: For each different mix.
- C. Shop Drawings: Prepared by or under supervision of a qualified professional engineer. Detail fabrication and installation of cast stone units. Indicate member locations, plans, elevations, dimensions, shapes, cross sections, limits of each finish, and types of reinforcement, including special reinforcement, and lifting devices necessary for handling and erection.
 - 1. Include building elevations showing layout of units and locations of joints and anchors.
 - 2. Indicate locations and details of anchorage devices to be embedded in other construction.
 - 3. Include erection procedure for precast units, sequence of erection, and erection tolerances.
 - 4. Provide complete design calculations, including loads imposed on structure, stamped and signed by qualified professional engineer.
 - 5. Where new castings are required to produce replacement members, provide full-scale details of castings.
- D. Samples for Initial Selection: For colored mortar, showing the full range of colors available.
- E. Samples for Verification:
 - 1. For each mortar color required, showing the full range expected in the finished construction. Make samples using the same sand and mortar ingredients to be used on Project. Label samples to indicate type and amount of colorant used.
 - 2. For each color and texture of cast stone required, 10-inches (250 mm) square in size.
- F. Full-Size Samples: For each type of cast stone trim unit required. Make available for Architect's review at Project site before installing cast stone.
 - 1. Approved Samples may be installed in the Work.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Fabricator and Professional Engineer.
- B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of cast stone with requirements indicated.
- C. Certification that the materials incorporated in this Work are free from hazardous contaminants.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in manufacturing cast stone units similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to manufacture required units.

1. Fabricator shall assume responsibility for engineering cast stone units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
 2. Fabricator is a producing member of the Cast Stone Institute
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the location of the Project and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cast stone units that are similar to those indicated for this Project in material, design, and extent.
- C. Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
- D. Source Limitations for Cast Stone: Obtain cast stone units through one source from a single manufacturer.
- E. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.
- F. Mock-ups for Trim Units: Incorporate cast stone trim units in mock-up specified in Division 04 Section "Unit Masonry".
- G. Mock-ups for Panels: Prior to installing cast stone wall panels, construct mockups for each form of construction and finish required to verify selections made under Sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for Work.
1. Locate mockups in-place on the building in the location and of the size indicated or, if not indicated, as directed by Architect.
 2. Include exposed sealant joint in mock-up.
 3. Notify Architect 7 days in advance of the dates and times when mockups will be constructed.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Obtain Architect's approval of mockups before start of Work.
 6. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 7. Demolish and remove exterior mock-ups at the completion of the Work.
 8. Mock-up in undamaged condition may be incorporated in the Work.
- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Coordination."
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Pack, handle, and ship cast stone units in suitable packs or pallets.

1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units, if required, using dollies with wood supports.
 2. Store cast stone units on wood skids or pallets with nonstaining, waterproof covers. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.
- B. Store installation materials on elevated platforms, under cover, and in a dry location.
- C. Store mortar aggregates where grading and other required characteristics can be maintained and contamination avoided.

1.8 COORDINATION

- A. Coordinate production and delivery of cast stone with unit masonry work to minimize the need for on-site storage and to avoid delaying the Work.
- B. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Provide products manufactured by one of the following:
1. Arriscraft
 2. American ArtStone.
 3. Continental Cast Stone Manufacturing, Inc.
 4. Corinthian Cast Stone
 5. Stone Legends Inc.

2.2 CAST STONE MATERIALS

- A. General: Comply with ASTM C 1364 and the following:
- B. Portland Cement: ASTM C 150, Type I, containing not more than 0.60 percent total alkali when tested according to ASTM C 114.
- C. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C 33; gradation as needed to produce required textures.
- D. Fine Aggregates: Manufactured or natural sands complying with ASTM C 33, gradation as needed to produce required textures.
- E. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
- F. Reinforcement: Deformed steel bars complying with ASTM A 615/A 615M.

1. Epoxy Coating: ASTM A 775/A 775M.
2. Galvanized Coating: ASTM A 767/A 767M.

- G. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A 276 or ASTM A 666, Type 304.

2.3 CASTING MATERIALS

- A. Cast Stone Casting Compound: Factory-formulated single-component mix designed for casting replacement cast stone pieces in custom color to match the original cast stone pieces, and that has only to be mixed with water at the casting fabrication shop. Cast stone casting mortar shall be completely mineral based, free of any latex or acrylic bonding agents or additives, and highly resistant to freeze-thaw damage.
1. Formulate casting compound used for casting reproduction cast stone in colors and textures to match each type of existing cast stone being reproduced.
 2. Basis of Design Product: Provide Jahn M150 Casting Mortar by Cathedral Stone Products, Inc., or equal product of one of the following:
 - a. Keim
 - b. Edison Coatings, Inc.

2.4 STEEL SUPPORT AND CONNECTION MATERIALS

- A. Carbon-Steel Shapes: ASTM A 36. Steel shapes shall meet the requirements of ASTM A992 (50 ksi steel).
- B. Carbon-Steel Plate: Structural quality, hot-rolled carbon steel, ASTM A 283, Grade C.
- C. Electrodes for Welding: Comply with AWS code and ASTM A 232, E70XX Electrodes, Low Hydrogen.
- D. Finish: For exterior steel items, steel in exterior walls, exposed units, and items indicated for galvanizing, apply zinc coating by hot-dip process according to ASTM A 123/A 123M, after fabrication, and ASTM A 153/A 153M, as applicable. For inserts cast into precast units, provide hot-dipped galvanized, electrogalvanized, or cadmium coated finish. For all other items, provide shop painting with rust-inhibitive primer.

2.5 STAINLESS-STEEL SUPPORT AND CONNECTION MATERIALS

- A. Anchors: Stainless steel, ASTM A 666, Type 304, of temper and diameter required to support loads without exceeding allowable design stresses.
- B. Dowels: Round stainless-steel bars complying with ASTM A 276, Type 304, 1/2-inch diameter.
- C. Accessories: Provide clips, hangers, plastic shims, and other accessories required to install cast stone units.

- D. Provide stainless steel support and connection materials for exterior cast stone, unless otherwise indicated on Drawings.

2.6 CAST STONE UNITS

- A. Provide cast stone units complying with ASTM C 1364.
 - 1. Provide units that are resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666, Procedure A, as modified by ASTM C 1364.
- B. Physical Properties:
 - 1. Compressive Strength: Minimum 6,500 psi when tested per ASTM C 1194.
 - 2. Absorption: Maximum 6% when tested per ASTM C 1195.
 - 3. Freeze Thaw: Maximum 5% when tested per C1364.
 - 4. Unit Density: Minimum 130 pcf when tested per ASTM C642.
 - 5. Cast stone units installed at grade shall be suitable for use at or below grade.
- C. Reinforce units as indicated and as required by ASTM C 1364. Use galvanized or epoxy-coated reinforcement when covered with less than 1-1/2 inches (38 mm) of material. Minimum coverage shall be twice the diameter of the bars.
 - 1. Area of reinforcement in panels greater than 12" wide shall be not less than 1/4 percent of the cross section area when steel is specified.
- D. Fabrication Method: Use a Vibrant-Tamp placement method or machine manufacture using a zero slump mixture to achieve desired appearance and physical properties.
- E. Fabricate units with sharp arris and details accurately reproduced with indicated texture on all exposed surfaces, unless otherwise indicated.
 - 1. Slope exposed horizontal surfaces at least 1:12, unless otherwise indicated.
 - 2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
 - 3. Provide drips on projecting elements, unless otherwise indicated.
- F. Fabricate panels and trim members to size, shape and thicknesses indicated on Drawings for each application.
 - 1. Exterior wall panels shall be full-depth (3-5/8") thickness minimum, unless otherwise indicated on Drawings.
- G. Cure and finish units as follows:
 - 1. Cure units in totally enclosed curing room under dense fog and water spray at 95 percent relative humidity for 24 hours.
 - 2. Yard cure units until the sum of the mean daily temperatures for each day equals or exceeds 350 deg F.
 - 3. Acid etch units to remove cement film from surfaces indicated to be finished.

- H. Color and Texture: Exposed surfaces shall exhibit a fine-grained texture similar to natural stone; no bug-holes or air voids shall be permitted.

- 1. Color and Texture: Match existing.

2.7 CASTING REPLACEMENT PANELS

- A. Casting Replacement Panels:

- 1. Preparation: Prior to packing the mold, apply a non-staining mold release to all surfaces, making sure to treat undercut areas well.
 - 2. Ferrous metal reinforcement exposed within or adjacent to the repair area shall be coated with a rust inhibitor.
 - 3. Mix casting mortar powder with water in ratio as recommended by manufacturer, and in compliance with manufacturer's directions.
 - 4. Clean the mold of all foreign material. Coat the mold with a non-staining release agent. Scoop approximately 1/3 of the mixed mortar into the mold and tamp it firmly. Press the initial application into place by hand, making certain to completely fill intricate detailing and undercut areas. As the build-up of material proceeds, tamp mortar repeatedly to consolidate. Compaction may be performed using wood tamp and a mallet.. Repeat the process until the mold is slightly overfilled.
 - 5. Once filled and firmly compacted, screed excess material to produce a flush surface with the top of the mold. Cover casting with plastic sheeting for approximately 24 hours.
 - 6. Curing: After the initial 12-24 hours has elapsed, uncover the mold and pour clean potable water into the cast until the point of rejection. Recover mold with the plastic. Remove cast from the mold after an additional 24 hours have passed.

- B. New castings shall match original in profile, thickness and size.

2.8 MORTAR MATERIALS

- A. Provide mortar materials that comply with Division 04 Section "Unit Masonry."

2.9 ACCESSORIES

- A. Anchors for Cast Stone Trim: Units fabricated with tabs or dowels designed to engage kerfs or holes in cast stone trim units and holes for fastening to framing of type as indicated, size as required for project conditions, fabricated from stainless steel complying with ASTM A 276 or ASTM A 666, Type 304.
- B. Dowels: Round stainless-steel bars complying with ASTM A 276, Type 304, 1/2-inch (12-mm) diameter.
- C. Cast Stone Cleaner: Sure Kleen #600 by ProSoCo Products Inc., or equal.
- D. Through wall flashing, weep wicks and other accessories are specified in Division 04 Section "Unit Masonry."

2.10 MORTAR MIXES

- A. Provide ASTM C 270, Type N colored mortar. Comply with requirements in Division 04 Section "Unit Masonry" for mortar mixes.

2.11 SOURCE QUALITY CONTROL

- A. Employ an independent testing agency to sample and test cast stone units according to ASTM C 1364.
 - 1. Include testing for freezing and thawing resistance.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of cast stone.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with Cast Stone Institute recommendation for installation of cast stone units.
- B. Set cast stone as indicated on Contract Drawings. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
- C. Anchor cast stone panels in position by bolting, welding, grouting, or as otherwise indicated. Remove temporary shims, wedges, and spacers as soon as possible after anchoring and grouting are completed.
- D. Drench units with clear water just before setting.
- E. Set units in full bed of mortar with full head joints, unless otherwise indicated. Build anchors and ties into mortar joints as units are set.
 - 1. Fill dowel holes and anchor slots with mortar.
 - 2. Fill collar joint solid as units are set.
 - 3. Build concealed flashing into mortar joints as units are set.
 - 4. Leave head joints open in coping and other units with exposed horizontal surfaces. Keep joints clear of mortar, and rake out to receive sealant.
- F. Rake out joints for pointing with mortar to depths of not less than 3/4 inch (19 mm). Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.

- G. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch (10 mm). Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
- H. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.
- I. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated.
 - 1. Sealing joints is specified in Division 07 Section "Joint Sealants."
 - 2. Keep joints free of mortar and other rigid materials.

3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m) or 1/4 inch in 20 feet (6 mm in 6 m) or more.
- B. Variation from Level: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 3/8 inch (9 mm) maximum.
- C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches (3 mm in 900 mm) or one-fourth of nominal joint width, whichever is less.
- D. Variation in Plane between Adjacent Surfaces (Lipping): Do not exceed 1/16-inch (1.5-mm) difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

3.4 ADJUSTING AND CLEANING

- A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.
- B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean cast stone as work progresses. Remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
 - 3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
 - 4. Clean cast stone in conformance cleaner manufacturer's directions.

December 14, 2023
Construction Documents
SED No. 44-10-00-01-0-001-041

Enlarged City School District of Middletown
Twin Towers Middle School
Additions and Alterations

END OF SECTION 047200

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural-steel materials.
2. Shrinkage-resistant grout.
3. Shear stud connectors.

B. Related Requirements:

1. Section 053100 "Steel Decking" for field installation of shear stud connectors through deck.
2. Section 055000 "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame and other steel items not defined as structural steel.

1.2 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.
- B. Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or along grid lines designated as "SLRS" on Drawings, including columns, beams, and braces and their connections.
- C. Heavy Sections: Rolled and built-up sections as follows:
1. Shapes included in ASTM A6/A6M with flanges thicker than 1-1/2 inches.
 2. Welded built-up members with plates thicker than 2 inches.
 3. Column base plates thicker than 2 inches.
- D. Protected Zone: Structural members or portions of structural members indicated as "protected zone" on Drawings. Connections of structural and nonstructural elements to protected zones are limited.
- E. Demand-Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the seismic-load-resisting system and which are indicated as "demand critical" or "seismic critical" on Drawings.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply

with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

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

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

- A. Product Data:

1. Structural-steel materials.
2. High-strength, bolt-nut-washer assemblies.
3. Shear stud connectors.
4. Anchor rods.
5. Threaded rods.
6. Forged-steel hardware.
7. Slide bearings.
8. Prefabricated building columns.
9. Shop primer.
10. Galvanized-steel primer.
11. Etching cleaner.
12. Galvanized repair paint.
13. Shrinkage-resistant grout.

- B. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
2. Environmental Product Declaration: For each product.
3. Health Product Declaration: For each product.
4. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.
5. Environmental Product Declaration: For each product.
6. Environmental Product Declaration: For each product.
7. Environmental Product Declaration: For each product.
8. Third-Party Certifications: For each product.
9. Third-Party Certified Life Cycle Assessment: For each product.
10. Health Product Declaration (HPD): For each product.
11. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.

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

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment Drawings.

3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
 5. Identify members and connections of the seismic-load-resisting system.
 6. Indicate locations and dimensions of protected zones.
 7. Identify demand-critical welds.
 8. Identify members not to be shop primed.
- D. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide in accordance with AWS D1.1/D1.1M for each welded joint whether prequalified or qualified by testing, including the following:
1. Power source (constant current or constant voltage).
 2. Electrode manufacturer and trade name, for demand-critical welds.
- E. Delegated Design Submittal: For structural-steel connections indicated on Drawings to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Mill test reports for structural-steel materials, including chemical and physical properties.
- E. Product Test Reports: For the following:
1. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
 2. Direct-tension indicators.
 3. Tension-control, high-strength, bolt-nut-washer assemblies.
 4. Shear stud connectors.
- F. Survey of existing conditions.
- G. Source quality-control reports.
- H. Field quality-control reports.

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality

Certification Program and is designated an AISC-Certified Plant, Category BU or is accredited by the IAS Fabricator Inspection Program for Structural Steel (Acceptance Criteria 172).

- B. Installer Qualifications: A qualified Installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector.
- C. Shop-Painting Applicator Qualifications: Qualified in accordance with AISC's Sophisticated Paint Endorsement P1 or to SSPC-QP 3.
- D. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.
 - 1. Welders and welding operators performing work on bottom-flange, demand-critical welds are to pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G are to be considered separate processes for welding personnel qualification.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 - 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with applicable provisions of the following specifications and documents:
 - 1. ANSI/AISC 303.
 - 2. ANSI/AISC 341.
 - 3. ANSI/AISC 360.

4. RCSC's "Specification for Structural Joints Using High-Strength Bolts."

B. Connection Design Information:

1. Option 1: Connection designs have been completed and connections indicated on the Drawings.
2. Option 2: Fabricator's experienced steel detailer selects or completes connections in accordance with ANSI/AISC 303.
 - a. Select and complete connections using schematic details indicated and ANSI/AISC 360.
 - b. Use Allowable Stress Design; data are given at service-load level.
3. Option 3 and 3A: Design connections in accordance with ANSI/AISC 303 by fabricator's qualified professional engineer. Member reinforcement at connections is indicated on Drawings.
 - a. Use Allowable Stress Design; data are given at service-load level.
4. Option 3 and 3B: Design connections and final configuration of member reinforcement at connections in accordance with ANSI/AISC 303 by fabricator's qualified professional engineer.
 - a. Use Allowable Stress Design; data are given at service-load level.

C. Moment Connections: Type FR, fully restrained.

D. Construction: Moment frame.

2.2 STRUCTURAL-STEEL MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. W-Shapes: ASTM A992/A992M.
- C. Channels, Angles, M-Shapes: ASTM A36/A36M.
- D. Channels, Angles, S-Shapes: ASTM A36/A36M.
- E. Plate and Bar: ASTM A36/A36M.
- F. Corrosion-Resisting (Weathering) Structural-Steel Shapes, Plates, and Bars: ASTM A588/A588M, 50 ksi.
- G. Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade C structural tubing.
- H. Corrosion-Resisting (Weathering), Cold-Formed Hollow Structural Sections: ASTM A847/A847M structural tubing.

- I. Steel Castings: ASTM A216/A216M, Grade WCB, with supplementary requirement S11.
- J. Steel Forgings: ASTM A668/A668M.
- K. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

- A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
 - 1. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with plain finish.
- B. Zinc-Coated High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.
 - 1. Finish: Hot-dip zinc coating.
 - 2. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with mechanically deposited zinc coating finish.
- C. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F3125/F3125M, Grade F1852, Type 1, heavy-hex head assemblies, consisting of steel structural bolts with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.
 - 1. Finish: Plain.
- D. Shear Stud Connectors: ASTM A108, AISI C-1015 through C-1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

2.4 RODS

- A. Unheaded Anchor Rods: ASTM F1554, Grade 36.
 - 1. Configuration: Hooked.
 - 2. Nuts: ASTM A563 heavy-hex carbon steel.
 - 3. Plate Washers: ASTM A36/A36M carbon steel.
 - 4. Washers: ASTM F436, Type 1, hardened carbon steel.
 - 5. Finish: Plain.
- B. Headed Anchor Rods: ASTM F1554, Grade 36, straight.
 - 1. Nuts: ASTM A563 heavy-hex carbon steel.

2. Plate Washers: ASTM A36/A36M carbon steel.
3. Washers: ASTM F436, Type 1, hardened carbon steel.
4. Finish: Plain.

C. Threaded Rods: ASTM A36/A36M.

1. Nuts: ASTM A63 heavy-hex carbon steel.
2. Washers: ASTM F436, Type 1, hardened carbon steel.
3. Finish: Plain.

2.5 FORGED-STEEL STRUCTURAL HARDWARE

- A. Clevises and Turnbuckles: Made from cold-finished carbon-steel bars, ASTM A108, AISI C-1035.
- B. Eye Bolts and Nuts: Made from cold-finished carbon-steel bars, ASTM A108, AISI C-1030.
- C. Sleeve Nuts: Made from cold-finished carbon-steel bars, ASTM A108, AISI C-1018.

2.6 PRIMER

- A. Steel Primer:
 1. SSPC-Paint 23, latex primer.
 2. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.
- B. Galvanized-Steel Primer: MPI#26.
 1. Etching Cleaner: MPI#25, for galvanized steel.
 2. Galvanizing Repair Paint: ASTM A780/A780M.

2.7 SHRINKAGE-RESISTANT GROUT

- A. Metallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.
- B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.8 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.

1. Camber structural-steel members where indicated.
 2. Fabricate beams with rolling camber up.
 3. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing has been erected.
 4. Mark and match-mark materials for field assembly.
 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, [mechanically thermal cut,]or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted in accordance with SSPC-SP 3.
- F. Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using automatic end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.
- G. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural-steel frame. Straighten as required to provide uniform, square, and true members in completed wall framing. Build up welded framing, weld exposed joints continuously, and grind smooth.
- H. Welded-Steel Door Frames: Build up welded-steel doorframes attached to structural-steel frame. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk machine screws, uniformly spaced not more than 10 inches o.c. unless otherwise indicated on Drawings.
- I. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.9 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's

"Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

- B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

2.10 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel in accordance with ASTM A123/A123M.

1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize lintels shelf angles and welded door frames attached to structural-steel frame and located in exterior walls.

2.11 SHOP PRIMING

- A. Shop prime steel surfaces, except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces of high-strength bolted, slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces unless indicated to be painted.
6. Corrosion-resisting (weathering) steel surfaces.
7. Surfaces enclosed in interior construction.

- B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:

1. SSPC-SP 2.
2. SSPC-SP 3.
3. SSPC-SP 7 (WAB)/NACE WAB-4.
4. SSPC-SP 14 (WAB)/NACE WAB-8.
5. SSPC-SP 11.
6. SSPC-SP 6 (WAB)/NACE WAB-3.
7. SSPC-SP 10 (WAB)/NACE WAB-2.
8. SSPC-SP 5 (WAB)/NACE WAB-1.
9. SSPC-SP 8.

- C. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner or in accordance with SSPC-SP 16.
- D. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 - 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.12 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.
 - 1. Allow testing agency access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
 - 2. Bolted Connections: Inspect shop-bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
 - 3. Welded Connections: Visually inspect shop-welded connections in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - a. Liquid Penetrant Inspection: ASTM E165/E165M.
 - b. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - c. Ultrasonic Inspection: ASTM E164.
 - d. Radiographic Inspection: ASTM E94/E94M.
 - 4. In addition to visual inspection, test and inspect shop-welded shear stud connectors in accordance with requirements in AWS D1.1/D1.1M for stud welding and as follows:
 - a. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear stud connector.
 - b. Conduct tests in accordance with requirements in AWS D1.1/D1.1M on additional shear stud connectors if weld fracture occurs on shear stud connectors already tested.
 - 5. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
 - 1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.
 - 1. Do not remove temporary shoring supporting composite deck construction and structural-steel framing until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.
- B. Baseplates, Bearing Plates, and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of baseplate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.
- C. Maintain erection tolerances of structural steel within ANSI/AISC 303.
- D. Align and adjust various members that form part of complete frame or structure before

permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
 3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.
- C. Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.

3.5 REPAIR

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing, and repair galvanizing to comply with ASTM A780/A780M.
- B. Touchup Painting:
1. Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply

with SSPC-PA 1 for touching up shop-painted surfaces.

- a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
2. Cleaning and touchup painting are specified in Section 099600 "High-Performance Coatings."
- C. Touchup Priming: Cleaning and touchup priming are specified in Section 099600 "High-Performance Coatings."

3.6 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform the following special inspections:
 1. Verify structural-steel materials and inspect steel frame joint details.
 2. Verify weld materials and inspect welds.
 3. Verify connection materials and inspect high-strength bolted connections.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
 1. Bolted Connections: Inspect bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
 2. Welded Connections: Visually inspect field welds in accordance with AWS D1.1/D1.1M.
 - a. In addition to visual inspection, test and inspect field welds in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - 1) Liquid Penetrant Inspection: ASTM E165/E165M.
 - 2) Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - 3) Ultrasonic Inspection: ASTM E164.
 - 4) Radiographic Inspection: ASTM E94/E94M.
 3. Shear Stud Connectors: In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 - a. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 - b. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.

December 14, 2023
Construction Documents
SED No. 44-10-00-01-0-001-041

Enlarged City School District of Middletown
Twin Towers Middle School
Additions and Alterations

END OF SECTION 051200

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof deck.
2. Acoustical roof deck.
3. Composite floor deck.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for normal-weight and lightweight structural concrete fill over steel deck.
2. Section 051200 "Structural Steel Framing" for shop- and field-welded shear connectors.
3. Section 055000 "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Roof deck.
2. Acoustical roof deck.
3. Composite floor deck.

B. Shop Drawings:

1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

C. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
2. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.
3. Environmental Product Declaration (EPD): For each product.
4. Product Certificates: For indigenous materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each indigenous material.

5. Environmental Product Declaration: For each product.
6. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each regional material.
7. Environmental Product Declaration: For each product.
8. Environmental Product Declaration: For each product.
9. Third-Party Certifications: For each product.
10. Third-Party Certified Life Cycle Assessment: For each product.
11. Health Product Declaration (HPD): For each product.
12. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.

1.3 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Product Certificates: For each type of steel deck.
- C. Test and Evaluation Reports:
 1. Product Test Reports: For tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
 - a. Power-actuated mechanical fasteners.
 - b. Acoustical roof deck.
 2. Research Reports: For steel deck, from ICC-ES showing compliance with the building code.
- D. Field Quality-Control Submittals:
 1. Field quality-control reports.
- E. Qualification Statements: For welding personnel and testing agency.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with SDI QA/QC and the following welding codes:
 1. AWS D1.1/D1.1M.
 2. AWS D1.3/D1.3M.
- B. Electrical Raceway Units: Provide UL-labeled cellular floor-deck units complying with UL 209 and listed in UL's "Electrical Construction Equipment Directory" for use with standard header ducts and outlets for electrical distribution systems.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Store products in accordance with SDI MOC3. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.
 - 1. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck in accordance with AISI S100.
- B. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from listings of another qualified testing agency.
- C. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

2.2 ACCESSORIES

- A. Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile indicated.

- G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
- H. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
- I. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0747 inch thick, with factory-punched hole of 3/8-inch minimum diameter.
- J. Shear Stud Connectors: ASTM A108, AISI C-1015 through C-1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.
- K. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.
- L. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck, with 3-inch- wide flanges and level recessed pans of 1-1/2-inch minimum depth. For drains, cut holes in the field.
- M. Galvanizing Repair Paint: ASTM A780/A780M.
- N. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories in accordance with SDI C, SDI NC, and SDI RD, as applicable; manufacturer's written instructions; and requirements in this Section.
- B. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
 - 1. Align cellular deck panels over full length of cell runs and align cells at ends of abutting panels.

- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install in accordance with deck manufacturer's written instructions.
- J. Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.

3.3 INSTALLATION OF ROOF DECK

- A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
 - 1. Weld Diameter: 5/8 inch, nominal.
 - 2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds as indicated.
 - 3. Weld Washers: Install weld washers at each weld location.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 36 inches, and as follows:
 - 1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
 - 2. Mechanically clinch or button punch.
 - 3. Fasten with a minimum of 1-1/2-inch- long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
 - 1. End Joints: Lapped 2 inches minimum.
- D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and mechanically fasten flanges to top of deck. Space mechanical fasteners not more than 12 inches apart with at least one fastener at each corner.

1. Install reinforcing channels or zees in ribs to span between supports and mechanically fasten.
- E. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels in accordance with deck manufacturer's written instructions. mechanically fasten to substrate to provide a complete deck installation.
 1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.
- F. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive in accordance with manufacturer's written instructions to ensure complete closure.
- G. Sound-Absorbing Insulation: Installation into topside ribs of deck as specified in architectural drawings (if applicable).

3.4 INSTALLATION OF FLOOR DECK

- A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:
 1. Weld Diameter: 5/8 inch, nominal.
 2. Weld Spacing:
 - a. Space and locate welds as indicated.
 3. Weld Washers: Install weld washers at each weld location.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 36 inches, and as follows:
 1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
 2. Mechanically clinch or button punch.
 3. Fasten with a minimum of 1-1/2-inch- long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
 1. End Joints: Lapped.
- D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure in accordance with SDI recommendations unless otherwise indicated.
- E. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, in accordance with SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

3.5 REPAIR

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint in accordance with ASTM A780/A780M and manufacturer's written instructions.
- B. Repair Painting:
 - 1. Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.
 - 2. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
 - 3. Wire brushing, cleaning, and repair painting of bottom deck surfaces are included in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
 - 4. Wire brushing, cleaning, and repair painting of rust spots, welds, and abraded areas of both deck surfaces are included in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
 - 1. Special inspections and qualification of welding special inspectors for cold-formed steel floor and roof deck in accordance with quality-assurance inspection requirements of SDI QA/QC.
 - a. Field welds will be subject to inspection.
 - 2. Steel decking will be considered defective if it does not pass tests and inspections.
 - 3. Shear Stud Connectors: In addition to visual inspection, test and inspect field-welded shear connectors in accordance with requirements in AWS D1.1/D1.1M for stud welding and as follows:
 - a. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 - b. Conduct tests in accordance with requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors that are already tested.
- C. Prepare test and inspection reports.

END OF SECTION 053100

SECTION 054000 – COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Exterior non-load bearing steel stud framing.
- B. Related Sections include the following:
 - 1. Division 05 Section "Metal Fabrications" for masonry shelf angles and connections and miscellaneous steel framing.

1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
 - 1. Design Loads: As indicated on Structural Drawings.
 - 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Non-Load Bearing Studs for Masonry Veneers: Horizontal deflection of 1/600 of the horizontally projected span.
 - b. Non-Load Bearing Studs at Other Materials: Horizontal deflection of 1/360 of the horizontally projected span.
 - 3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).
- B. Cold-Formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."
- C. Cold-Formed Steel Framing Design Standards:
 - 1. Wall Studs: AISI S211.
 - 2. Headers: AISI S212.
 - 3. Lateral Design: AISI S213.
- D. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.

1.3 SUBMITTALS

- A. Product Data: For each type of cold-formed metal framing product and accessory indicated.
- B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
 - 1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the professional engineer licensed in the State of New York, who is responsible for their preparation.
 - 2. For prefabricated work, show lifting points and loads and temporary and permanent reinforcement required during transport and erection.
 - 3. For connections to structural steel, show steel substrates as detailed on the steel shop drawings.
- C. Welding certificates.
- D. Qualification Data: For professional engineer.
- E. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that each of the following complies with requirements, based on evaluation of comprehensive tests for current products:
 - 1. Steel sheet.
 - 2. Expansion anchors.
 - 3. Power-actuated anchors.
 - 4. Mechanical fasteners.
 - 5. Vertical deflection clips.
 - 6. Horizontal drift deflection clips
 - 7. Miscellaneous structural clips and accessories.
- F. Research/Evaluation Reports: For cold-formed metal framing.

1.4 QUALITY ASSURANCE

- A. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.
- B. Professional Engineer Qualifications: A professional engineer who is licensed in the State of New York and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.
- C. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

- D. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
 - E. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - F. Vertical and Lateral Fire Propagation Test Characteristics: The exterior wall assembly of the new Classroom Addition is required to comply with NFPA 285 "Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components." The base wall, stud cavity insulation, wall sheathing, air barrier, continuous wall rigid insulation and exterior cladding are components that are required to be evaluated as part of this specific assembly test. Cold-formed metal wall framing shall be part of an assembly that has passed NFPA 285 testing.
 - G. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."
 - 1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Truss Design."
 - H. Preinstallation Conference: Conduct conference at Project site.
- 1.5 DELIVERY, STORAGE, AND HANDLING
- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
 - B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:
 - 1. ClarkDietrich Building Systems.
 - 2. MarinoWare; a division of Ware Industries.
 - 3. Super Stud Building Products, Inc.

2.2 MATERIALS

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:

1. Grade: ST33H (ST230H) and ST50H (ST340H) as required by structural performance.
2. Coating: G60 (Z180).

2.3 EXTERIOR AND INTERIOR NON LOAD BEARING WALL FRAMING

- A. Built-up Members: Built-up members of manufacturer's standard C-shaped steel section, with stiffened flanges, nested into a U-shaped steel section joist track, with unstiffened flanges; unpunched; of web depths indicated; and as follows:
1. Minimum Base-Metal Thickness: 16 gauge minimum, unless otherwise indicated Drawings.
 2. Flange Width: 1-5/8 inches (41 mm), minimum.

2.4 FRAMING ACCESSORIES

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

2.5 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts headless, hooked bolts headless bolts, with encased end threaded, and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C mechanically deposition according to ASTM B 695, Class 50.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure,

a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

- E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035
- B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.
- D. Shims: Load bearing, high-density multimonomer plastic, nonleaching.
- E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.
- F. Spray Foam Insulation/Sealer: Low expansion type, recommended by manufacturer for intended use.

2.7 FABRICATION

- A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.

4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

3.3 INSTALLATION, GENERAL

- A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.

- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).
- D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
 - 1. Cut framing members by sawing or shearing; do not torch cut.
 - 2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
- H. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- I. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
 - 1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 EXTERIOR AND INTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Fasten both flanges of studs to top and bottom track, unless otherwise indicated. Space studs as follows:
 - 1. Stud Spacing: 16 inches (406 mm).

- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure as required on Drawings to prevent transfer of vertical loads while providing lateral support.
 - 1. Install single-leg deflection tracks and anchor to building structure.
 - 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
 - 3. Connect vertical deflection clips to studs and anchor to building structure.
 - 4. Connect drift clips to cold formed metal framing and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
 - 1. Install additional row of horizontal bridging in curtain wall stud beneath deflection track when curtain wall studs are not fastened to an additional top track.
 - 2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system

3.5 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds and screw connections will be subject to testing and inspecting.
- C. Testing agency will report test results within 24 hours and in writing to Contractor and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- F. Inspect all prefabricated trusses before installation.

3.6 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Steel ladder.
2. Aluminum roof ladder with parapet crossover platform.
3. Steel stairs with concrete-filled treads and platforms.
4. Handrails and railings at stairs and ramps.
5. Handrails attached to walls adjacent to stairs and ramps.
6. Guardrails, including guardrails at exterior locations.
7. Support angles for elevator door sills.
8. Loose bearing and leveling plates.
9. Loose steel lintels.
10. Shelf angles.
11. Steel framing and supports for ceiling hung doors and panels, ceiling hung equipment, ceiling hung curtains, and other items indicated on Drawings.
12. Steel framing and supports for mechanical and electrical equipment.
13. Steel framing and supports for part height partitions.
14. Steel framing and supports for applications where framing and supports are not specified in other Sections.
15. Steel elevator sump pit gratings.
16. Cast metal nosings at concrete stairs.
17. Elevator hoistway beam and safety beam.
18. Loading dock edging.
19. Bollards
20. Stainless steel trim at pizza oven.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal stairs, handrails and railings, and guardrails.
- B. Structural Performance of Metal Stairs, Walkways and Platforms: Provide metal stairs, walkways and platforms capable of withstanding the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each component of metal stairs, walkways and platforms.
1. Treads and Platforms of Metal Stairs, and Walkways: Capable of withstanding a uniform load of 100 lbf/sq. ft. (4.79 kN/sq. m) or a concentrated load of 300 lbf (1.33 kN) on an area of 4 sq. in. (25.8 sq. cm), whichever produces the greater stress.

2. Stair and Walkway Framing: Capable of withstanding stresses resulting from loads specified above in addition to stresses resulting from railing system loads.
 3. Limit deflection of treads, platforms, walkways and framing members to $L/360$ or $1/4$ inch (6.4 mm), whichever is less.
- C. Structural Performance of Handrails and Railings: Provide handrails and railings capable of withstanding the following structural loads without exceeding the allowable design working stress of materials for handrails, railings, anchors, and connections:
1. Top Rail of Guards: Capable of withstanding the following loads applied as indicated:
 - a. Concentrated load of 200 lbf (890 N) applied at any point and in any direction.
 - b. Uniform load of 50 lbf/ft. (730 N/m) applied horizontally and concurrently with uniform load of 100 lbf/ft. (1460 N/m) applied vertically downward.
 - c. Concentrated and uniform loads above need not be assumed to act concurrently.
 2. Handrails Not Serving as Top Rails: Capable of withstanding the following loads applied as indicated:
 - a. Concentrated load of 200 lbf (890 N) applied at any point and in any direction.
 - b. Uniform load of 50 lbf/ft. (730 N/m) applied in any direction.
 - c. Concentrated and uniform loads above need not be assumed to act concurrently.
 3. Infill Area of Guards: Capable of withstanding a horizontal concentrated load of 200 lbf (890 N) applied to 1 sq. ft. (0.09 sq. m) at any point in system, including panels, intermediate rails, balusters, or other elements composing infill area.
 - a. Load above need not be assumed to act concurrently with loads on top rails in determining stress on guards.

1.3 ACTION SUBMITTALS

- A. Product Data: For all fabricated products including the following:
1. Gratings.
 2. Paint products.
 3. Grout.
 4. Nonslip aggregates and nonslip-aggregate surface finishes
 5. Ladders
 6. Nosings.
 7. Pre-engineered handrail and railing systems.
- B. Shop Drawings: Detail fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples for Verification: Sample of the following:

1. 6" square piece of each type of bar grating.
2. Each type of stainless steel finish on 6" long piece of each type of metal shape.
3. 6" long fabricated stainless steel handrail.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding Certificates: Copies of certificates for welding procedures and personnel.
- B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- C. Delegated-Design Submittal: For stairs, handrails and railings, and guardrails including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of metal stairs, platforms, walkways, handrails and railing systems that are similar to those indicated for this Project in material, design, and extent.
- C. Welding: Qualify procedures and personnel according to the following:
1. AWS D1.1, "Structural Welding Code--Steel."
 2. AWS D1.3, "Structural Welding Code--Sheet Steel."
 3. AWS D1.2, "Structural Welding Code--Aluminum."
 4. AWS D1.6, "Structural Welding Code--Stainless Steel."
 5. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
- D. Mockups, Railings and Handrails: Build mockups of each type of handrail, railing and guardrail system to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
1. Each mock-up shall consist of a typical panel including two posts, top rail, infill area, and anchorage system components that are full height and are not less than 24 inches (600 mm) in length.

2. Notify Architect seven days in advance of dates and times when mock-up will be constructed
3. Remove/dismantle and reprepare mock-up as required to obtain Architect's approval.
4. Approved mock-ups may be incorporated in the finished work.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

1.7 COORDINATION

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

1.8 SEQUENCING AND SCHEDULING

- A. Sequence and coordinate installation of wall handrails as follows:
1. Mount handrails only on completed walls. Do not support handrails temporarily by any means not satisfying structural performance requirements.
 2. Mount handrails only on gypsum board assemblies reinforced to receive anchors, and where the location of concealed anchor plates has been clearly marked for benefit of Installer.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

- B. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500. For exterior installations and where indicated, provide tubing with hot-dip galvanized coating.
- C. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads. For exterior installations and where indicated, provide pipe with hot-dip galvanized coating.
- D. Slotted Channel Framing: Cold-formed metal channels with flange edges returned toward web and with 9/16-inch- (14.3-mm-) wide slotted holes in webs at 2 inches (51 mm) o.c.
 - 1. Width of Channels: 1-5/8 inches (41 mm).
 - 2. Depth of Channels: As indicated.
 - 3. Metal and Thickness: Galvanized steel complying with ASTM A 653/A 653M, structural quality, Grade 33 (Grade 230), with G90 (Z275) coating; 0.108-inch (2.8-mm) nominal thickness.
 - 4. Finish: Unfinished.
- E. Steel Bars for Gratings: ASTM A 36/A 36M.
- F. Wire Rod for Grating Crossbars: (ASTM A 510M)
- G. Malleable-Iron Castings: ASTM A 47, Grade 32510 (ASTM A 47M, Grade 22010).
- H. Gray-Iron Castings: ASTM A 48, Class 30 (ASTM A 48M, Class 200), unless another class is indicated or required by structural loads.
- I. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 (ASTM A 47M) malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.
- J. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.3 STAINLESS STEEL

- A. Tubing: ASTM A 554, Grade MT 304
- B. Pipe: ASTM A 312/A 312M, Grade TP 304
- C. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.
- D. Plate and Sheet: ASTM A 666, Type 304

2.4 ALUMINUM

- A. Extruded Bars, Shapes and Mouldings: ASTM B 221 (ASTM B 221M), alloy 6063-T6 or 6063-T52.
- B. Castings: ASTM B 26, Almag 35.

2.5 PAINT

- A. Shop Primer for Interior Ferrous Metal: Modified oil-alkyd primer, Tnemec 88-559 or 10-1009, or equivalent. Primer shall be compatible with finish paint specified in Section 09900.
- B. Shop Primer for Galvanized Ferrous Metal: Polyamide epoxy primer, Tnemec F.C. Typoxy Series 27, or equivalent. Primer shall be compatible with finish paint specified in Section 09900.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- D. Shop Primer for Exterior Ferrous Metal: Organic zinc-rich primer, complying with SSPC-Paint 20 and compatible with topcoat; Tnemec-Zinc 90-97; Tnemec Company, Inc.
- E. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.

2.6 FASTENERS

- A. General: Provide Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls, except as noted below. Select fasteners for type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F 1554, Grade 36.
- D. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).
- E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- F. Wood Screws: Flat head, carbon steel, ASME B18.6.1.
- G. Plain Washers: Round, carbon steel, ASME B18.22.1 (ASME B18.22M).
- H. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1 (ASME B18.21.2M).

- I. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Material: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

- J. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.

2.7 GROUT

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.8 CONCRETE FILL

- A. Concrete Materials and Properties: Normal-weight, ready-mixed concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa), unless higher strengths are indicated.

2.9 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Shear and punch metals cleanly and accurately. Remove burrs.
- C. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

- F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- G. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.
- H. Allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- I. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- J. Remove sharp or rough areas on exposed traffic surfaces.
- K. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

2.10 ROUGH HARDWARE

- A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 sections.
- B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

2.11 METAL STAIRS

- A. General: Construct stairs to conform to sizes and arrangements indicated. Join pieces together by welding, unless otherwise indicated. Provide complete stair and bleacher assemblies, including metal framing, hangers, struts, clips, brackets, bearing plates, and other components necessary for the support of stairs, and platforms, and as required to anchor, hang, and contain the stairs on the supporting structure.
- B. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.
 - 1. Commercial class.

- C. Stair Framing: Fabricate stringers of structural steel channels, or plates, or a combination thereof, as indicated. Provide closures for exposed ends of stringers. Construct platforms of structural steel channel headers and miscellaneous framing members as indicated. Weld headers to strings, and framing members to strings and headers.
 - 1. Where required, provide hanger rods to support landings from floor construction above. Locate hanger rods within stud space of shaft-wall construction.
 - 2. Where masonry walls support metal stairs, provide temporary supporting struts designed for erecting steel stair components before installing masonry.
- D. Metal Risers, Subtread Pans, and Subplatforms: Form to configurations shown from steel sheet of thickness necessary to support indicated loads, but not less than 0.0677 inch (1.7 mm).
 - 1. Steel Sheet: Uncoated cold-rolled steel sheet, unless otherwise indicated.
 - 2. Attach risers and subtreads to stringers with brackets made of steel angles or bars. Weld brackets to stringers and attach metal pans to brackets by welding, riveting, or bolting.
 - 3. Shape metal pans to include nosing integral with riser.
- E. Steel Stair Finishes:
 - 1. Provide hot-dipped galvanized finish for all components of exterior stair and platform system including fittings, brackets, anchors, fasteners, and sleeves
 - 2. Shop prime and field paint all steel stairs systems

2.12 HANDRAILS AND RAILINGS AND GUARDRAILS

- A. General: Fabricate handrails and railings to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacings, and anchorage, but not less than that needed to withstand indicated loads.
 - 1. For post-mounted handrails at ramps in corridors where indicated, provide pre-engineered round post stainless steel railing system consisting of the following:
 - a. Stainless steel Type 304 tubular handrails and posts with 1-1/2" outside diameter by 5/64" wall thickness for handrails and 1.9" diameter by 0.109" wall thickness for posts.
 - b. Finish shall be 240 grain/grit finish.
 - c. Provide top caps for posts, fasteners and all other accessories as required for complete installation.
 - d. Basis of Design Product: Provide CIRCUM Round Post Railing System by HDI Railing Systems, or equal.
- B. Interconnect members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
 - 1. At tee and cross intersections of pipe and tube, cope ends of intersecting members to fit contour of tube to which end is joined, and weld all around.

- C. Form changes in direction of handrails and rails as detailed.
- D. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- E. Close exposed ends of pipe and tube handrail and railing members with prefabricated end fittings.
- F. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.
- G. Provide swinging gates to match railing/guard construction, complete with self-closing spring hinges and lockset or panic device where indicated.
- H. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting railings and for attaching to other work. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.
 - 1. Connect railing posts to metal framing by direct welding, unless otherwise indicated.
 - 2. Connect railing posts to concrete by inserting into preset sleeves, attaching to floor brackets, or core drilling, as indicated.
- I. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.
- J. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- K. For railing posts set in concrete, provide steel sleeves not less than 6 inches (150 mm) long with inside dimensions not less than 1/2 inch (13 mm) greater than outside dimensions of post, with steel plate forming bottom closure.
- L. For galvanized handrails and railings, provide galvanized fittings, brackets, fasteners, sleeves, and other ferrous-metal components.
- M. For nongalvanized handrails and railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.
- N. Steel Handrail and Railing Finishes:
 - 1. Provide non-galvanized finish for steel components of interior steel railings and handrails. Provide nongalvanized ferrous metal fittings, brackets, fasteners, and

- sleeves, except galvanize anchors embedded in masonry and concrete construction.
- 2. Provide hot-dipped galvanized finish for all components of exterior steel handrail and railing system including fittings, brackets, anchors, fasteners, and sleeves.
- 3. Shop prime and field paint all steel handrails and railings.

O. Stainless Steel Handrail Finishes: No. 4.

2.13 STEEL LADDERS

- A. General: Fabricate ladders for locations shown, with dimensions, spacings, details, and anchorages as indicated.
 - 1. Comply with ANSI A14.3, except for elevator pit ladders.
 - 2. For elevator pit ladders, comply with ASME A17.1/CSA B44.
- B. Siderails: Continuous, 1/2-by-2-1/2-inch (12-by-64-mm) steel flat bars, with eased edges, spaced 18 inches (457 mm) apart.
- C. Bar Rungs: 3/4-inch- (19-mm-) diameter steel bars, spaced 12 inches (300 mm) o.c.
- D. Fit rungs in centerline of side rails; plug-weld and grind smooth on outer rail faces.
- E. Support each ladder at top and bottom and not more than 60 inches (1500 mm) o.c. with welded or bolted steel brackets. Size brackets to support design loads specified in ANSI A14.3.
- F. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
- G. Galvanize ladders, including brackets and fasteners, in the following locations:
 - 1. Exterior.
 - 2. Interior, where indicated.

2.14 ALUMINUM LADDERS WITH CROSSOVER PLATFORMS

- A. General: Fabricate ladders with crossover platforms to comply with ANSI A14.3 and OSHA Standard 3124-12r 2003 "Stairways and Ladders". Assemble by welding or riveting.
- B. Tubular Rail Low Parapet Access Ladder with Platform and Return: Provide ladder with crossover platform fabricated with the following components:
 - 1. Rungs: Not less than 1-1/4 inches (32 mm) in section and 18-3/8 inches (467mm) long, formed from tubular aluminum extrusions. Squared and deeply serrated on all sides. Rungs shall withstand a 1,500 pound (454 kg) load without deformation or failure.

2. Heavy Duty Tubular Side Rails: Assembled from two interlocking aluminum extrusions no less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide. Construction shall be self-locking stainless steel fasteners, full penetration TIG welds and clean, smooth and burrfree surfaces.
3. Walk-Through Rail and Roof Rail Extension: Not less than 3 feet 6 inches (1067 mm) above the landing and shall be fitted with deeply serrated, square, tubular grab rails.
4. Landing Platform: 1-1/2 inches (38 mm) or greater diameter, tubular aluminum guardrails and decks of serrated aluminum treads.
5. Ladder Size: As indicated on Drawings for each location.
6. Finish: Mill finish.
7. Basis of Design Product: Model 503 by O'Keeffe's Inc. or equal products of one of the following:
 - a. UPNOVR Inc.
 - b. Precision Ladders, LLC

C. Provide all fasteners and attachment brackets to building as required.

2.15 METAL GRATINGS

- A. Metal Bar Gratings: Form to configurations shown from metal bar grating; fabricate to comply with NAAMM MBG 531, "Metal Bar Grating Manual"
 1. Steel Gratings: Fabricate from welded steel grating with 1-1/4-by-3/16-inch (32-by-5-mm) bearing bars at 15/16 inch (24 mm) o.c. and crossbars at 4 inches (100 mm) o.c., NAAMM designation: W-15-4 (1-1/4 x 3/16) STEEL. Surface shall be smooth.
 - a. Application: Elevator pit sump pit cover.
- B. Steel Frames: Fabricate from ASTM A 36/A 36M steel angle, 1-1/2" x 1-1/2" x 1/4" in size unless otherwise noted, with welded anchor for casting into slab.
- C. Fabricate grating with steel angle or steel plate carrier at each end for attachment to frame. Secure grating to frame with removable bolts; provide tamper proof bolts for exterior locations.
- D. Do not notch bearing bars at supports to maintain elevation
- E. Steel Grating Finishes:
 1. Provide hot-dipped galvanized finish for all components of elevator pit gratings including fittings, brackets, anchors, fasteners, and sleeves.
 2. Provide hot-dipped galvanized finish for all steel frames for gratings.
 3. Shop prime and field paint all steel gratings and steel framing members.

2.16 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

- B. Galvanize plates after fabrication.

2.17 LOOSE STEEL LINTELS

- A. Fabricate loose structural-steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- B. Weld adjoining members together to form a single unit where indicated.
- C. Size loose lintels to provide bearing length at each side of openings equal to one-twelfth of clear span, but not less than 8 inches (200 mm), unless otherwise indicated.
- D. Galvanize loose steel lintels located in exterior walls.
- E. Shop prime and field paint all lintels, leave embedded portions of lintels unpainted.

2.18 SHELF ANGLES

- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated.
- B. Galvanize shelf angles to be installed in exterior walls.
- C. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.19 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports that are not a part of structural-steel framework as necessary to complete the Work.
- B. Fabricate units from structural-steel shapes, plates, tubes, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors 1-1/4 inches (32 mm) wide by 1/4 inch (6 mm) thick by 8 inches (200 mm) long at 24 inches (600 mm) o.c., unless otherwise indicated.
 - 3. Furnish inserts if units must be installed after concrete is placed.
- C. Fabricate supports for ceiling hung doors and panel partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated.

Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on Shop Drawings.

- D. Fabricate framing and supports for solid surface countertops from cast iron and connectors as detailed on Drawings, for table legs.
- E. Galvanize miscellaneous framing and supports where indicated, and in exterior locations.

2.20 CAST NOSINGS

- A. Fabricate units of cast aluminum in sizes and configurations indicated and in lengths necessary to accurately fit openings or conditions. Provide units with an integral abrasive finish consisting of aluminum oxide, silicon carbide, or a combination of both.
- B. Configurations: Provide units in the following configurations, unless otherwise indicated:
 - 1. Nosings: Cross-hatched units, 4 inches (100 mm) wide with 1-inch (25-mm) lip, for casting into concrete steps.
- C. Provide anchors for embedding units integral in concrete.
- D. Apply bituminous paint to concealed bottoms, sides, and edges of units set into concrete.
- E. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Safety Tread Co., Inc.
 - 2. Amstep Products.
 - 3. Safe-T-Metal Co.
 - 4. Wooster Products Inc.
- F. Application: Use at cast-in-place concrete stairs.

2.21 METAL BOLLARDS

- A. Fabricate metal bollards from Schedule 40 steel pipe.
 - 1. Cap bollards with 1/4-inch-thick, steel plate with domed top.
- B. Prime steel bollards with zinc rich primer.

2.22 FINISHES, GENERAL

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

2.23 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
 - 1. ASTM A 123, for galvanizing steel and iron products.
 - 2. ASTM A 153/A 153M, for galvanizing steel and iron hardware..
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes indicated as unpainted, and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Paint embedded steel that is partially exposed on exposed portions and initial 2 inches of embedded areas only.
 - 1. Do not paint surfaces to be welded or high-strength bolted with friction-type connections.
 - 2. Apply 2 coats of paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.
- D. Powder Paint: Manufacturer's standard process., in color selected by Architect.

2.24 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).

2.25 STAINLESS-STEEL FINISHES

- A. Remove tool and die marks and stretch lines or blend into finish.
- B. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
- C. Directional Satin Finish: No. 4.
- D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

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

3.2 INSTALLING METAL STAIRS WITH GROUTED BASEPLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of baseplates.
- B. Set steel stair baseplates on wedges, shims, or leveling nuts. After stairs have been positioned and aligned, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
 - 1. Use nonmetallic, nonshrink grout, unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 INSTALLING RAILINGS AND HANDRAILS

- A. Adjust handrails and railing systems before anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or, if not indicated, as required by design loads. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:
1. Anchor posts to steel by welding directly to steel supporting members.
 2. Use steel pipe sleeves preset and anchored into concrete for installing posts where indicated. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions. Leave anchorage joint exposed; wipe off surplus anchoring material; and leave 1/8-inch (3-mm) buildup, sloped away from post.
 3. Where indicated, core-drill holes not less than 5 inches (125 mm) deep and 3/4 inch (20 mm) larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.
 4. Cover anchorage joint of post with flange of same metal as post where indicated.
 5. Anchor handrail ends to concrete and masonry with steel round flanges welded to rail ends and anchored with postinstalled anchors and bolts.
 6. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and welded to railing ends.
- B. Attach handrails to wall with wall brackets. Provide bracket with 1-1/2-inch (38-mm) clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads. Secure wall brackets to building construction as follows:
1. Use type of bracket with predrilled hole for exposed bolt anchorage.
 2. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 3. For hollow masonry anchorage, use toggle bolts.
 4. For steel-framed gypsum board assemblies, use hanger or lag bolts set into wood backing between studs. Coordinate with stud installation to locate backing members.

3.4 SETTING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.

1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.5 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings, if any.
- B. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
 1. Where grout space under bearing plates is indicated at girders supported on concrete or masonry, install as specified above for setting and grouting bearing and leveling plates.

3.6 INSTALLING NOSINGS

- A. Install with anchorage system indicated to comply with manufacturer's written instructions.
- B. Center nosings on tread widths.
- C. For nosings embedded in concrete steps or curbs, align nosings flush with riser faces and level with tread surfaces.
- D. Seal thresholds exposed to exterior with elastomeric sealant complying with Division 07 Section "Joint Sealants" to provide a watertight installation.

3.7 INSTALLATION OF METAL BOLLARDS

- A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.
- B. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

3.8 ADJUSTING AND CLEANING

- A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 Section "Painting."
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

December 14, 2023
Construction Documents
SED No. 44-10-00-01-0-001-041

Enlarged City School District of Middletown
Twin Towers Middle School
Additions and Alterations

END OF SECTION 055000

Millwork Schedule			
Location	Description	Material	Finish/Color
Note: Trim all locker banks with stained wood molding. Provide stained wood cap at tile edge in all corridors. See drawings for details.			
Ground Floor			
Breakroom G70h	Pantry style upper and base cabinets	Solid surface countertop/splash with Plam base and upper cabinets	Wilsonart Bluestone #9074 EA with Formica White Drops #8824-58
3D Art G33	Pantry art style upper and base cabinets	Solid surface countertop/splash with Plam base and upper cabinets	Wilsonart Bluestone #9074 EA with Formica White Drops #8824-58
3D Art G33a	Pantry art style upper and base cabinets	Plam countertop/splash with Plam open shelving base and upper cabinets	Formica Greystone # 464-58 with Formica White Drops # 8824-58
2D Art G35	Pantry art style upper and base cabinets	Solid surface countertop/splash with Plam base and upper cabinets	Wilsonart Bluestone #9074 EA with Formica White Drops #8824-58
2D Art G35a	Pantry art style upper and base cabinets	Plam countertop/splash with Plam open shelving base and upper cabinets	Formica Greystone # 464-58 with Formica White Drops # 8824-58
Vestibule G34	Transaction counter	Solid Surface transaction counter	Transaction counter - Wilsonart Peace Gray #9232 with wood stained brackets.
2D Art G37	Pantry style upper and base cabinets	Solid surface countertop/splash with Plam base and upper cabinets	Wilsonart Bluestone #9074 EA with Formica White Drops #8824-58
2D Art G37a	Pantry style upper and base cabinets	Plam countertop/splash with Plam base and upper cabinets	Formica Greystone # 464-58 with Formica White Drops # 8824-58
Pre- Engineering G40	Pantry Style uppers and lowers Wall Mounted open shelving	Plam counters/splash and cabinets/shelving	Countertop- Formica Greystone #464-58 with vertical surfaces in Formica White Twill #9285-58. Shelving- White
Pre- Engineering G40a,b	Wall mounted cabinets	Plam cabinets	Formica White Twill # 9285-58
Pre- Engineering G42	Pantry Style uppers and lowers Wall Mounted open shelving	Plam counters/splash and cabinets/shelving	Countertop- Formica Greystone #464-58 with vertical surfaces in Formica White Twill #9285-58. Shelving - White
Pre- Engineering G42a,b	Wall mounted cabinets	Plam cabinets	Formica White Twill # 9285-58
Pre-Engineering Nook C006	Bench	Solid Surface bench with Plam walls	Walls- Wilsonart- Handspun Dove 5034-38 with Corian Mineral bench
Tech Support G44	Built in work counter	Solid Surface material	Wilsonart Peace Grey
1st Floor			
Vestibule 101	Security Transaction counter	Corian Endura Quartz counter and surround	Smoky Marble- 5 mm
Reception 105	Reception desk with transaction counter	Solid surface countertop Plam vertical surfaces	Corian - Limestone Prima with Formica Graystone # 464-58
Copy 105C	Pantry style base and upper cabinets	Solid surface countertop and splashes, Plam vertical surfaces	Wilsonart Peace Gray #9232 with Formica White Twill #9285-58
Main office 105	Mailboxes with open shelving base cabinets below	Plam unit with nametags. Main countertop- Solid grey stained wood edge to match	Formica Greystone #464-58
Faculty 107	Kitchen cabinets (2 banks)and Island	Solid surface countertop Plam vertical surfaces	Wilsonart Peace Gray #9232 with Formica White Twill #9285-58 at perimeter. Island-Wilsonart Bluestone #9074EA, Formica Navy Grafix #7018-58

Millwork Schedule			
Location	Description	Material	Finish/Color
Nurse 109	Reception desk with transaction counter	Solid surface transaction top, Plam countertop Plam vertical surfaces	Transaction counter- Wilsonart Bluestone #9074, Countertop- Formica Greystone #464-58 with vertical surfaces in Formica White Twill #9285-58
Exam 109 b, c, e	Pantry style base and upper cabinets	Solid surface countertop and splashes, Plam vertical surfaces	Wilsonart Peace Gray #9232 with vertical surfaces in Formica White Twill #9285-58
Classrooms 131,133,135,137, 231, 331	Countertops over bookcases (Note; coordiante with final casewrok submission)	Plam counter with PVC edge (1-1/2" built up edge)	Wilsonart- Handspun Dove laminate #5034-38 with Doellken edge #2425 Fog
Library 144	Built in worktop computer counters at 2 heights	Solid Surface material	Wilsonart Bluestone #9074EA with wood accents
	Kiosk Stations with base cabinet	Plam wall hung shelf	Wilsonart Pressed linen #4991-38
	Perimeter Bookcases	White Oak Stained	
	Built in work station desk	Solid Surface material	Wilsonart Bluestone #9074EA with wood accents
Library Office 144a	Pantry style base and upper cabinets	Solid surface countertop and splashes, Plam vertical surfaces	Wilsonart Peace Gray# 9232 with Formica White Twill # 9285-58
Instrument repair152	Pantry style drawer /sink base and upper cabi	Solid surface countertop and splashes, Plam vertical surfaces	Wilsonart Peace Gray #9232 with Formica White Twill # 9285-58
Stage Prep 166	Countertop / brackets	Plam countertop	Wilsonart,Handspun Dove 5034-38
2nd Floor			
Faculty Rm 217	Pantry style base cabinets	Solid surface countertop and splashes, Plam vertical surfaces	Wilsonart Peace Gray #9232 with Formica White Twill #9285-58
3rd Floor			
Faculty Rm 316	Pantry style base cabinets	Solid surface countertop and splashes, Plam vertical surfaces	Wilsonart Peace Gray #9232 with Formica White Twill #9285-58

SECTION 061000 ROOF CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Applicable provisions of the Conditions of the Contract and Division 1, General Requirements, govern work in this Section.

1.2 DESCRIPTION OF WORK

- A. This section includes roof related carpentry work, different specification sections describe other carpentry work.
- B. The work of this Section includes all plant, labor, materials, equipment, testing and services necessary to complete the work shown on the drawings, schedules and notes, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:
 - 1. Roof related wood nailers, blocking, shims and plywood, including curbs, support rails, pipe penetration curbs, expansion joints and drains on existing and new roof areas.
 - 2. Light gauge metal framing at roof eaves and mechanical equipment, including curbs, support rails, pipe penetration curbs, expansion joints and drains on existing and new roof areas.
 - 3. Re-secure existing roof related blocking being reused; remove and separate multiple layers of blocking, and secure each layer individually if necessary.

1.3 RELATED WORK SPECIFIED ELSEWHERE – Entire Project Specification with specific reference to those sections noted above and as follows:

- | | |
|---------------|------------------------------------|
| A. Division 4 | Masonry |
| B. 075419 | PVC Roofing |
| C. 076200 | Sheet Metal Flashing & Specialties |
| D. 077200 | Roof Accessories |

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. A firm (Installer) with at least 5 continuous years experience performing work similar to that required for this project, employing personnel skilled in the work specified.
 - a. The Installer shall directly employ the personnel performing the work of this section.
 - b. The Installer shall have a supervisor on the roof when work is in progress. The Supervisor shall have a minimum of 5 years experience with work similar in nature and scope to this project, and speak fluent English.

1. Submit the supervisor's resume upon request.
2. The Installer shall provide a reference list of at least three previously completed projects of comparable size and similar design, within fifty miles of this project, which may be observed by representatives of the Owner:
 - a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number.
 - b. Submit the reference list upon request.
- B. Material Quality: Obtain each type of material from a single source to ensure consistent quality, color, pattern, and texture.
- C. Pre-Construction: Attend the pre-construction meeting and discuss how and when carpentry work will be performed and coordinated with other work, and how the building will be kept watertight as work occurs.

1.5 SUBMITTALS

- A. Submit the following items far enough in advance to obtain approval prior to performing any work on site:
 1. A pre-work site and building inspection report with photos, to document conditions before work starts on site.
 2. Manufacturer's technical literature for all components, to identify the products and manufacturers.
 3. Test reports and certifications substantiating compliance with specification requirements – only if requested by the Architect.
 4. 2 foot long on-site samples which show the size, shape, configuration and method of fastening for all wood blocking assemblies, and which show how the blocking assemblies will relate to and fit on adjoining work.
- B. Simultaneously provide all roof related submittals needed for this project, for all technical sections, collated by section. Incomplete and incorrect submittals will not be reviewed.
 1. Submittals shall be prepared and made by the firm that will perform the actual work.
 2. Provide electronic submittals via an on-line submittal exchange program if one is established for this project; if an on-line program is not established, provide the submittals on portable USB drives in pdf format, organized in folders by Section.
 - a. Do not send technical submittals via email.
 - b. Do not include Safety Data Sheets with the technical submittals.

- C. Safety Data Sheets: Simultaneously provide all Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders for each building.
- D. Payment requisitions will not be processed until all submittals are received and approved.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store materials so they are kept dry. Cover with tarps and protect against exposure to weather and contact with damp or wet surfaces.
- B. Do not overload the structure when storing material on the roof.
- C. Protect roof surfaces where material and equipment are placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.

1.7 GUARANTEE

- A. Provide a written Contractor's Guarantee which guaranties that all work will remain free of material and workmanship defects and in a watertight condition for five years beginning upon Final Completion:
 - 1. Defects include but are not limited to the following: leakage, delamination, lifting, loosening, splitting, cracking, joint separation and movement.
 - 2. Make the repairs and modifications necessary to enable the work to perform as guaranteed at his own expense:
 - 3. Guarantee coverage shall include removing and replacing items installed as part of the original work, if removal is needed to make repairs.
- B. Provide one Guarantee that covers "all work performed" when a single contractor is awarded work specified in multiple Sections.
- C. The Guarantee shall take effect no more than 30 days before the satisfactory completion of all punch list work.
- D. The Contractor's Surety Company may add a rider to the Performance Bond which clarifies that Performance Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the entire five year term of the Contractor's Guarantee.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. WOOD, including shims, nailers, blocking, furring and similar members, in the sizes indicated, worked into the shapes shown, and as follows:

1. Lumber: Douglas Fir dimension lumber, free of large knots and other imperfections.
 2. Plywood: Exterior grade APA rated Type CDX underlayment plywood.
 3. Beveled Siding: Utility grade cedar, redwood, or synthetic siding, 1/2 inch by 6 inches and 3/4 inch by 10 inches wide, tapered to 1/8 inch thick.
- B. METAL, for roof curbs and blocking, light gauge metal channel and stud sections factory formed of minimum 23 gauge cold rolled galvanized steel.

2.2 FASTENERS

- A. Minimum #12 diameter screws fabricated of hot dipped galvanized steel, stainless steel, or steel covered with a proprietary rust inhibiting coating.
1. Do not use un-coated steel nails. Remove and replace carpentry components installed with un-coated steel nails.
 2. If nails are used, they shall be annular ring shank type.
 3. Do not use dry wall screws to secure wood blocking assemblies. Remove and replace carpentry components installed with drywall screws.

2.3 CARPENTRY ACCESSORIES

- A. Gypsum board & related accessories: 5/8 inch thick Type X Firecode gypsum board, galvanized drywall screws, asbestos free factory pre-mixed joint compound, joint tape, and galvanized steel J, L and corner beads.
- B. Fiberglass and Rockwool insulation: un-faced batts, minimum thickness 6 inches, and as needed to fill the expansion joints and metal blocking assemblies.

PART 3 - EXECUTION

3.1 INSTALLATION – GENERAL

- A. Coordinate carpentry work with the installation of the roofing system, insulation, flashings, and other similar items.
- B. Shim and set carpentry work plumb and true, except provide slope at the top surfaces of horizontal members as indicated.
- C. Stagger joints in built up assemblies at least 2 feet to obtain maximum strength. Provide the shapes needed and adjust wood blocking to suit the existing conditions and achieve full bearing and secure attachment. Discard defective material, and pieces which are too small, and fabricate the work with a minimum of joints and an optimum joint arrangement.
- D. Securely attach carpentry work to resist a force of 275 pounds per lineal foot in any direction. Countersink all fasteners flush unless otherwise shown.

- E. Space fasteners to achieve adequate holding power, and generally 12 inches apart.
 - 1. Space fasteners 8 inches apart.
 - 2. Install two rows of fasteners in blocking assemblies wider than 5 inches.
- F. Fit carpentry work neatly scribed and cut to fit within 1/8 inch of adjoining materials. Position furring, nailers, blocking, shims and similar supports for the proper attachment of subsequent work.
- G. Fasten wood and metal blocking assemblies to metal decks with #12 screws.
- H. Fasten wood and metal blocking assemblies to concrete decks and masonry walls with 1/4 inch diameter Spike or Drive fasteners. Pre-drill the holes.

3.2 CLEANING, PROTECTION AND WATERTIGHTNESS

- A. Inspect the interior and exterior of the building and grounds, and submit a written report with photos to document any pre-existing leakage or damage, prior to performing any other work on site.
- B. The Owner will conduct a similar inspection at the completion of the work, and the Contractor will be charged for all leaks and damage that were not documented in the Contractor's report, or repaired to the Owners satisfaction at the Contractor's expense.
- C. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.
- D. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather - which may occur unexpectedly. Make all work areas watertight at the end of each day's work.
- E. Clean up all litter, refuse, rubbish, scrap materials and debris at least twice a day; at noon and at the end of the work day, so the roof and site are neat, orderly and workmanlike. Place the debris in a dumpster, and remove the dumpster from the site as soon as it is full or no longer being used.
- F. Carefully and thoroughly clean the entire roof to remove all residual debris when all work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.

END OF SECTION

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Wood blocking, cants, furring, supports, and nailers.
2. Plywood backing panels.

B. Related Work Specified Elsewhere:

1. Rough carpentry at roof is specified in Division 06 Section "Roof Carpentry".

1.2 DEFINITIONS

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

1. NELMA - Northeastern Lumber Manufacturers Association.
2. NLGA - National Lumber Grades Authority.
3. SPIB - Southern Pine Inspection Bureau.
4. WCLIB - West Coast Lumber Inspection Bureau.
5. WWPA - Western Wood Products Association.

1.3 ACTION SUBMITTALS

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

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials, both before and after exposure to elevated temperatures when tested according to ASTM D 5516 and ASTM D 5664.
3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses.
- B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
 - 1. Preservative-treated wood.
 - 2. Fire-retardant-treated wood.

1.5 QUALITY ASSURANCE

- A. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard) shall contain no added urea-formaldehyde resins. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI).

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings..

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Provide dressed lumber, S4S, unless otherwise indicated.
 - 3. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPAC U1; Use Category UC2 for interior construction not in contact with ground, and Use Category UC3b for exterior construction not in contact with ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
 - 2. The use of CCA preservative treated wood is prohibited.
- B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.

- C. Mark each treated item with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Use treatment that does not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
 - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.
- C. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency

2.4 MISCELLANEOUS LUMBER

- A. Provide miscellaneous lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Furring.
 - 4. Sleepers
 - 5. Cants
- B. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with 19 percent maximum moisture content and the following species: Mixed southern pine; SPIB.

- C. For concealed boards, provide lumber with 19 percent maximum moisture content of the following species and grades:
 - 1. Spruce-pine-fir (south) or Spruce-pine-fir, Construction or 2 Common grade; NELMA, NLGA, WCLIB, or WWPA.

2.5 PLYWOOD PANELS

- A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2 inch (12.7 mm) thick.
 - 1. Paint before mounting of equipment.
- B. Miscellaneous Concealed Plywood: Exposure 1 sheathing, span rating to suit framing in each location, and thickness as indicated but not less than 1/2 inch (13 mm).
 - 1. Provide fire-retardant-treated panels for interior locations unless indicated.
 - 2. Provide preservative-treated panels for exterior locations unless indicated.

2.6 MISCELLANEOUS MATERIALS

- A. Fasteners:
 - 1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
 - 2. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

2.7 ACCESSORY MATERIALS

- A. Weather Resistant Barrier: Asphalt-saturated organic felt, ASTM D 226, Type 1 (No. 15 asphalt felt), unperforated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.

- C. Apply field treatment complying with AWPAC M4 to cut surfaces of preservative-treated lumber and plywood.
- D. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.
- E. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.

3.2 PANEL PRODUCT INSTALLATION

- A. Fastening Methods: Fasten panels as indicated below:
 - 1. Plywood Backing Panels: Screw to supports.
 - 2. Miscellaneous Concealed Plywood Panels: Screw to supports.

3.3 WOOD BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

END OF SECTION 061053

SECTION 061643 - GYPSUM SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Sheathing joint and penetration treatment.

B. Related Requirements:

1. Division 07 Section "Fluid-Applied Membrane Air and Moisture Barriers" for moisture-resistive barrier applied over wall sheathing.

1.2 ACTION SUBMITTALS

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

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain each gypsum sheathing product through one source from a single manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

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

1.5 SEQUENCING AND SCHEDULING

- A. Sequence installing sheathing with installing exterior cladding to comply with requirements indicated below:
1. Do not leave glass-mat gypsum sheathing board exposed to weather for more than 180 days.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory," or GA-600, "Fire Resistance Design Manual."

- B. Vertical and Lateral Fire Propagation Test Characteristics: The exterior wall assembly of the New Classroom Addition is required to comply with NFPA 285 "Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components." The base wall, stud cavity insulation, wall sheathing, air barrier, continuous wall rigid insulation and exterior cladding are components that are required to be evaluated as part of this specific assembly test. Gypsum sheathing shall be part of an assembly that has passed NFPA 285 testing.

2.2 GYPSUM SHEATHING, GENERAL

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

2.3 WALL SHEATHING

- A. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. National Gypsum Company; Gold Bond e(2)XP.
 - b. United States Gypsum Co.; Securock.
 - c. Georgia Pacific; DensGlass
 - 2. Type and Thickness: Type X, 5/8 inch (15.9 mm) thick.
 - 3. Size: 48 by 96 inches (1219 by 2438 mm) or 48 by 120 inches (1219 by 3048 mm) for vertical installation.

2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
- B. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
 - 1. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, use screws that comply with ASTM C 954.

2.5 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

- A. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.
 - 1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches (50 mm) wide, 10 by 10 or 10 by 20 threads/inch (390 by 390 or 390 by 780 threads/m),

- of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.
2. VOC Content: 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and complying with VOC content limits of authorities having jurisdiction.
 3. Sealants and tapes shall be compatible with air and moisture barrier specified in Section 072726

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with manufacturer's published instructions.
- D. Coordinate wall sheathing installation with air and moisture barrier installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
 1. Fasten gypsum sheathing to cold-formed metal framing with screws.
 2. Install boards with a 3/8-inch (9.5-mm) gap where non-load-bearing construction abuts structural elements.
 3. Install boards with a 1/4-inch (6.4-mm) gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.
 1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of boards.

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

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

END OF SECTION 061643

SECTION 064020 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Plastic-laminate cabinets and casework.
 - 2. Interior wood trim and rails
 - 3. Plastic laminate countertops.
 - 4. Plastic laminate shelves.
 - 5. Recessed bench in corridor.
- B. Refer to the Millwork Schedule for scope required.
- C. Related Work Specified Elsewhere:
 - 1. Solid surface countertops are specified in Division 06 Section "Solid Surface Material Fabrications."
 - 2. FRP panel cladding for Cafeteria are specified in Division 09 Section "Fiberglass Reinforced Plastic Panels."
 - 3. Ultra-compact, sintered porcelain countertops are specified in Division 12 Section "Ultra-Compact (Porcelain) Countertops."

1.2 DEFINITIONS

- A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items, unless concealed within other construction before woodwork installation.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated, including cabinet hardware and accessories, and finishing materials and processes.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show details full size.
 - 2. Show locations and sizes of furring, blocking, and hanging strips and clips, cabling and connectors, and attachment devices, including concealed blocking and reinforcement specified in other Sections.
 - 3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, wire management, and other items installed in architectural woodwork.
 - 4. Show locations of seams in countertops.

C. Samples for Verification: For the following:

1. Lumber with or for transparent finish, 50 sq. in. (300 sq. cm), for each species and cut, finished on 1 side and 1 edge.
2. Wood-veneer-faced panel products with or for transparent finish, 8 by 10 inches (200 by 250 mm), for each species and cut. Include at least one face-veneer seam and finish as specified.
3. Plastic-laminate-clad products, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish.

D. Product Certificates: Signed by manufacturers of woodwork certifying that products furnished comply with requirements.

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

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed architectural woodwork similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production and installation of interior architectural woodwork.

C. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork, construction, finishes, and other requirements.

1. Provide AWI Quality Certification Program certificate indicating that woodwork complies with requirements of grades specified.

1.5 DELIVERY, STORAGE, AND HANDLING

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

1.6 PROJECT CONDITIONS

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

- B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

- 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.

1.7 COORDINATION

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

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
- B. Low-Emitting Materials: All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard) shall contain no added urea-formaldehyde resins. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI)
- C. Wood Species and Cut for Transparent Finish: Grade A Birch, plain sawn/sliced.
 - 1. Matching: Solid stock shall be matched for color and grain; veneer faces shall be compatible in color with solid stock.
 - 2. Veneer Matching: Slip matched and balanced within panel.
- D. Cabinet Interiors (Cabinets with Doors): Plastic laminate with 3 mm PVC edgebanding (kerf and adhesion installation) on shelves.
- E. Wood Products: Comply with the following:
 - 1. Hardboard: Tempered, S1S, Class 1 minimum 1/4 inch and conforming to PS 58-73.
 - 2. Particleboard: Minimum 45 lb. density particleboard complying with requirements in ANSI A208.1, Grade M - 3i.
 - 3. Medium-Density Fiberboard: ANSI A208.2, Grade 130
 - 4. Softwood Plywood: DOC PS 1, Medium Density Overlay.
 - 5. Hardwood Plywood and Face Veneers: HPVA HP-1.

- F. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.
 - 1. Provide PVC or polyester edge banding complying with LMA EDG-1 on components with exposed or semiexposed edges.
- G. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.
 - 1. Basis of Design Colors, Patterns and Finishes: One of the following in locations as scheduled on the Millwork Schedule included in Division 06:
 - a. Formica "White Drops" #8824-58
 - b. Formica "Greystone" #464-58.
 - c. Formica "White Twill" #9285-58.
 - d. Formica "Navy Grafix" #7018-58.
 - e. Wilsonart "Handspun Dove" #5034-38.
 - f. Wilsonart "Pressed Linen" #4991-38
 - 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering high-pressure decorative laminates that may be incorporated into the Work include, but are not limited to, the following:
 - a. Formica Corporation.
 - b. Laminart.
 - c. Panolam Industries International, Inc.
 - d. Wilsonart
- H. Decorative Protection Panels: Impact-resistant panels fabricated from treated fiberglass core with plastic laminate face sheets consisting of Grade H1, 0.0677 inches to 0.0827 inches thick, and as follows:
 - 1. Flammability: Meets Class A.
 - 2. Laminate Color: Formica Marine Blue 914, in matte finish (-58).
 - 3. Application: Bench walls and ceilings.
 - 4. Basis of Design Product: Formica HardStop Decorative Protection Panels, or equal.
 - 5. Accessories:
 - a. Provide aluminum trim profiles for seam treatment of types and finish as selected by Architect.
 - b. Provide bonding adhesive and seam filler as recommended by manufacturer.
- I. Adhesive for Bonding Plastic Laminate: Contact cement.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.
- J. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Wood Glues: 30 g/L.
2. Contact Adhesive: 80 g/L.

- K. Glass for Swinging Cabinet Doors and for Glass Shelves: Clear Tempered Glass, 1/2" thick, as specified in Division 08 Section "Glazing."
- L. PVC Edgebanding: Provide Doellkin Edge 1-5/16" wide and in 3 mm thickness, in color Fog 2425.

2.2 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 08 Section "Door Hardware."
- B. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
 2. Other specific finishes are scheduled on Drawings
- C. Bumpers: Clear pressure sensitive non-skid vinyl bumpers 1/2 inch diameter by 5/32 inches thick; Grass #GF-BP-C, or equivalent.
- D. Frameless Concealed Hinges (European Type): 180 degrees of opening, self-closing, three-way adjustable; Grass #GF-1200VX-8, or equivalent.
- E. Catches: Magnetic catches, 5 lb. holding power; Ives 324-P69, or equivalent. Provide 1 top mounted at each door.
- F. Pulls: Mockett Rounded Square Pull #1088-SS Platinum finish.
- G. Wire Management Grommets: Plastic grommets with cut-out covers cap, 1-1/2 inch I.D. unless otherwise indicated; Hughes Plastic Parts, or equivalent. Color as selected by Architect from manufacturer's standard colors.
- H. Drawer Slides: 3/4 extension type, constructed from zinc plated cold-rolled steel, with ball-bearing rollers, 75 lbf (330 N) load rated; Accuride 214 Series, or equivalent.
- I. Slides for File Drawers: Full extension type, constructed from zinc plated cold-rolled steel, with ball-bearing rollers, 200 lbf (890 N) load rated; Accuride 4437 Series, or equivalent.
- J. Pencil Drawer Slides: 45 lbf (200 N), Accuride 214 Series, or equivalent
- K. Adjustable Shelf Supports: Peg type, steel, 5/16" stem length, 1/4" bore, spoon width 25/64"; Progressive IF-739NP, or equivalent.

- L. Locks: Door locks - NL-C8173-26D; drawer locks - NL-C8178-26D; strike - NL-C2004-14A; National Cabinet Lock, or equivalent. Keyed as requested by Owner.
- M. Levelers: Plastic leveling system, including socket, leveler, toe kick clip, and toe kick handle; Camar model CM-835-E1-00, CM-345-10-P2, CM-202-V1-T2, and CM-230-01-DE, or equivalent.

2.3 ACCESSORIES

- A. Shelving: 3/4" thick with 3 mm PVC kerfed edges, unless otherwise indicated.
 - 1. Provide MDO plywood for painted shelving.
 - 2. Provide wood veneered panel product with solid wood edge where scheduled or indicated on drawings.
 - 3. Provide plastic laminate faced panel product where scheduled or indicated on drawings.
 - 4. Shelving as part of a bookcase assembly shall be 1" thick.
- B. Adjustable Shelf Supports: Decorative, heavy-duty double-slotted standards adjustable on 1-1/4" centers with decorative brackets in length indicated on drawings. Include all accessories including cover strips, end caps, joiners, spacers and fasteners, as required for complete installation. Provide with epoxy finish in color as selected by Architect from manufacturer's standards.
 - 1. Product: Knap & Vogt #82 standards and #182 brackets, or equivalent.
- C. Countertop Support: Rakks EH Surface Mount Bracket RAKKS #EH1824 or equal.
 - 1. Finish: White or grey powder paint finish as selected by Architect.

2.4 INSTALLATION MATERIALS

- A. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.5 FABRICATION, GENERAL

- A. Interior Woodwork Grade: Provide Premium grade interior woodwork complying with the referenced quality standard.
- B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
- C. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails: 1/16 inch (1.5 mm)
- D. Complete fabrication, including assembly, and hardware application, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 1. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.
- E. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
 1. Seal edges of openings in countertops with a coat of varnish.

2.6 INTERIOR WOOD TRIM AND RAILS

- A. Quality Standard: Comply with AWI Section 6.
- B. Grade: Premium, for transparent finish items.
- C. For trim items wider than available lumber, use veneered construction. Do not glue for width.
- D. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work
- E. Assemble casings in plant except where limitations of access to place of installation require field assembly.
- F. Assemble moldings in plant to maximum extent possible. Miter corners in plant and prepare for field assembly with bolted fittings designed to pull connections together.

2.7 PLASTIC-LAMINATE CABINETS AND CASEWORK

- A. Quality Standard: Comply with AWI Section 10 requirements for custom laminate cabinets.
- B. Grade: Premium
- C. AWI Type of Cabinet Construction: Full overlay.

- D. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
 - 1. Horizontal Surfaces Other Than Tops: HGS.
 - 2. Postformed Surfaces: HGP.
 - 3. Vertical Surfaces: HGS.
 - 4. Edges: HGS
- E. Materials for Semiexposed Surfaces Other Than Drawer Bodies:
 - 1. Drawer Sides and Backs: Thermoset decorative overlay.
 - 2. Drawer Bottoms: Thermoset decorative overlay.
- F. Colors, Patterns, and Finishes: As scheduled, or if not scheduled, as selected by Architect.
- G. Substrate: Plywood.
- H. Provide dust panels of 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

2.8 PLASTIC LAMINATE COUNTERTOPS

- A. Quality Standard: Comply with AWI Section 11 requirements for high-pressure decorative laminate countertops.
- B. Grade: Custom.
- C. High-Pressure Decorative Laminate Grade: HGS.
- D. Colors, Patterns, and Finishes: As scheduled, or if not scheduled, as selected by Architect.
- E. Edge Treatment: As indicated on Drawings.
- F. Core Material: Particleboard or medium-density fiberboard.
- G. Core Material at Sinks: Particleboard made with exterior glue, or medium-density fiberboard made with exterior glue
- H. Backing: Provide all laminate counter tops with backer/balance sheets.
- I. Provide backsplashes and end splashed as indicated.

2.9 SHOP FINISHING

- A. Quality Standard: Comply with AWI Section 5, unless otherwise indicated.

1. Grade: Provide finishes of same grades as items to be finished.
- B. General:
1. Finish all transparent finished architectural woodwork at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.
- C. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative overlay.
- D. Transparent Finish: Comply with requirements indicated below for grade, finish system, staining, and sheen, with sheen measured on 60-degree gloss meter per ASTM D 523:
1. AWI Finish System 9: UV Curable, Acrylated Epoxy, Polyester or Urethane.
 2. Staining: As selected by Architect.
 3. Wash Coat for Stained Finish: Apply a vinyl wash coat to woodwork made from closed-grain wood before staining and finishing.
 4. Open Finish for Open-Grain Woods: Do not apply filler to open-grain woods.
 5. Sheen: Satin.

PART 3 - EXECUTION

3.1 PREPARATION

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

3.2 INSTALLATION

- A. Quality Standard: Install woodwork to comply with AWI Sections cited for fabrication and in the same grade, as specified in Part 2 of this Section for type of woodwork involved
- B. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).

- C. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.
- D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- E. Wood Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 36 inches (900 mm) long, except where shorter single-length pieces are necessary.
 - 1. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base, if finished.
 - 2. Install trim with no more variation from a straight line than 1/8 inch in 96 inches (3 mm in 2400 mm).
- F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
 - 2. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches (400 mm) o.c. with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish
- G. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - 1. Install countertops with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
 - 2. Secure backsplashes to tops with concealed metal brackets at 16 inches (400 mm) o.c.
 - 3. Caulk space between backsplash and wall with sealant specified in Division 07 Section "Joint Sealants."
- H. Complete the finishing work specified in this Section to extent not completed at shop or before installation of woodwork. Fill nail holes with matching filler where exposed. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats were applied in shop.

3.3 ADJUSTING AND CLEANING

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

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

END OF SECTION 064020

SECTION 066116 - SOLID SURFACE MATERIAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes solid surface material fabricated into the following:
 - 1. Solid surface material countertops.
 - 2. Solid surface material sills.
 - 3. Solid surface material bench tops/seats.
- B. Related Sections include the following:
 - 1. Blocking and grounds, including supports for solid surface material countertops, is specified in Division 06 Section "Miscellaneous Carpentry".
 - 2. Sealants are specified in Division 07 Section "Sealants."

1.2 ACTION SUBMITTALS

- A. Shop Drawings: Indicate dimensions, component sizes, fabrication details, attachment provisions, cutouts for insertion of accessories, and coordination requirements with adjacent work.
- B. Samples: Submit minimum 6" x 6" samples of selected colors and patterns. Where color is not specified, provide full range of manufacturer's available color samples for selection by Architect.
- C. Product Data: Indicate product description, fabrication information, and compliance with specified performance requirements.

1.3 INFORMATIONAL SUBMITTALS

- A. Maintenance Data: Submit manufacturer's care and maintenance data, including repair and cleaning instructions. Include in project closeout documents.
- B. Fabricator's Certificate: Submit certificate from manufacturer stating that fabricator is certified by manufacturer for this work.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Firm experienced and licensed by manufacturer for production of solid surface fabrications similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delaying the Work.

- B. Fire-Test-Response Characteristics: Provide materials with surface-burning characteristics as indicated below, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Flame Spread: 25 or less.
2. Smoke Developed: 450 or less

1.5 JOB CONDITIONS

- A. Do not deliver components to project site until areas are ready for installation. Store indoors.
- B. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation for duration of project.
- C. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of work. Allow for adjustments where taking of field measurements before fabrication might delay work.
- D. Coordination: Furnish inserts and anchorages which must be built into other work. Coordinate delivery with other work to avoid delay.

1.6 WARRANTY

- A. General: The special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Manufacturer's Warranty. The manufacturer warrants to the original purchaser for commercial use that the manufacturer will at its option repair or replace, without charge, such product if it fails due to a manufacturing defect during the first 10 years after initial installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturers: Provide Basis of Design Products or equal product of one of the following:
1. AristechAcrylics, LLC.
 2. DuPont Polymers
 3. Formica

2.2 MATERIALS

- A. General: Provide materials which have been selected for surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections on finished units are not acceptable.
- B. Solid Surface Material: Homogeneous solid sheets of filled plastic resin complying with ICPA SS-1.
 - 1. Thickness: 12 mm (1/2").
 - 2. Color(s) and Pattern(s):
 - a. Countertops: One of the following in locations as scheduled on the Millwork Schedule included in Division 06:
 - 1) Corian "Limestone Prima"
 - 2) Corian "Dove"
 - 3) Corian "Mineral"
 - 4) Wilsonart "Bluestone" 9074EA
 - 5) Wilsonart "Peace Gray" 9232
 - b. Sills: Corian "Deep Titanium".
 - 3. Finish: Semigloss.
 - 4. Basis of Design Products: Corian Solid Surface by DuPont Polymers, and Wilsonart Solid Surface by Wilsonart Engineered Surfaces, LLC, or equal.

2.3 MISCELLANEOUS MATERIALS

- A. Joint Adhesive: Manufacturer's standard two-part adhesive kit to create inconspicuous, non-porous joints with chemical bonding.
- B. Installation Adhesive: Product recommended by fabricator for each substrate for secure anchorage.

2.4 FABRICATION

- A. General: All fabrications shall be made using solid surface material. Fabrications shall be adhesively jointed with no exposed seams and having edge details as indicated on drawings. No exposed fasteners shall be allowed.
- B. Factory fabricate components into single unit to sizes and shapes indicated, in accordance with approved shop drawings.
- C. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints.
- D. Provide factory cutouts for bowls, plumbing fittings and accessories as indicated on the drawings.
- E. Cut and finish component edges with clean, sharp returns. Route radii and contours to template. Repair or reject defective and inaccurate work.

- F. Countertops and Sills: Fabricate tops and sills in one piece. Comply with solid surfacing material manufacturer's recommendations for adhesives, sealers, fabrication, and finishing. Provide countertops with backsplash, endsplashes, aprons and nosings as shown.
 - 1. Total countertop and sill thickness shall be as indicated on the Drawings or if not indicated, 1-1/2" thick. Provide built-up fabrication as required to obtain required total thickness.
 - 2. Countertop Edges: Built-up, 1-1/2" thick, with eased edge.
 - 3. Provide waterfall edge at all sills.
- G. Allowable Tolerances
 - 1. Variation in component size: $\pm 1/8"$.
 - 2. Location of openings: $\pm 1/8"$ from indicated location.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine surface to receive work and conditions under which work will be installed. Do not proceed with work until all unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Install components plumb and level, scribed to adjacent finishes, in accordance with approved shop drawings and product installation data.
- B. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work. Keep components and hands clean when making joints.

3.3 ADJUST AND CLEAN

- A. Clean exposed surfaces using materials and methods recommended by manufacturer, and provide protection as necessary to prevent damage during remainder of construction period. Repair work or replace damaged work that cannot be repaired as required.
- B. Keep components and hands clean during installation. Remove adhesives, sealants, and other stains. Replace stained components.

END OF SECTION 066116

SECTION 071326 – SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Types of sheet waterproofing specified in this Section include the following:
 - 1. Adhesive-coated HDPE sheet waterproofing for below grade applications at elevator pit floors.
 - 2. Rubberized asphalt sheet waterproofing for below grade applications at elevator pit walls, basement walls and all below-grade walls at occupied spaces.
 - 3. Drainage protection board for vertical applications.
- B. Related Sections Include the Following:
 - 1. Division 07 Section "Thermal Insulation" for below-grade rigid insulation installed with waterproofing.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site in compliance with the following:
 - 1. Before installing waterproofing, meet with Owner, Architect, consultants, independent testing agency, waterproofing manufacturer, and other concerned entities.
 - 2. Review requirements for waterproofing, including surface preparation specified under other Sections, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, inspection and testing procedures, and protection and repairs.
 - 3. Notify participants at least 7 days before conference.

1.3 ACTION SUBMITTALS

- A. Product Data for each type of waterproofing specified, including manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties.
 - 1. Certification by waterproofing materials manufacturer that products supplied comply with local VOC regulations.
- B. Shop Drawings showing locations and extent of waterproofing, including details for substrate joints and cracks, sheet flashings, penetrations, tie-ins with adjoining construction, and other termination conditions.

- C. Samples, 3-by-6-inch (75-by-150-mm) minimum size, of each waterproofing and associated materials required for Project.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer. Submit certificates signed by manufacturer stating that installers comply with requirements under the "Quality Assurance" Article
- B. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Obtain primary waterproofing materials of each type required from a single manufacturer that has been producing such materials for a minimum of ten years. Provide secondary materials only as recommended by manufacturer of primary materials.
- B. Installer: A firm with not less than five waterproofing projects similar to requirements (including size and scope) for this Project with satisfactory in-service performance and which is acceptable to primary waterproofing materials manufacturer.
- C. Single-Source Responsibility: Obtain waterproofing materials from a single manufacturer regularly engaged in manufacturing waterproofing.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product, date of manufacture, and directions for storage.
- B. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

- A. Substrate: Proceed with work after substrate construction, openings, and penetrating work have been completed and areas are free of standing or running water, ice, and frost. Verify that concrete is dry, smooth, and free from sharp or ragged out-angles, honeycombing, rock pockets, depressions, and projections.
- B. Environmental Conditions: Apply waterproofing within range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
 - 1. Do not apply waterproofing in snow, rain, fog, or mist.
 - 2. Proceed with waterproofing and associated work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturers' recommendations and warranty requirements.

- C. Do not install waterproofing where it will be exposed to rain, sleet or snow for any duration prior to the installation of toppings or other adjacent materials.

1.8 WARRANTY

- A. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty: Submit a written warranty executed by the manufacturer, agreeing to repair or replace sheet membrane waterproofing that fails in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Provide waterproofing system with all auxiliary components as required and recommended by manufacturer for applications indicated; manufactured by one of the following, or equal:
 - 1. Carlisle Coatings and Waterproofing
 - 2. GCP Applied Technologies, Inc.
 - 3. Tamko Roofing Products, Inc.

2.2 RUBBERIZED ASPHALT SHEET WATERPROOFING

- A. Self-adhesive, cold-applied composite sheet consisting of a thickness of 1.4 mm (0.056 in.) of rubberized asphalt and 0.1 mm (0.004 in.) of cross-laminated, high density polyethylene film, formed into uniform flexible sheets of not less than 1.5 mm (0.060 inch) thick, complying with the following:
 - 1. Tensile Strength: 325 psi minimum; ASTM D 412.
 - 2. Ultimate Elongation: 300 percent minimum; ASTM D 412.
 - 3. Puncture Resistance: 50 lbs minimum; ASTM E 154.
 - 4. Hydrostatic Head Resistance: 230 feet minimum; ASTM D 5385.
 - 5. Water Absorption: Not more than 0.1 percent weight gain after 48 hours' immersion at 70 deg F (21 deg C); ASTM D 570.
 - 6. Permeance: 0.1 perm maximum; ASTM E 96, Section 12 – Water Method.
- B. Basis of Design Product: Provide Bituthene System 3000 by GCP Applied Technologies, Inc. or one of the following:
 - 1. CCW MiraDRI 860/861, Carlisle Coatings and Waterproofing.
 - 2. TW-60; Tamko Roofing Products, Inc.

2.3 ADHESIVE-COATED HDPE SHEET WATERPROOFING

- A. Adhesive-Coated HDPE Sheet for Horizontal Applications: 46-mil- (1.2-mm-) thick, uniform, flexible sheets consisting of 30-mil- (0.76-mm-) thick, HDPE sheet coated with a pressure-sensitive rubber adhesive, a protective adhesive coating, a detackifying surface treatment, an uncoated self-adhering side lap strip, and a release liner with the following physical properties:
1. Tensile Strength, Film: 4000 psi (27.6 MPa) minimum; ASTM D 412.
 2. Low-Temperature Flexibility: Pass at minus 10 deg F (minus 23 deg C); ASTM D 1970.
 3. Peel Adhesion to Concrete: 5 lbf/in. (875 N/m); ASTM D 903, modified.
 4. Lap Adhesion: 2.5 lbf/in. (440 N/m); ASTM D 1876, modified.
 5. Hydrostatic-Head Resistance: 231 feet (70 m); ASTM D 5385, modified.
 6. Vapor Permeance: 0.01 perms (0.6 ng/Pa x s x sq. m); ASTM E 96, Water Method.
 7. Water Absorption: 0.5 percent; ASTM D 570.
- B. Basis of Design Product: Provide Preprufe 300R manufactured by GCP Applied Technologies, Inc. or one of the following:
1. Underseal Underslab Membrane; Polyguard Products, Inc.
 2. Or equivalent.

2.4 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
- B. Adhesives and Joint Tape: Provide types of adhesive compound and tapes recommended by waterproofing sheet manufacturer for bonding to substrate (if required), for waterproofing seams in membrane, and for waterproofing joints between membrane and flashings, adjoining surfaces, and projections through membrane.
1. Detail Tape for HDPE Membrane: Two-sided, pressure-sensitive, self-adhering reinforced tape, 4-1/2 inches (114 mm) wide, with a tack-free protective adhesive coating on one side and release film on self-adhering side.
- C. Primers: Provide type of concrete primer recommended by manufacturer of sheet waterproofing material for applications required.
- D. Flashing Materials: Except as otherwise indicated, provide types of flexible sheet material for flashing as recommended by waterproofing sheet manufacturer.
- E. Trowelable Liquid Membrane: Two component, cold-applied trowel grade waterproofing material used to flash corners, form fillets and detail hard-to-reach areas. Type recommended by membrane manufacturer, compatible with membrane.

- F. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick, predrilled at 9-inch (229-mm) centers.
- G. Rigid Insulation: Specified in Division 07 Section "Thermal Insulation".
- H. Waterstops: Hydrophilic waterstop for non-moving concrete construction joints.
 - 1. Basis of Design Product: Adcor by GCP Applied Technologies or equal.

2.5 MOLDED-SHEET DRAINAGE PANELS

- A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite drainage panels, 3-dimensional, nonbiodegradable, manufactured with a permeable geotextile bonded to molded-plastic-sheet drainage core and designed to effectively convey water.
 - 1. Vertical Application: Provide product with properties suitable for use vertically:
 - a. Thickness: 0.40 inches (10.16 mm) min.
 - b. Compressive Strength per ASTM D 1621: 15,000 pounds per sq. ft..
 - c. Filter Fabric Tensile Strength per ASTM D 4632: 100 pounds min.
 - d. Filter Fabric Puncture Resistance per ASTM D 4833: 65 pounds.
 - e. Filter Fabric Apparent Opening Size per ASTM D 4751: Sieve size 70 max.
 - 1) Basis of Design Product: Provide Hydroduct 220 by GCP Applied Technologies, Inc. or one of the following:
 - 2) CCW MiraDRAIN 6000/6200, Carlisle Coatings and Waterproofing.
 - 3) Hydrodrain 400, American Hydrotech, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions under which waterproofing systems will be applied, with Installer present, for compliance with requirements. Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Do not proceed with installation until after minimum concrete curing period recommended by waterproofing manufacturer.
 - 2. Verify substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 - 3. Verify that compacted subgrade is dry, smooth, and sound; and ready to receive adhesive-coated HDPE sheet.
 - 4. Notify Architect in writing of anticipated problems using waterproofing over substrate.

3.2 SURFACE PREPARATION

- A. General: Comply with manufacturer's instructions for preparing surface.

- B. Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for waterproofing application.
- C. Mask off adjoining surfaces not receiving waterproofing to prevent spillage affecting other construction.
- D. Remove grease, oil, bitumen, form release agents, paints, and other penetrating contaminants from concrete.
- E. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.
- F. Prepare, fill, prime, and treat joints and cracks in substrate in accordance with manufacturer's directions. Remove dust and dirt from joints and cracks according to ASTM D 4258.
- G. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135 and manufacturer's directions.
- H. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.
- I. Apply primer to substrate surfaces at rate recommended by manufacturer of primary waterproofing materials. Prime only area that will be covered by waterproofing membrane in same working day. Reprime areas not covered by waterproofing membrane within 24 hours.

3.3 INSTALLATION, GENERAL

- A. Comply with manufacturer's instructions for handling and installing sheet waterproofing materials.
 - 1. Apply rubberized asphalt membrane waterproofing to vertical surfaces of elevator pit, foundation walls, and elsewhere as indicated on drawings.
 - 2. Apply adhesive coated HDPE membrane waterproofing under slab at elevator pit, for all blind pours, at basement floor slabs and elsewhere as indicated on drawings.
- B. Coordinate installing waterproofing materials with associated work to provide complete system complying with combined recommendations by manufacturers and installers involved in Work. Schedule installation to minimize exposure of sheet waterproofing materials.

3.4 RUBBERIZED ASPHALT SHEET WATERPROOFING APPLICATION

- A. Accurately align sheets and maintain uniform side and end laps of minimum dimensions required. Stagger end laps.
- B. Apply bonding adhesive to substrate at required rate and allow to partially dry.

- C. Apply waterproofing sheet to vertical surfaces in shingled fashion, starting at the low point and working toward high point of wall. Overlap all side seams a minimum of 2-1/2 inches and end laps a minimum of 5 inches. Roll all membrane with hand roller. Firmly press edges of membrane to surfaces to provide watertight seal. Apply bead of mastic to all terminations.
 - 1. Provide a fillet of liquid membrane at all inside corners covered with sheet waterproofing prior to flashing with sheet waterproofing.
- D. Seal projections through membrane and seal seams. Bond to vertical surfaces and also, where shown or recommended by manufacturer, bond to horizontal surfaces.
- E. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal waterproofing sheet in place with clamping ring.
- F. Apply continuous sheets over sheet strips bridging substrate cracks, construction, and contraction joints
- G. For vertical and sloped-wall membrane, finish in termination bar; otherwise finish under flashing or under masonry in joint. Seal exposed edges with mastic or sealant.
- H. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheets extending 6 inches (150 mm) beyond repaired areas in all directions.
- I. Correct deficiencies in or remove sheet waterproofing that does not comply with requirements, repair substrates, reapply waterproofing, and repair sheet flashings.
- J. Immediately install drainage panels with butted joints over waterproofing membrane

3.5 ADHESIVE-COATED HDPE SHEET WATERPROOFING APPLICATION

- A. Install adhesive-coated HDPE sheets according to manufacturer's written instructions.
- B. Horizontal Applications: Install adhesive-coated HDPE sheet with HDPE face against substrate. Accurately align sheets and maintain uniform 3-inch- (75-mm-) minimum lap widths and end laps. Overlap and seal seams. Overlap, stagger, and seal end laps with detail tape to ensure watertight installation.
- C. Corners: Seal lapped terminations and cut edges of sheet waterproofing at inside and outside corners with detail tape.
- D. Seal penetrations through sheet waterproofing to provide watertight seal with detail tape patches or wraps and a liquid-membrane troweling.
- E. Install sheet waterproofing and auxiliary materials to produce a continuous watertight tie into adjacent waterproofing.
- F. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Tape perimeter of damaged or nonconforming area extending 6 inches

(150 mm) beyond repaired areas in all directions. Apply a patch of sheet waterproofing and firmly secure with detail tape.

- G. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

3.6 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

- A. Place and secure molded-sheet drainage panels with geotextile facing away from wall surface, according to manufacturer's written instructions over installed waterproofing membrane. Use adhesives that do not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels by installing protection course of rigid insulation over drainage panel, as indicated on Drawings.

3.7 INSULATION INSTALLATION

- A. Install single layer of board insulation over installed drainage panel as indicated on Drawings. Cut and fit to within 3/4 inch (19 mm) of projections and penetrations
- B. On vertical surfaces, set insulation units in adhesive or tape applied according to manufacturer's written instructions.
- C. Protect during subsequent construction operations.

3.8 PROTECTING AND CLEANING

- A. Protect waterproofing from damage and wear during application and remainder of construction period according to manufacturer's written instructions. Do not allow traffic of any type on unprotected membrane.
- B. Protect installed insulation from damage due to ultraviolet light exposure, physical abuse, and other causes. Provide temporary coverings where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.
- C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 071326

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Foam-plastic board insulation.
2. Mineral-wool board insulation.
3. Mineral-wool blanket insulation.

B. Related Sections:

1. Section 042000 "Unit Masonry" for insulation installed in cavity walls and masonry cells.
2. Section 075419 "PVC Roofing" for insulation specified as part of roofing construction.
3. Section 078446 "Joint Firestopping" for insulation installed as part of a perimeter joint firestopping system.
4. Section 092900 "Gypsum Board" for installation of acoustical blankets in metal-framed assemblies.

1.2 ACTION SUBMITTALS

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

1.3 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.
- B. Research/Evaluation Reports: For foam-plastic insulation, from ICC-ES.

1.4 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- B. Vertical and Lateral Fire Propagation Test Characteristics: The exterior wall assembly of the new Classroom Addition is required to comply with NFPA 285 "Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components." The base wall, stud cavity insulation, wall sheathing, air barrier, continuous wall rigid insulation and exterior cladding are components that are required to be evaluated as part of this specific assembly test. Insulation shall be part of an assembly that has passed NFPA 285 testing.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam-plastic board insulation as follows:
 - 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site before installation time.
 - 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 FOAM-PLASTIC BOARD INSULATION

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, 25 psi minimum compressive strength, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
 - 1. Basis of Design Product: Styrofoam Brand SM Insulation by DuPont (formerly Dow) or equal products by one of the following:
 - a. DiversiFoam Products.
 - b. Owens Corning.
 - 2. Thickness: As indicated on Drawings for each application.
 - 3. Edges: Square edge or shiplap edge boards, manufacturer's standard for thicknesses required.
 - 4. Applications: Below grade applications.
- B. Extruded-Polystyrene Board Insulation: ASTM C 578, Type X, 15-psi minimum compressive strength, with maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
 - 1. Basis of Design Product: Styrofoam Brand Cavtymate by DuPont (formerly Dow) or equal products by one of the following:
 - a. DiversiFoam Products.
 - b. Owens Corning.
 - 2. Thickness: As indicated on Drawings for each application.
 - 3. Edges: Square edge or shiplap edge boards, manufacturer's standard for thicknesses required.
 - 4. Application: Exterior wall sheathing (continuous insulation).
 - 5. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

- C. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

- 1. VOC Limits: Provide adhesives with VOC content not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).

2.2 MINERAL-WOOL BOARD INSULATION (SEMI-RIGID)

- A. Semi-Rigid Unfaced, Mineral-Wool Board Insulation: ASTM C 612, Types 1A, 1B and 1VB; with maximum flame-spread and smoke-developed indexes of zero and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

- 1. Basis of Design Product: Provide Cavityrock by Rockwool or equal product by one of the following:
 - a. Johns Manville
 - b. Owens Corning
 - 2. R-Value per Inch of Thickness: 4.3
 - 3. Density:
 - a. Greater or Equal to 2.5 Inches of Thickness: Dual Density; 6.2 lb/cu. ft. outer layer and 3.8 lb/cu. ft. inner layer.
 - b. Less Than 2.5 Inches of Thickness: Minimum 4.3 lb/cu. ft.
 - 4. Application: Provide for perimeter wall insulation at spandrels in curtainwall framing, at steel beams, roof areas, and other areas indicated.
 - a. Refer to Section 078446 "Joint Firestopping" for mineral wool insulation provided as part of a joint firestopping assembly/system.

2.3 MINERAL-WOOL BLANKET INSULATION

- A. Unfaced, Mineral-Wool Blanket Insulation: ASTM C 665, Type 1 (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 0 and 0, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

- 1. Basis of Design Product: Provide Comfortbatt by Rockwool or equal product by one of the following:
 - a. Owens Corning
 - b. Johns Manville
 - 2. R-Value per Inch of Thickness: 4.0 minimum
 - 3. Overall Thickness: As indicated on Drawings for each application
 - 4. Application: Provide for concealed building insulation in metal-framed soffit/roof assemblies, parapets, exterior stud walls, and elsewhere indicated on drawings.

2.4 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position indicated with self-locking washer in place.

1. Products: Subject to compliance with requirements, provide one of the following or equal:
 - a. AGM Industries, Inc.; Series T TACTOO Insul-Hangers.
 - b. Eckel Industries of Canada; Stic-Klip Type N Fasteners
 - c. Gemco; Spindle Type.
 2. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square.
 3. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation indicated.
- B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of specified thickness securely in position indicated with self-locking washer in place.
1. Products: Subject to compliance with requirements, provide one of the following or equal:
 - a. Gemco; 90-Degree Insulation Hangers.
 2. Angle: Formed from 0.030-inch- (0.762-mm-) thick, perforated, galvanized carbon-steel sheet with each leg 2 inches (50 mm) square.
 3. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation indicated.
- C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.
1. Products: Subject to compliance with requirements, provide one of the following or equal:
 - a. AGM Industries, Inc.; RC150 or SC150.
 - b. Gemco; Dome-Cap, R-150 or S-150.
 2. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
 - a. Crawl spaces.
 - b. Ceiling plenums.
 - c. Attic spaces.
 - d. Where indicated.
- D. Gas-Actuated Insulation Fasteners: Non-metallic insulation fastener assembly consisting of a plate or washer component formed from HDPE and a nail or pin component fabricated from zinc coated carbon steel pre-mounted in the plastic assembly, designed to be installed using a proprietary gas-actuated tool.
1. Products: Subject to compliance with requirements, provide one of the following or equal:
 - a. X-IE-G Insulation Fastening System by Hilti

b. Ramset-I-F System by ITW Commercial Construction

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF BELOW-GRADE INSULATION

- A. On vertical surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions. Extend insulation to dimension below exterior grade line as indicated.
 - 1. Where below grade insulation is installed over drainage protection board and installed waterproofing membrane, install boards vertically, loose laid.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.4 INSTALLATION OF INSULATION FOR FRAMED AND FURRED CONSTRUCTION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Foam-Plastic Board Insulation: Seal joints between units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill

voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

- C. Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 - 4. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs. Install with required number of fasteners in accordance with manufacturer's recommendations.
- D. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
 - 1. Unfaced mineral wool insulation.

3.5 INSTALLATION OF INSULATION IN CEILINGS FOR SOUND ATTENUATION

- A. Where mineral-wool blankets are indicated for sound attenuation above ceilings, install blanket insulation over entire ceiling area in thicknesses indicated. Extend insulation 48 inches (1219 mm) up either side of partitions.

3.6 INSTALLATION OF INSULATION FOR CONCRETE AND CMU SUBSTRATES

- A. Install board insulation on concrete or CMU substrates by adhesively attached, spindle-type insulation anchors as follows:
 - 1. Fasten insulation anchors to concrete and CMU substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
 - 2. Apply insulation standoffs to each spindle to create cavity width indicated between concrete or CMU substrate and insulation.
 - 3. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
 - 4. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.
- B. Install board insulation on concrete substrates by gas-actuated fastening system in accordance with manufacturer's directions.

3.7 INSTALLATION OF CURTAIN-WALL INSULATION

- A. Install board insulation in curtain-wall construction where indicated on Drawings according to curtain-wall manufacturer's written instructions.
 - 1. Hold insulation in place by securing metal clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to hold insulation securely in place without touching spandrel glass.
 - 2. Maintain cavity width of dimension indicated between insulation and glass, but in no case less than 1 inch cavity width.
 - 3. Install insulation to fit snugly without bowing.
 - 4. Install insulation where it contacts perimeter fire-containment system to prevent insulation from bowing under pressure from perimeter fire-containment system; refer to Section 078446 for installation of joint firestopping system components.

3.8 PROTECTION

- A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

SECTION 072419 - WATER-DRAINAGE EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

PART 1 - GENERAL

1.1 This Section includes the following:

1. Water-drainage exterior insulation and finish system (EIFS) applied over gypsum sheathing.

B. Related Work Specified Elsewhere:

1. Gypsum sheathing is specified in Division 06 Section "Gypsum Sheathing."

1.2 DEFINITIONS

- A. Class PB EIFS: A non-load-bearing, exterior wall cladding system that consists of an insulation board attached adhesively, mechanically, or both to the substrate; an integrally reinforced base coat; and a textured protective finish coat.
- B. Water-Drainage EIFS: EIFS with a means that allows water entering into an EIFS assembly to drain to the exterior.

1.3 ACTION SUBMITTALS

- A. Product Data: For each component of EIFS specified.
- B. Shop Drawings: Show fabrication and installation of system including plans, elevations, sections, details of components, reveals, joint locations and configurations within system and between system and construction penetrating it, termination details, and attachments to construction behind system.
- C. Samples for Initial Selection: Manufacturer's color charts and small-scale samples consisting of units or sections of units showing the full range of colors, textures, and patterns available for each finish choice indicated.
 1. Submit sealant manufacturer's standard bead samples consisting of strips of actual products showing the full range of colors available.
- D. Samples for Verification: 24-inch- (600-mm-) square panels for each finish, color, texture, and pattern specified. Prepare samples using same tools and techniques intended for actual work.

1.4 INFORMATIONAL SUBMITTALS

- A. Manufacturer Certificates: Signed by EIFS manufacturer, certifying the following:

1. EIFS complies with requirements.
2. Substrates to which EIFS is indicated to be attached are acceptable to EIFS manufacturer.
3. Accessory products installed with EIFS, including joint sealants, flashing, water-resistive barrier coatings, trim, whether or not furnished by EIFS manufacturer and whether or not specified in this Section, are acceptable to EIFS manufacturer..

B. Qualification Data: For installer.

C. Product Test Reports: Indicate compliance of proposed EIFS with physical property requirements specified in "Performance Requirements" Article based on comprehensive testing of current products by a qualified testing and inspecting agency.

D. Research/Evaluation Reports: Evidence of EIFS compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An installer who is certified in writing by the EIFS manufacturer as qualified to install their system using trained workers

B. Source Limitations: Obtain materials for system from one source and by a single manufacturer or by manufacturers approved by EIFS manufacturer as compatible with other system components.

C. Mock-ups: Mockups: Prepare mockups of new EIFS installation to demonstrate aesthetic effects and qualities of materials and execution. Prepare mockups on existing walls under same weather conditions to be expected during remainder of the Work. Final selection of EIFS finish coat appearance will be made by Architect based on acceptance of mock-ups.

1. Locate mock-ups where directed by Architect.
2. Notify Architect seven days in advance of dates and times when mock-up will be performed.
3. Provide a mock-up of approximately 25 sq. ft. in area for each type of EIFS finish to be provided.
4. Reprepare mock-ups as required to obtain Architect's approval.
5. Do not commence general EIFS installation work until Architect's acceptance of mock-ups' visual qualities has been obtained.
6. Cover and protect approved mock-ups until completion of all general EIFS work.
7. Approved mock-ups will be used as standard against which all EIFS work will be judged.
8. Approved mock-ups may become part of the final work upon acceptance by Architect

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original, unopened packages with manufacturer's labels intact and clearly identifying products.

- B. Store materials inside and under cover; keep them dry and protected from the weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes.

- 1. Stack insulation board flat and off the ground.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install system when ambient outdoor air and substrate temperatures are 40 deg F (4.4 deg C) and falling unless temporary protection and heat are provided to maintain ambient temperatures above 40 deg F (4.4 deg C) during installation of wet materials and until they have dried thoroughly and become weather resistant, but for at least 24 hours after installation.

1.8 COORDINATION AND SCHEDULING

- A. Coordinate installation of EIFS with related Work specified in other Sections to ensure that wall assemblies, including sheathing, flashing, trim, joint sealers, windows, and doors, are protected against damage from the effects of weather, age, corrosion, moisture, and other causes. Do not allow water to penetrate behind EIFS.

1.9 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace components of EIFS-clad drainage-wall assemblies that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Bond integrity and weathertightness.
 - b. Deterioration of EIFS finishes and other EIFS materials beyond normal weathering.
 - 2. Warranty coverage includes the following components of EIFS-clad drainage-wall assemblies:
 - a. EIFS finish, including base coats, finish coats, and reinforcing mesh.
 - b. Insulation installed as part of EIFS.
 - c. Insulation adhesive and mechanical fasteners.
 - d. EIFS accessories, including trim components and flashing.
 - e. Water-resistive barrier coatings.
 - f. EIFS drainage components.
 - 3. Warranty Period: Ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturers: Subject to compliance with requirements, provide "Outsulation X + MD" system by Dryvit Systems, Inc., or equal products by one of the following:

1. Synergy, a BASF Company.
2. STO.

2.2 PERFORMANCE REQUIREMENTS

- A. EIFS Performance: Comply with ASTM E2568 and with the following:

1. Weathertightness: Resistant to uncontrolled water penetration from exterior, with a means to drain water entering EIFS to the exterior
2. Structural Performance of Assembly and Components:
 - a. Wind Loads: Uniform pressure as indicated on Structural Drawings.
3. Impact Performance: ASTM E2568; Standard impact resistance except provide Ultra High impact resistance at all lower panels within 8 ft. of ground.
4. Abrasion Resistance: Sample consisting of 1-inch- (25.4-mm-) thick EIFS mounted on 1/2-inch- (12.7-mm-) thick gypsum board; cured for a minimum of 28 days; and showing no cracking, checking, or loss of film integrity after exposure to 528 quarts (500 L) of sand when tested per ASTM D 968, Method A.
5. Mildew Resistance: Sample consisting of finish coat applied to 2-by-2-inch (50.8-by-50.8-mm) clean glass substrate; cured for 28 days; and showing no growth when tested per ASTM D 3273 and evaluated according to ASTM D3274.
6. Drainage Efficiency: 90 percent average minimum when tested according to ASTM E2273.

- B. Fire-Test-Response Characteristics: Provide system assemblies and components with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting agency.

1. Flame Spread of Insulation Board and Finish Coats: 25 or less when tested individually per ASTM E 84.
2. Smoke Developed of Insulation Board and Finish Coats: 450 or less when tested individually per ASTM E 84.

2.3 MATERIALS

- A. Compatibility: Provide substrates, adhesive, board insulation, reinforcing meshes, base- and finish-coat materials, air and moisture barrier, sealants, and accessories that are compatible with one another and approved for use by system manufacturer for Project.
- B. Colors, Textures, and Patterns of Finish Coat: Comply with the following requirements:
1. Provide Architect's selections from system manufacturer's full range of colors, textures, and patterns for type of finish coat indicated.

- C. Weather Barrier: System manufacturer's secondary air and weather barrier 100 percent acrylic barrier job mixed with portland cement complying with ASTM C 150, Type I designed to seal substrates from moisture penetration and to improve the bond between substrate of type indicated and adhesive used for application of insulation; "Backstop NT," or equivalent.
- D. Weather Barrier Accessories:
 - 1. Fiberglass Mesh Tape: Open weave fiberglass mesh tape with pressure sensitive adhesive; "Grid Tape," or equivalent.
 - 2. Liquid-Applied Flashing: Flexible water-based polymer material; "Aquaflash Liquid" and "Aquaflash Mesh" or equivalent.
 - 3. Flashing and Filler: Flexible waterproof, low temperature gun applied material: "Backstop Flash and Fill" or equivalent.
- E. Waterproof Adhesive for Application of Insulation: System manufacturer's waterproof formulation designed for indicated use, compatible with substrate, and complying with the following requirements:
 - 1. Job-mixed formulation of portland cement complying with ASTM C 150, Type I, and polymer-based adhesive; "Genesis," or equivalent.
- F. Extruded-Polystyrene Board Insulation: Rigid, closed cell high-performance polystyrene material formed by the extrusion process, and meeting ASTM C578 Type X properties.
 - 1. R-Value = 5.0/inch
 - 2. Provide insulation in boards not more than 24 by 48 inches (610 by 1219 mm) and in thickness indicated but not more than 4 inches (102 mm).
 - 3. Provide pre-coated insulation starter boards, corners and shapes as required for complete installation.
 - 4. Basis of Design Product: Provide DOW XENERGY XPS by Dryvit.
- G. Reinforcing Mesh: Balanced, alkali-resistant, open-weave glass-fiber mesh treated for compatibility with other system materials, made from continuous multiend strands with retained mesh tensile strength of not less than 120 lbf/in. (21 dN/cm) per EIMA 105.01, complying with ASTM D 578 and the following requirements for minimum weight:
 - 1. Heavy-Duty/Panzer Mesh: 20.0 oz./sq. yd. at bottom panels (within 8 ft of walking surface).
 - 2. Standard/I.S. Reinforcing Mesh: Not less than 5.0 oz./sq. yd.
 - 3. Strip Reinforcing Mesh: Not less than 3.75 oz./sq. yd. (127 g/sq. m).
 - 4. Corner Reinforcing Mesh: Not less than 7.2 oz./sq. yd. (244 g/sq. m).
- H. Base-Coat Materials: System manufacturer's standard mixture complying with the following requirements for material composition and method of combining materials:

1. Job-mixed formulation of portland cement complying with ASTM C 150, Type I, white or natural color; and manufacturer's standard polymer-emulsion adhesive designed for use indicated; "Genesis," or equivalent.
 2. At moisture-sensitive (non-vertical surfaces) provide "Dryflex", a high percentage acrylic co-polymer material, which is mixed with Portland cement to produce a water-resistant base coat and adhesive.
- I. Primer: System manufacturer's standard factory-mixed elastomeric-polymer primer for preparing base-coat surface for application of finish coat; "ColorPrime," or equivalent.
- J. Finish-Coat Materials: System manufacturer's standard mixture complying with the following requirements for material composition and method of combining materials:
1. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, sound stone particles, and fillers to produce finish with appearance to match natural cut limestone; Dryvit Limestone finish with DPR; in color to match cast stone on the building as selected by the Architect.
- K. Water: Potable.
- L. Trim Accessories: Type as designated or required to suit conditions indicated and to comply with system manufacturer's written requirements, manufactured from vinyl plastic and complying with ASTM C 1063.
1. Drip Screed: Prefabricated one-piece type for attachment behind insulation, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and extended to form a drip; "Drainage Strip," or equivalent.
- M. Elastomeric Sealant Products: Provide sealant in accordance with requirements of Division 07 "Joint Sealants" Section and as recommended by EIFS system manufacturer..
- N. Fasteners: Type recommended by EIFS system manufacturer based on substrate.
- O. Parapet Cap Flashing: Type for both flashing and covering parapet top, with design complying with ASTM C1397 and ANSI/SPRI/FM 4435/ES-1.
- 2.4 MIXING
- A. General: Comply with system manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials except as recommended by system manufacturer. Mix materials in clean containers. Use materials within time period specified by system manufacturer or discard.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of system. Proceed with installation of system only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect contiguous work from moisture deterioration and soiling caused by application of systems. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.
- B. Protect system, substrates, and wall construction behind them from inclement weather during installation. Prevent infiltration of moisture behind system and deterioration of substrates.
- C. Prepare and clean substrates to comply with system manufacturer's written requirements to obtain optimum bond between substrate and adhesive for insulation.

3.3 SUBSTRATE PROTECTION APPLICATION

- A. Air and Moisture-resistive Weather Barrier: Apply over sheathing to provide a air and water-resistive barrier.
 - 1. Tape and seal joints, exposed edges, terminations, and inside and outside corners of sheathing unless otherwise indicated by EIFS manufacturer's written instructions.
- B. Flexible Flashing: Install over weather-resistive barrier, applied and lapped to shed water; seal at openings, penetrations, terminations, and where required by EIFS manufacturer. Prime substrates if required and install flashing to comply with EIFS manufacturer's written instructions and details.

3.4 TRIM INSTALLATION

- A. Trim: Apply trim accessories at perimeter of EIFS, at expansion joints, at windowsills, and elsewhere as indicated. Coordinate with installation of insulation.
 - 1. Weep Screed/Track (Drainage Strips): Use at bottom termination edges, at window and door heads, and at floor line expansion joints of water-drainage EIFS unless otherwise indicated.
 - 2. Windowsill Flashing: Use at windows unless otherwise indicated.
 - 3. Expansion Joint: Use where indicated on Drawings.
 - 4. Casing Bead: Use at other locations.
 - 5. Parapet Cap Flashing: Use where indicated on Drawings.

3.5 INSTALLATION

- A. Comply with ASTM C1397 and the EIFS manufacturer's system application instructions. Apply base coat sufficient to fully embed the reinforcing mesh. The recommended method is to apply the base coat in two (2) passes

- B. Board Insulation: Adhesively attach insulation to substrate in compliance with ASTM C 1397 and the following:
1. Apply adhesive to insulation by notched-trowel method, with notches oriented vertically to produce drainage channels that remain functional after the insulation is adhered to substrate.
 2. Press and slide insulation board into place. Apply pressure over the entire surface of the insulation board to accomplish uniform contact, high initial grab, and an overall level surface.
 3. Allow adhered insulation to remain undisturbed for period recommended by system manufacturer, but not less than 24 hours, before beginning rasping and sanding insulation, or applying base coat and reinforcing mesh.
 4. Apply insulation boards over dry substrates in courses with long edges oriented horizontally. Begin first course from drip screed/drainage strip and work upward. Work from perimeter casing beads toward interior of panels if possible.
 5. Stagger vertical joints in successive courses to produce running bond pattern. Locate joints so no piece of insulation is less than 12 inches (300 mm) wide or 6 inches (150 mm) high. Offset joints not less than 6 inches (150 mm) from corners of window and door openings.
 - a. Offset joints of insulation not less than 6 inches (150 mm) from horizontal and 4 inches (100 mm) from vertical joints in sheathing.
 6. Interlock ends at internal and external corners.
 7. Abut boards tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between insulation boards. If gaps greater than 1/16 inch (1.6 mm) occur, fill with insulation cut to fit gaps exactly; insert insulation without using adhesive or other material.
 8. Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes complying with details indicated.
 9. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/32 inch (0.8 mm) from surface of insulation and to remove yellowed areas due to sun exposure; do not create depressions deeper than 1/16 inch (1.6 mm).
 10. Score substrates to receive finish system to profiles indicated on drawings.
 11. Interrupt insulation for expansion joints where indicated.
 12. Form joints for sealant application by leaving gaps between adjoining insulation edges and between insulation edges and dissimilar adjoining surfaces. Make gaps wide enough to produce joint widths indicated after encapsulating joint substrates with base coat and reinforcing mesh.
 13. Treat exposed edges of insulation board as follows:
 - a. Wrap edges after installing insulation board and before applying field-applied reinforcing mesh.
 - b. Wrap mesh of width required to extend not less than 2-1/2 inches (63 mm) onto substrate behind insulation board, cover insulation board edge, and extend not less than 2-1/2 inches (63 mm) onto insulation board face.
 - c. Wrap edges of insulation board, except those forming substrates of sealant joints, by encapsulating with base coat, reinforcing mesh, and finish coat.

- d. Wrap edges of insulation board forming substrates of sealant joints within system or between system and other work by encapsulating with base coat and reinforcing mesh.
14. Treat edges of insulation board at trim accessories by extending base coat, reinforcing mesh, and finish coat over face leg of accessories.
15. Coordinate flashing installation with installation of insulation to produce a wall system that does not allow water to penetrate behind protective coating.
- C. Install trim accessories at locations indicated according to system manufacturer's written instructions.
- D. Install expansion joints at locations indicated, where required by system manufacturer, and as follows:
 1. Where expansion joints are indicated in substrates behind EIFS.
 2. Where EIFS adjoins dissimilar substrates, materials, and construction.
 3. Where wall height changes.
- E. Apply base coat to exposed surfaces of insulation in minimum thickness recommended in writing by system manufacturer, but not less than 1/16-inch (1.6-mm) dry-coat thickness.
- F. Embed reinforcing mesh of type indicated below in wet base coat to produce wrinkle-free installation with mesh continuous at corners and overlapped not less than 2-1/2 inches (64 mm) or otherwise treated at joints to comply with ASTM C 1397 and EIFS manufacturer's written instructions. Do not lap reinforcing mesh within 8 inches (204 mm) of corners. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are not visible.
 1. Heavy-Duty/Panzer Mesh: 20.0 oz./sq. yd. at bottom panels (within 8 ft of walking surface).
 2. Standard/I.S. Reinforcing Mesh: Not less than 5.0 oz./sq. yd.
- G. Additional Reinforcing Mesh: Apply strip reinforcing mesh around openings extending 4 inches (100 mm) beyond perimeter. Apply additional 9-by-12-inch (230-by-305-mm) strip reinforcing mesh diagonally at corners of openings (re-entrant corners). Apply 8-inch-(200-mm-) wide strip reinforcing mesh at both inside and outside corners, unless base layer of mesh is lapped not less than 4 inches (100 mm) on each side of corners.
 1. Embed strip reinforcing mesh in base coat before applying first layer of reinforcing mesh.
- H. Double Base-Coat Application: At lower panels, apply second base coat in the same manner and thickness as first application, with standard reinforcing mesh. Do not apply until first base coat has cured.
- I. Apply tinted primer over dry base coat according to system manufacturer's written instruction.

- J. Apply finish coat over dry primer, maintaining a wet edge at all times for uniform appearance, in thickness required by system manufacturer to produce a uniform finish of color and texture matching approved sample and mock-ups.

3.6 INSTALLATION OF JOINT SEALANTS

- A. Prepare joints and apply sealants, of type and at locations indicated, to comply with applicable requirements in Division 07 Section "Joint Sealants" and EIFS manufacturer's instructions.
 - 1. Clean surfaces to receive sealants to comply with indicated requirements and system manufacturer's written instructions.
 - 2. Apply primer recommended in writing by sealant manufacturer for surfaces to be sealed.
 - 3. Install sealant backing to control depth and configuration of sealant joint and to prevent sealant from adhering to back of joint.
 - 4. Apply masking tape to protect areas adjacent to sealant joints. Remove tape immediately after tooling joints, without disturbing joint seal.
 - 5. Apply joint sealants after base coat has cured but before applying finish coat.

3.7 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform required special inspections.
- B. EIFS will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports

3.8 CLEANING AND PROTECTING

- A. Remove temporary covering and protection of other work. Promptly remove coating materials from window and door frames and other surfaces outside areas indicated to receive system coatings.
- B. Provide final protection and maintain conditions, in a manner acceptable to Installer and system manufacturer, that ensure system is without damage or deterioration at the time of Substantial Completion.

END OF SECTION 072419

SECTION 072726 - FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes fluid-applied, vapor-permeable membrane air barriers.
- B. Related Requirements:
 - 1. Section 061643 "Gypsum Sheathing" for wall sheathings and wall sheathing joint-and-penetration treatments.

1.2 DEFINITIONS

- A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.
- B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.
- C. Air-Barrier Assembly: The collection of air-barrier materials and accessory materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review air-barrier requirements and installation, special details, mockups, air-barrier protection, and work scheduling that covers air barriers.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of products.
- B. Shop Drawings: For air-barrier assemblies.
 - 1. Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 - 2. Include details of interfaces with other materials that form part of air barrier.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.
- C. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Mockups: Build mockups to set quality standards for materials and execution and for preconstruction testing.
 - 1. Install fluid-applied membrane air barriers system on mockups of exterior wall systems specified in other specification sections to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.
 - a. Include junction with roofing membrane, building corner condition, and foundation wall intersection.
 - b. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- B. Protect stored materials from direct sunlight.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air-barrier manufacturer.
 - 1. Protect substrates from environmental conditions that affect air-barrier performance.
 - 2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

1.9 WARRANTY

- A. Manufacturer's Warranty: Submit manufacturer's standard warranty form for membrane systems, include affirmation of waterproofing mock-up observation and approval as required by warranty provisions. Approval by manufacturer for warranty is required prior to system application. Submit manufacturer's "Request Form" and supporting documentation at completion of waterproofing application through the local Authorized Distributor of the materials.

1. Warranty Period: Five years from date of Substantial Completion.

- B. Special Installer's Warranty: Installer's standard form in which installer agrees to repair or replace membranes that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.
- B. VOC Content: 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and complying with VOC content limits of authorities having jurisdiction.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Air barrier shall be capable of performing as a continuous vapor-retarding air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- A. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.2 L/s x sq. m of surface area at 75 Pa) when tested according to ASTM E 283, ASTM E 783, or ASTM E 2357.
- B. Vertical and Lateral Fire Propagation Test Characteristics: The exterior wall assembly of the new Classroom Addition is required to comply with NFPA 285 "Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components." The base wall, stud cavity insulation, wall sheathing, air barrier, continuous wall rigid insulation and exterior cladding are components that are required to be to be evaluated as part of this specific

assembly test. Membrane air and moisture barriers shall be part of an assembly that has passed NFPA 285 testing.

2.3 HIGH-BUILD VAPOR-PERMEABLE MEMBRANE AIR BARRIER

- A. Fluid-Applied, Vapor-Permeable Membrane Air Barrier: Synthetic polymer membrane with an installed dry film thickness, according to manufacturer's written instructions, of 35 mils (0.9 mm) or thicker over smooth, void-free substrates.
 - 1. Basis of Design Product: Provide Henry Company; Air-Bloc 31MR or one of the following:
 - a. GCP Applied Technologies: Perm-A-Barrier VPL.
 - b. ExoAir 230 by Tremco.
 - 2. Physical and Performance Properties:
 - a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. (0.02 L/s x sq. m of surface area at 75-Pa) pressure difference; ASTM E 2178.
 - b. Vapor Permeance: Minimum 10 perms (580 ng/Pa x s x sq. m); ASTM E 96/E 96M.
 - c. Ultimate Elongation: Minimum 200 percent; ASTM D 412, Die C.

2.4 ACCESSORY MATERIALS

- A. General: Provide primers, transition strips, termination strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.
- B. Primer: Liquid waterborne primer recommended for substrate by air-barrier material manufacturer.
 - 1. Basis of Design Product: Aquatac by Henry Co., or equal.
- C. Liquid Flashing: Moisture cure single-component elastomeric liquid-applied flashing containing Silyl-Terminated Polyether (STPE) polymer, designed to cure through reaction with airborne moisture.
 - 1. Basis of Design Product: Air-Bloc LF Liquid-Applied Flashing by Henry Co., or equal.
- D. Counterflashing Strip: Modified bituminous, 40-mil- (1.0-mm-) thick, self-adhering sheet consisting of 32 mils (0.8 mm) of rubberized asphalt laminated to an 8-mil- (0.2-mm-) thick, cross-laminated polyethylene film with release liner backing.
 - 1. Basis of Design Product: Blueskin SA or Blueskin SA LT by Henry Co., or equal

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 - 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 - 2. Verify that concrete has cured and aged for minimum time period recommended by air-barrier manufacturer.
 - 3. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 - 4. Verify that masonry joints are flush and completely filled with mortar.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air-barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with 26 gauge stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.
- H. Bridge isolation joints, expansion joints and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

3.3 ACCESSORIES INSTALLATION

- A. Install accessory materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.
 - 1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
 - 2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches (75 mm) of coverage is achieved over each substrate.
 - 3. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
 - 4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
- B. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- C. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.
- D. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- E. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip/flashing so that a minimum of 3 inches (75 mm) of coverage is achieved over each substrate. Maintain 3 inches (75 mm) of full contact over firm bearing to perimeter frames, with not less than 1 inch (25 mm) of full contact.
 - 1. Transition Strip/Flashing: Roll firmly to enhance adhesion.
- F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with sealant.
- G. Terminations:
 - 1. Seal strips and transition strips around masonry reinforcing or ties and penetrations.
 - 2. Seal top of through-wall flashings to air barrier with an additional 6-inch- (150-mm-) wide, transition strip.
 - 3. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with sealant or liquid flashing.

- H. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches (150 mm) beyond repaired areas in strip direction.

3.4 FLUID AIR-BARRIER MEMBRANE INSTALLATION

- A. Apply air-barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier according to air-barrier manufacturer's written instructions and details. Apply air-barrier material within manufacturer's recommended application temperature ranges.
 - 1. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
 - 2. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
 - 3. Where multiple prime coats are needed to achieve required bond, allow adequate drying time between coats
- B. High-Build Membrane Air Barriers: Apply a continuous unbroken air-barrier membrane to substrates according to the following thickness. Apply air-barrier membrane in full contact around protrusions such as masonry ties.
 - 1. Vapor-Permeable Membrane Air Barrier: Total dry film thickness as recommended in writing by manufacturer to meet performance requirements, but not less than 35-mil (0.9-mm) dry film thickness, applied in one or more equal coats.
- C. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.
- D. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a Project Inspector to perform inspections.
- B. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
 - 1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
 - 2. Continuous structural support of air-barrier system has been provided.
 - 3. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
 - 4. Site conditions for application temperature and dryness of substrates have been maintained.
 - 5. Maximum exposure time of materials to UV deterioration has not been exceeded.
 - 6. Surfaces have been primed, if applicable.

7. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
8. Termination mastic has been applied on cut edges.
9. Strips and transition strips have been firmly adhered to substrate.
10. Compatible materials have been used.
11. Transitions at changes in direction and structural support at gaps have been provided.
12. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
13. All penetrations have been sealed.

C. Air barriers will be considered defective if they do not pass tests and inspections.

1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.

D. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

3.6 CLEANING AND PROTECTION

A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. If exposed to these conditions for more than 30 days, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed membrane according to air-barrier manufacturer's written instructions.
2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

C. Remove masking materials after installation.

END OF SECTION 072726

SECTION 074114 - METAL-FACED GLAZING PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:

1. Non-insulated metal-faced wall panels for glazing into interior storefront framing sidelites.

1.2 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal panel and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, and special details. Distinguish between factory- and field-assembled work.
- C. Samples for Initial Selection: For each type of metal-faced panel indicated with factory-applied color finishes.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, sheets, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Protect strippable protective covering on metal panels from exposure to sunlight and high humidity, except to extent necessary for period of metal panel installation.

1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify locations of framing dimensions by field measurements before metal panel fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 PANEL MATERIALS

- A. Aluminum Sheet: Coil-coated sheet, ASTM B 209 (ASTM B 209M), alclad alloy 3003, 3004, or 3105 for painted finishes, with temper as required to suit forming operations and structural performance required.

2.2 METAL-FACED WALL PANELS

- A. Non-Insulated Metal Panels: Manufacturer's standard laminated aluminum-faced panels of overall thickness indicated, flat with no deviations in plane exceeding 1/16 inch in 24 inches (1.5 mm in 600 mm) or 1/8 inch (3 mm) over entire panel, forming outer skin of panels with specified core between panels.
 - 1. Face Panels Fabrication: Face panels shall be coil coated aluminum sheet bonded to solid substrate.
 - a. Aluminum Sheet Thickness: 0.032"
 - b. Substrate: Cement board.
 - c. Exposed Panel Texture: Smooth.
 - d. Exposed Panel Finish: Painted enamel or powder paint, in colors as selected for each location by Architect from full range of colors.
 - 2. Edge Configuration: Unsealed.
 - 3. Overall Panel Thickness: 1/2".
 - 4. Basis of Design Product: Mapes Veneer/Glazing Panel by Mapes Architectural Products or equal.

2.3 FABRICATION

- A. General: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

2.4 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PANEL INSTALLATION, GENERAL

- A. General: Install metal-faced panels in orientation, sizes, and locations indicated on Drawings and in compliance with approved shop-drawings. Anchor metal-faced panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Field cutting of metal-faced glazing panels is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal-faced panel manufacturer.

3.3 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074114

SECTION 074213.53 - COMPOSITE METAL WALL AND SOFFIT PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Metal-faced composite core wall panels used for soffits, fascia cladding, wall panels, cornice cladding, copings, canopy cladding, sunshade cladding and other applications.
2. Metal wall panel accessories including closures, fasteners and clips, corners, flashings, and other components of wall panel system.
3. Wall panel stub framing system.
 - a. Subframing required to support the composite core wall panel profiles indicated on the Drawings shall be part of the system designed under this Section.

B. Related Sections include the following:

1. Division 05 Section "Cold-Formed Metal Framing" for secondary support framing supporting metal panels.
2. Division 07 Section "Joint Sealants" for field-applied sealants not otherwise specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal panel and accessory.

B. Shop Drawings: Show fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment systems, trim, flashings, closures, and accessories; and special details. Distinguish between factory- and field-assembled work.

1. Include structural data indicating compliance with performance requirements, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
2. Indicate coordination dimensions related to structural support system elements provided by others.

C. Samples for Initial Selection:

1. Include Samples of trim and accessories involving color selection.
2. Include manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each sealant exposed to view

- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
1. Metal Panels: 12 inches (300 mm) long by actual panel width. Include fasteners, clips, closures, and other metal panel accessories.
 2. Trim and Closures: 12 inches (300 mm) long. Include fasteners and other exposed accessories.
 3. Sealants: 12 inches (300 mm) long strips of cured sealants showing the colors to be provided for each sealant exposed to view

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Maintenance Data: For metal panels to include in maintenance manuals.
- C. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of metal panels through one source from a single manufacturer.
- C. Mockups: Prior to installing composite metal wall panels, construct mockups for each form of construction and finish required to verify selections made under Sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for Work.
1. Provide mock-up of roof coping/cornice assembly for each different configuration.
 2. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect.
 3. Include exposed sealant joint in mock-up.
 4. Notify Architect 7 days in advance of the dates and times when mockups will be constructed.
 5. Demonstrate the proposed range of aesthetic effects and workmanship.
 6. Obtain Architect's approval of mockups before start of Work.
 7. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
- D. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of metal wall panel systems including secondary

framing that are similar to those indicated for this Project in material, design, and extent.

- E. Preconstruction Compatibility and Adhesion Testing: Submit samples of materials that will contact joint sealants to joint-sealant manufacturers for testing indicated in subparagraphs below:
 - 1. Use manufacturer's standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - a. Perform tests under environmental conditions replicating those that will exist during installation.
 - 2. Submit no fewer than nine pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
 - 3. Schedule enough time for testing and analyzing results to prevent delaying the Work.
 - 4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, sheets, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Protect strippable protective covering on metal panels from exposure to sunlight and high humidity, except to extent necessary for period of metal panel installation.

1.6 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Verify locations of framing dimensions by field measurements before metal panel fabrication and indicate measurements on Shop Drawings.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel assemblies that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including rupturing, cracking, or puncturing.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Provide metal panel assemblies that comply with performance requirements specified as determined by testing manufacturers' standard assemblies similar to those indicated for this Project, by a qualified testing and inspecting agency.
- B. Thermal Movements: Provide metal panel assemblies that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- C. Air Infiltration: Air leakage through assembly of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) of wall area when tested according to ASTM E 283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 1.57 lbf/sq. ft. (75 Pa) for metal-faced composite core wall panels.

- D. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa) for metal-faced composite core wall panels.
- E. Structural Performance: Metal wall panel assemblies shall withstand the effects the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 330:
 - 1. Wind Loads: Determine loads based on the following minimum design wind pressures:
 - a. Uniform pressure as indicated on Structural Drawings.
 - 2. Deflection Limits: Metal wall panel assemblies shall withstand wind loads with horizontal deflections no greater than the following
 - a. 1/175 of the span at the perimeter and 1/60 of the span anywhere in the panel for metal-faced composite core wall panels.
 - 3. Secondary Framing: Design secondary framing system according to AISI "Standard for Cold-Formed Steel Framing - General Provisions."
- F. Vertical and Lateral Fire Propagation Test Characteristics: The exterior wall assembly of the new Classroom Addition is required to comply with NFPA 285 "Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components." The base wall, stud cavity insulation, wall sheathing, air barrier, continuous wall rigid insulation and exterior cladding are components that are required to be to be evaluated as part of this specific assembly test. Metal wall and soffit panels shall be part of an assembly that has passed NFPA 285 testing.

2.2 PANEL MATERIALS

- A. Aluminum Sheet: Coil-coated sheet, ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.

2.3 MISCELLANEOUS METAL FRAMING

- A. Steel Sheet Components, General: Complying with ASTM C 645 requirements for metal and with ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized zinc coating.
- B. Subgirts: C- or Z-shaped sections fabricated from 0.0598-inch (1.5-mm) bare steel thickness, shop-painted, cold-formed, metallic-coated steel sheet.
- C. Base or Sill Angles and Channels: 0.079-inch (2.0-mm) bare steel thickness, cold-formed, galvanized steel sheet.
- D. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base Metal Thickness: 0.0179 inch (0.45 mm).
 2. Depth: 7/8 inch (22 mm) unless otherwise indicated.
- E. Cold-Rolled Furring Channels: 0.0538-inch (1.37-mm) bare steel thickness, with minimum 1/2-inch- (13-mm-) wide flange.
1. Depth: As indicated.
- F. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum bare steel thickness of 0.0312 inch (0.79 mm).
- G. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- (1.59-mm-) diameter wire, or double strand of 0.0475-inch- (1.21-mm-) diameter wire.
- H. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating.
1. Fasteners for Panels: Self-drilling or self-tapping, zinc-plated, hex-head carbon-steel screws, with a stainless-steel cap or zinc-aluminum-alloy head and EPDM or neoprene sealing washer.

2.5 METAL-FACED COMPOSITE CORE WALL AND SOFFIT PANELS

- A. General: Provide factory-formed and -assembled, metal-faced composite panels fabricated from two metal facings bonded, using no glues or adhesives, to solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment system components and accessories required for weathertight system. Metal composite panel system shall be a full system that includes the sub-framing designed by system supplier's professional engineer.
1. Surface-Burning Performance: Product shall have the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 2. Basis of Design Product: Provide Alucobond PLUS manufactured by 3A composites USA or equal products of one of the following:
 - a. Arconic Architectural Products (USA).
 - b. Mitsubishi Chemical Composites.

- B. Aluminum-Faced Composite Wall Panels: Formed with 0.020-inch- (0.50-mm-) thick, coil-coated aluminum sheet facings.
 - 1. Panel Thickness: 4 mm.
 - 2. Core: Fire retardant core.
 - 3. Exterior Finish for Aluminum: Three-coat fluoropolymer. AAMA 620/621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coats. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Color: As selected by Architect from manufacturer's full range.
- C. Attachment System Components: Formed from extruded aluminum.
 - 1. Include manufacturer's standard perimeter extrusions with integral weather stripping, panel stiffeners, panel clips and anchor channels as indicated or as required for a complete assembly.
- D. System Installation Method: Rout and return wet seal.
- E. Applications: Soffits, fascia, copings, cornice, wall cladding, trim, canopy cladding, sunshade cladding, and other articulated exterior metal wall panels, and other applications indicated on Drawings.
- F. Flashing and Trim Color: Same material, finish, and color as facings of adjacent panels

2.6 ACCESSORIES

- A. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels, unless otherwise indicated.

2.7 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Fabricate metal wall panels in a manner that eliminates condensation on interior side of panel and with joints between panels designed to form weathertight seals
- C. Metal-Faced Composite Wall Panels: Factory form panels in a continuous process with no glues or adhesives between dissimilar materials. Trim and square edges of sheets with no displacement of face sheets or protrusion of core material.
 - 1. Form panel lines, breaks, and angles to be sharp and true, with surfaces free from warp and buckle.

2. Fabricate panels with sharply cut edges, with no displacement of face sheets or protrusion of core material.
 3. Fabricate panels with panel stiffeners, as required to comply with deflection limits, attached to back of panels with structural silicone sealant or bond tape.
 4. Dimensional Tolerances:
 - a. Panel Bow: 0.8 percent maximum of panel length or width.
 - b. Squareness: 0.25 inch (5 mm) maximum.
- D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.
1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 2. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
 3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 4. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application but not less than thickness of metal being secured.

2.8 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of work.

- B. Examine primary and secondary framing to verify that structural panel support members and anchorages have been installed within alignment tolerances required by manufacturer.
 - 1. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before metal panel installation
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Framing: Install subpurlins, eave angles, furring, and other miscellaneous panel support members and anchorage according to metal panel manufacturer's written recommendations.

3.3 METAL PANEL INSTALLATION, GENERAL

- A. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Factory cut metal panels as required for penetrations and openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.
 - a. Field cutting of metal panels by saw or torch is not permitted.
 - 2. Install metal panels perpendicular to structural supports, unless otherwise indicated.
 - 3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal panel manufacturer.
- C. Joint Sealers: Install sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal panel manufacturer.

3.4 METAL WALL AND SOFFIT PANEL INSTALLATION

- A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Shim or otherwise plumb substrates receiving metal wall panels.
 - 2. Install flashing and trim as metal wall panel work proceeds.

- B. Clip Installation: Attach panel clips to supports at each metal-faced composite wall panel joint at locations, spacings, and with fasteners recommended by manufacturer. Attach routed-and-turned flanges of wall panels to panel clips with manufacturer's standard fasteners.
 - 1. Seal horizontal and vertical joints between adjacent panels with sealant backing and sealant. Install sealant backing and sealant according to requirements specified in Division 07 Section "Joint Sealants."
 - 2. Install semi-rigid mineral wool between subframing for the clip installation system where indicated.
- C. Installation Tolerances: Shim and align metal wall panels within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m), nonaccumulative, on level, plumb, and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.5 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074213.53

SECTION 075419 PVC ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Applicable provisions of the Conditions of the Contract and Division 1, General Requirements, govern work in this Section

1.2 DESCRIPTION OF WORK

- A. The work of this Section includes all plant, labor, materials, equipment, testing and services necessary to complete the work shown on the drawings, schedules, and keynotes, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:
 - 1. Install a new fully adhered reinforced 60 mil thick PVC roofing system, including a vapor barrier, thermal barrier, insulation, cover board, flashing, stripping and related accessories – on new addition roof areas.
 - 2. Install new 60 mil thick PVC flashings at new equipment curbs, support rails and electric, supply, return and control line Portals Plus curbs – on existing PVC roof areas; perform the work to maintain existing roof warranties previously issue by Johns Manville.
 - 3. Inspect the underside of the roof decks before starting work, and periodically each day as work occurs, to determine if there are conduits, pipes, ceiling hangers or fixtures next to the deck or fastened to the deck that could be affected as roof removal work occurs.
 - a. Perform roof work so any conduits, pipes, ceiling hangers or fixtures and not disturbed.
 - b. Replace and reset any conduits, pipes, ceiling hangers or fixtures that are affected by the work.
 - 4. Remove existing roofing, insulation, the vapor barrier, underlayment, wood blocking, and flashing – as needed to accomplish the work.
 - a. Clean all residual material from the surface of the decks, and from within the flutes of the steel decks.
 - b. The work may include removing asbestos containing roofing materials. Refer to the asbestos abatement specification for additional information and asbestos removal requirements.
 - 5. Install new insulation, cover boards, and PVC roofing to restore the existing roof where abandoned mechanical equipment and curbs are being removed.

6. Cover new rooftop ductwork with minimum 3-inch thick isocyanurate insulation and fully adhered un-reinforced 60 mil thick ethylene propylene diene monomer (EPDM) roofing.
 - a. Configure the insulation on the ducts so the top surfaces slope for drainage.
 - b. Install two roller applied coats of white acrylic coating on the EPDM after the work is complete and accepted in writing by the Architect.
 7. Protect new and existing roof surfaces where material and equipment are placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.
 8. Provide any miscellaneous mechanical, electrical, hoisting and other work needed, and remove, adjust, modify, reset and reconnect all roof-mounted and roof-penetrating devices to install the flashings as shown and specified.
 9. Install new flashings at the roof eaves, drains, and all roof-mounted and roof-penetrating equipment.
- 1.3 RELATED WORK SPECIFIED ELSEWHERE – Entire Project Specification with specific reference to those sections noted above and as follows:
- | | | |
|----|------------|------------------------------------|
| A. | Division 4 | Masonry |
| B. | 061000 | Roof Carpentry |
| C. | 076200 | Sheet Metal Flashing & Specialties |
| D. | 077200 | Roof Accessories |
- 1.4 CODE APPROVAL REQUIREMENTS
- A. Install roofing and insulation system components to meet the following minimum requirements:
 1. New York State Uniform Fire Prevention and Building Code, which includes by reference the New York State Energy Conservation Code.
 2. Underwriters Laboratories Inc. Class A External Fire Rating for roof assemblies tested in accordance with ASTM E 108 or UL 790.
 3. Underwriters Laboratories Inc. Standard 1256 for roof assemblies with foam insulation.
 4. Minimum wind uplift pressure calculated using ASCE 7 and a safety factor of 2:
 - a. Field Zone: 90 psf
 - b. Perimeter Zones: 135 psf
 - c. Corner Zone: 180 psf
 - B. Provide written certification from the Manufacturer, before beginning work, to confirm the roofing system meets these requirements.
- 1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1. A firm (Installer) with not less than 5 continuous years experience performing work similar to that required for this project, employing personnel skilled in the specified work.
 - a. The Installer shall directly employ the personnel performing the work of this section.
 - b. The Installer shall have a supervisor on the roof when work is in progress. The Supervisor shall have a minimum of 5 years experience with work similar in nature and scope to this project, and speak fluent English.
 1. Submit the supervisor's resume upon request.
2. The Installer shall provide a reference list of at least three previously completed projects of comparable size and similar design, within fifty miles of this project, which may be observed by representatives of the Owner:
 - a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number.
 - b. Submit the reference list upon request.
3. The Installer shall be acceptable to or licensed by the Manufacturer of the primary roofing materials, and provide written certification from the Manufacturer to confirm this prior to award if requested.

- B. Material Quality: Obtain each product, including the insulation, cover board, PVC roofing and flashing, and the cements, primers and adhesives from a single Manufacturer, which has manufactured the same products in the United States of America for not less than 5 continuous years.

1.6 PRE-CONSTRUCTION CONFERENCE:

- A. Meet at the project site approximately two weeks prior to starting roof related work, with the Architect, Owner and other representatives concerned about the work, to discuss the following:
1. How the building will be kept watertight as the work progresses.
 2. How roofing work will be coordinated with the installation of the thermal barrier, vapor barrier, insulation, cover board, flashings, roof top equipment and other items to provide a watertight installation.
 3. Generally accepted industry practice and the Manufacturer's instructions for handling and installing his products.

4. The condition of the substrate (deck), curbs, penetrations and other preparatory work needed.
5. Incomplete submittals; note that progress payments will be not processed until all submittals are received and approved.
6. The construction schedule, forecast weather, availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.
7. A schedule for Manufacturer and Architect inspections.

1.7 SUBMITTALS

- A. Submit the following items far enough in advance to obtain approval prior to performing any work:
 1. A pre-work site and building inspection report with photos to document conditions before work starts.
 2. Written certification from the Manufacturer which states that the Installer is acceptable or licensed to install the specified roofing; if not previously provided.
 3. Manufacturer's technical literature for all materials.
 4. Samples of the Contractor's guarantee and Manufacturer's warranty forms.
- B. Simultaneously provide all roof related submittals needed for this project, for all technical sections, collated by section. Incomplete submittals will not be reviewed.
 1. Submittals shall be prepared and made by the firm that will perform the actual work.
 2. Provide electronic submittals via an on-line submittal exchange program if one is established for this project; if an on-line program is not established, provide the submittals on portable USB drives in pdf format, organized in folders by Section.
 - a. Do not send technical submittals via email.
 - b. Do not include Safety Data Sheets with the technical submittals.
- C. Safety Data Sheets: Simultaneously provide all Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders for each building.
- D. Payment requisitions will not be processed until all submittals are received and approved.

1.8 JOB CONDITIONS (CAUTIONS & WARNINGS)

- A. Do not use oil base or plastic roof cement with PVC roofing. Do not allow waste products, (petroleum grease or oil, solvents, vegetable or mineral oil, animal fat) or direct steam venting to contact any roofing, insulation or flashing product. Do not expose PVC roofing and accessories to a temperature in excess of 175 degrees Fahrenheit.

- B. Splice cleaner, primers, cements and bonding adhesives are flammable. Do not breathe vapors or use near fire or flame or in a confined or unventilated area. Dispense only from a UL listed or approved safety can.
- C. Remove empty adhesive and solvent containers and contaminated rags from the roof daily and legally dispose of them daily.
- D. Do not apply adhesives next to open ventilation system louvers, or windows. Temporarily cover the louvers and windows with 6 mil fire retardant polyethylene and prevent adhesive odors from entering the building. Remove temporary covers at the end of each day's work.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Deliver material to the site in the Manufacturer's original and unopened packaging, bearing labels which identify the type and names of the products and Manufacturers, with the labels intact and legible.
- B. Cover all stored materials, except sealed cans of adhesives, with watertight tarpaulins installed immediately upon delivery.
- C. Immediately remove any insulation which gets wet from the job site.
- D. Store and install all material within the Manufacturer's recommended temperature range.
- E. Do not overload the structure when storing materials on the roof.
- F. Protect roof surfaces where material and equipment are placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.

1.10 GUARANTEE AND WARRANTY

- A. Provide a written Manufacturer's "Full System Warranty" which warrants that the new roofing system, including the insulation, PVC roofing and flashings, will remain in a watertight condition for twenty years beginning upon Final Completion.
 - 1. Warranty coverage shall remain in effect for wind speeds up to 72 miles per hour measured at ground level at the site.
 - 2. Warranty coverage shall have no dollar value limit.
- B. Provide written confirmation from Johns Manville to document the existing roof warranties remain in effect – after the new equipment curbs and flashings have been installed.
- C. Provide a written Contractor's Guarantee which guaranties that all work will remain free of material and workmanship defects and in a watertight condition for five years beginning upon Final Completion:

1. Defects include but are not limited to the following: leakage, adhesive separation, delamination, lifting, loosening, splitting, cracking, movement and undue expansion.
 2. Guarantee coverage shall include the repairs and modifications necessary to enable the work to perform as guaranteed.
 3. Guarantee coverage shall include removing and replacing items installed as part of the original work, if removal is needed to make guaranteed repairs.
 4. Guaranty coverage shall remain in effect for wind speeds up to 72 miles per hour measured at ground level at the site.
 5. Guaranty coverage shall have no dollar value limit.
 6. The Contractor's Surety Company may add a rider to the Performance Bond which clarifies that Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the five year term of the Contractor's Guarantee.
- D. Provide one Guarantee that covers "all work performed" when a single contractor is awarded work specified in multiple Sections.
- E. The Manufacturer's Warranty and Contractor's Guarantee shall take effect no more than 30 days before the satisfactory completion of all punch list work.
- F. Guarantee and Warranty coverage may be cancelled, for the affected portion of the roof, if the work is damaged by winds in excess of 72 mph, by hail, lightning, insects or animals, by failure of the structural substrate, by exposure to harmful chemicals, by other trades on the roof, or by vandalism, or if the Owner fails to maintain the roof in accordance with, or makes roof alterations contrary to, the Manufacturers printed recommendations.
- G. Guarantee and Warranty coverage shall be reinstated, for the remainder of the original term, if the Owner restores the roof to the condition it was in prior to the damage occurring.

1.11 SUBSTITUTIONS

- A. The following factors will be considered when evaluating a possible alternative to the roofing system specified:
1. The wording and intent of the warranty to be issued.
 2. The financial status, numbers of years in business and stability of the entity that will issue the warranty.
 3. A reference list of at least five completed similar projects of comparable size, with a successful functional history of at least five years, within approximately fifty miles of the Project.

4. Technical aspects of the system, especially relating to durability, serviceability and performance.
5. The capacity and history of the Manufacturer in providing technical response, on-site inspections and assistance.
6. The availability and prior experience of local authorized applicators to install and maintain the proposed alternate system.
7. The willingness and history of the Manufacturer in responding to warranty claims previously made by the Owner, Architect or any Consultant involved in this project.

PART 2 - PRODUCTS

2.1 GENERAL

- A. PVC system components are specified as products of Sika Sarnafil Inc. as a basis of design and to establish a standard of quality. Equal products and systems from Johns Manville and Carlisle will be accepted if submitted to show the substitute products meet the criteria established in this specification.
- B. Primary products required for this project include:
 1. Vapor barrier
 2. Thermal barrier
 3. Roof insulation
 4. Gypsum cover board
 5. PVC roofing
 6. Primers and adhesives
 7. Sealants
 8. PVC flashing
 9. Fasteners

2.2 MATERIALS:

- A. Primer & Vapor Barrier for Concrete Decks:
 1. Primer: Thin, cut back asphalt meeting ASTM D41.
 2. Vapor Barrier: Fire resistant torch grade SBS modified granular surfaced polyester and glass scrim reinforced cap sheet meeting ASTM D 6163 Type I, Grade G.
- B. Thermal Barrier: 1/2 inch thick fire resistant gypsum board decking with inorganic glass mat facers and a water resistant core, formulated in 48 x 96 inch square edge boards, UL Class A, meeting ASTM C-1177, manufactured under the trade name Dens-Deck Prime.
- C. Insulation:

1. Isocyanurate – Rigid cellular polyisocyanurate boards with fibrous felt/fiberglass mat facers, minimum compressive strength 20 psi, meeting ASTM C1289-01, Type II, Class 1, Grade 2, as manufactured by Sarnafil under the trade name Sarnatherm.
 1. Tapered insulation sloping 1/4 inch per foot, minimum starting thickness 5-1/2 inches.
 2. Crickets sloping 1/2 inch per foot.
 3. Flat insulation to be installed on areas with sloping decks consisting of a layer of 3 inch thick insulation installed over a layer of 2-1/2 inch thick insulation.
 4. Isocyanurate tapered edge strips installed at transitions and the drain sumps.
- D. Gypsum Cover Board: 1/4 inch thick fire resistant gypsum board decking with inorganic glass mat facers and a water resistant core, formulated in 48 x 96 inch square edge boards, UL Class A, meeting ASTM C-1177, manufactured under the trade name Dens-Deck Prime.
- E. Insulation adhesive: Two component low rise elastomeric foam adhesive, installed with a mixing extruding dispenser (a Pace Cart or Heated Pleural Extruding Spray Rig) intended for application at the temperatures that will be encountered.
- F. PVC: minimum .060 inches thick, fire retardant, fiberglass reinforced, PVC (polyvinyl chloride) G410 lacquer coated sheet membrane conforming to the following minimum physical properties:

<u>Properties</u>	<u>ASTM Test Method</u>	<u>Minimum Property</u>
Fiberglass Reinforcing Material		
Overall Thickness, min., inches	D638	0.060
Tensile Strength, min., psi	D638	1500
Elongation at Break, min. (machine x transverse)	D638	250% X 230%
Seam strength, min. (% of tensile strength)	D638	75
Properties after Heat Aging per D3045	-	-
Tensile Strength, min. % of original	D638	90
Elongation, min. % of original	D751	90
Tearing Resistance, min., lbf	D1004	10
Low Temperature Bend @ -40°F	D136	Pass
Accelerated Weathering Test, Xenon Arc	D2565	5,000
Cracking @ 7x magnification	-	None
Discoloration by observation	-	negligible
Crazing @ 7 x magnification	-	None
Linear Dimensional Change, max.	D1204	0.10%
Weight Change after Immersion in Water, max.	D570	± 3.0%
Static Puncture Resistance, 33 lbf	D5602	Pass
Dynamic Puncture Resistance, 7.3 ft-lbf	D5635	Pass
Color: as selected from the full range of Manufacturer's standard and custom colors.		
- G. Walkway Pads: 96 mil thick, rolled-out, polyester reinforced heat-weldable protection mat as manufactured by Sarnafil under the trade name Sarnatred, or approved equal.

2.3 RELATED MATERIALS

- A. Cleaners, adhesives, sealants, seam caulk and fasteners furnished by the PVC system Manufacturer and as listed below. Use low VOC adhesives and cleaners as required by regulations in effect at the time of application.
1. Wall and Curb Flashing: 60 mil thick G410 fiberglass reinforced PVC, color to match the color of the roof
 2. Pitch Pocket Filler: Two component urethane sealant.
 3. Corners: Prefabricated outside and inside flashing corners made of 60 mil thick unreinforced PVC, color to match the color of the roof.
 4. Sealant: One component acrylic-based resin blended with solvent and inorganic adhesives.
 5. PVC Adhesive: Solvent-based reactivating-type adhesive, Sarnacol 2170.
 6. Insulation Plates: 3 inch square, 26 gauge stamping of SAE 1010 steel with an AZ 55 Galvalume coating.
 7. Fasteners: #14 corrosion-resistant screws.
 8. Aluminum Tape: 2 inch wide pressure-sensitive aluminum tape.
 9. Solvent Cleaner: One component liquid for the general cleaning of residual asphalt, scuff marks, etc., from the membrane surface and to clean seam areas prior to hot-air welding.
 10. Soap cleaner: To clean the roof surface when all work is complete, to leave the new roof free of scuff marks, and construction dirt – Lestoil Heavy Duty Concentrated Cleaner.

PART 3 - EXECUTION

3.1 GENERAL

- A. Perform the work in a watertight, workmanlike manner, meeting the guarantee requirements specified herein; in accordance with the drawings and in conformance with the Manufacturer's requirements, except as enhanced in this specification.
- B. Perform work in areas with roof mounted mechanical equipment, so the work coincides with equipment shutdown periods and does not affect building occupants. Temporarily cover and protect equipment openings, and windows adjoining the work area, with 6 mil fire retardant polyethylene, so dirt, dust and odors do not enter the equipment or building. Remove covers at the end of each workday, and as soon as roof work is complete.
- C. Remove debris daily and as it is generated. Do not stock-pile debris on the roof. Do not leave any debris on the roof at the end of the day. Do not overload the roof structure when moving debris.

- D. Install roof system components on clean, dry surfaces only. Do not install any items when weather conditions and outside temperatures are not suitable in accordance with the Manufacturer's recommendations.
- E. Complete all work in sequence as quickly as possible so that as small an area as practicable is in the process of construction at any one time. Complete the entire area of work begun each day, the same day, and make all exposed edges watertight at the end of each day's work.

3.2 SUBSTRATE INSPECTION

- A. Remove existing roofing, insulation, flashings, underlayment material, and the vapor barrier as indicated, where needed to accommodate new equipment flashings – then carefully check the underlying existing deck.
- B. Immediately notify the Architect and Owner by telephone and in writing if defects in the substrate are discovered.
- C. Maintain the building watertight in the interim, but do not proceed with the installation of new roofing until defects have been corrected.

3.3 VAPOR BARRIER ON CONCRETE DECKS (Only)

- A. Install primer and a vapor barrier only on the concrete decks: install the primer and allow it to dry.
- B. Starting at the low point, torch apply and fully adhere modified bitumen vapor barrier sheets to the primed substrate. Lap sheets at least 4 inches at the ply overlaps and at least 6 inches at the end laps.
- C. Carefully install the vapor barrier sheets to achieve only the minimum required bleed out.
- D. Extend vapor barrier up vertical surfaces at the roof perimeter, and up and around all penetrations and curbs, and seal the vapor barrier to provide continuity of the building air/vapor envelope.

3.4 GYPSUM BOARD THERMAL BARRIER

- A. Install a gypsum board thermal barrier on steel deck areas prior to installing the isocyanurate insulation. Lay boards with tight joints; fill gaps over 1/4 inch wide.

3.5 INSULATION AND COVER BOARD

- A. Install tapered insulation neatly cut at all miters and transitions. Do not lace corner boards.
- B. Install insulation with joints offset between rows and layers a minimum of 12 inches. Cut insulation to fit neatly at penetrations and joints. Fill any gap which is greater than 1/4 inch.

- C. Fasten all layers of insulation and the gypsum board thermal barrier, only to the top flute of steel decks, with screws and discs which penetrate through the deck a minimum of 3/4 inch and a maximum of 1-1/2 inches.
 - 1. Install 16 fasteners per 4 by 8 foot insulation board in the field of the roof.
 - 2. Install 28 fasteners per 4 by 8 foot insulation board in 8 12 16 foot wide perimeter zones.
 - 3. Install 32 fasteners per 4 by 8 foot insulation board in 8 12 16 foot square corner zones.
- D. Carefully choose the length and position of each screw to ensure the screws do not protrude through the underside of the deck where visible inside the school.
- E. Install all layers of insulation in low rise polyurethane foam adhesive on the concrete decks with a vapor barrier. Apply the adhesive in accordance with the Manufacturer's recommendations, to achieve the specified minimum uplift resistance, and as described below.
 - 1. Install 1/2 inch diameter adhesive beads spaced 12 inches on center in the field of the roof.
 - 2. Install 1/2 inch diameter adhesive beads spaced 6 inches on center in 8 foot wide perimeter zones.
 - 3. Install 1/2 inch diameter adhesive beads spaced 4 inches on center in 8 foot square corner zones.
- F. Place 5 gallon pails half full of gravel or concrete on the insulation and gypsum cover board to hold it firmly in position while the low rise foam adhesive sets. Position the pails no more than approximately 24 inches apart in all directions.
 - 1. Remove and replace insulation and coverboards installed without using pails of gravel or concrete ballast.

3.6 PVC

- A. Apply adhesive to the substrate using solvent-resistant 3/4 inch nap paint rollers, in a smooth, even coating with no gaps, globs, puddles or similar inconsistencies. Only apply adhesive to those areas that will be completely covered the same day. Allow the adhesive to dry completely prior to installing the PVC.
 - 1. Open each can of adhesive and stir it with an electric paddle mixer for at least 5 minutes before applying the adhesive. Re-stir adhesive that is not used within two hours of initial mixing.
 - 2. Do not punch holes in cans of adhesive and use them in a "better spreader" without mixing.
 - 3. Replace roller covers each day; discard covers after each day's use.

- B. Unroll the PVC when the adhesive on the substrate is dry, overlapping adjacent sheets a minimum of 4 inches. Turn back one-half of the sheet's length and roller coat the underside of the sheet with adhesive. Roll the PVC onto the adhesive coated substrate when the adhesive has dried slightly to produce strings when touched with a dry finger. Do not allow the adhesive on the underside of the PVC to dry completely before bonding the sheet to the substrate.
- C. Firmly press the sheet into the adhesive, and roll it with a water-filled, foam-covered lawn roller by frequent rolling in two directions.
- D. Fold the un-bonded half of the sheet back and repeat the procedure.
- E. Do not apply adhesive to seam areas.
- F. Roofing installed over improperly applied adhesive and debris, and roofing installed with blisters, ridges, mole runs and similar deficiencies shall be removed and replaced at the Contractor's expense.
 - 1. Removal shall include the cover board and insulation.

3.7 SEAMS

- A. General:
 - 1. Clean PVC surfaces prior to hot-air heat welding. Weld dry surfaces only.
 - 2. Hot-air weld all PVC roof and flashing seams to finish at least 3 inches wide
 - 3. Use welding equipment provided by or approved by the material Manufacturer.
 - 4. Perform welding with personnel that have successfully completed a training course provided by a Manufacturer's Technical Representative.
 - 5. Allow welding equipment to warm up for at least one minute prior to welding.
 - 6. Form machine welded seams using automatic welding equipment. Follow the machine Manufacturers instructions and local codes for electric current supply, grounding and over current protection. Utilize a dedicated circuit if connected to house power, or provide a dedicated portable generator. Do not run other equipment off the generator used to power the automatic welding machine.
 - 7. Use metal tracks laid on the membrane, under the machine welder if needed to eliminate wrinkles.
- B. Quality Control of Welded Seams:
 - 1. Visually inspect all seams as they are formed, and then check the entire length of each seam for continuity using a rounded cotter pin removal tool.
 - 2. Evaluate all welded seams each day as they are formed, and at locations as directed by the Owner's or the Manufacturer's representatives.
 - a. Cut and examine 1 inch wide cross section samples of welded seams at least three times a day. Correct welds display failure from shearing of the PVC sheet, prior to separation of the weld. Install a target patch over each test cut.

3.8 FLASHING

- A. Install penetration flashings daily with the PVC roof as the job progresses. Do not install temporary flashings.
- B. Fully adhere flashings to compatible, dry, smooth, and solvent-resistant surfaces, by applying adhesive in smooth, even coats with no gaps, globs or similar inconsistencies. Press the sheet firmly in place and thoroughly roll it with a hand roller.
- C. Do not apply adhesive in seam areas that are to be heat welded. Overlap edges of adjoining flashing sheets a minimum of 4 inches. Hot air weld all flashing seams.
- D. Install factory prefabricated corners on all inside and outside corners.
- E. Mechanically fasten the top edge of all flashings 6 inches on center.

3.9 WALKWAY PADS

- A. Install walkway pads fully adhered to the roof surface, and with 2 inch wide heat welded perimeters, to provide a path where shown on the drawings, and around all HVAC units and rooftop equipment, and at all roof access and egress points.

3.10 DUCT WRAP WATERPROOFING:

- A. Cover new roof top ductwork with minimum 3-inch thick isocyanurate insulation and fully adhered 60 mil thick un-reinforced EPDM roofing.
 - 1. Install self-adhesive EPDM target patches to seal any duct air leaks.
 - 2. Install flat 3 inch thick insulation on the sides and bottom of the ducts.
 - 3. Install tapered insulation sloping 1/4 inch per foot, minimum-starting thickness 3 inches on top of the ducts.
 - 4. Secure the isocyanurate insulation with screws and plates, installed at the rate of one fastener per 2 square feet.
 - 5. Cover the insulation with fully adhered 60 mil reinforced EPDM roofing.
 - 6. Install two roller applied coats of white acrylic coating after the EPDM duct waterproofing has been approved and accepted by the Architect in writing.

3.11 MISCELLANEOUS

- A. Provide any miscellaneous roofing, flashing, caulking, and metal work needed to leave the work complete and entirely watertight, neatly and carefully executed in a thorough and workmanlike manner.
- B. Perform work on mechanical and electrical items using mechanics skilled and licensed in these trades. Provide new material, couplings, transition pieces, blocking, fasteners and the like needed to complete the work.

3.12 CLEANING, PROTECTION AND WATERTIGHTNESS

- A. Inspect the interior and exterior of the building and grounds, and submit a written report with photos to document any pre-existing leakage or damage, prior to performing any work.
- B. The Owner will conduct a similar inspection at the completion of the work, and the Contractor will be charged for all leakage or damage which was not documented in the Contractor's report, or repaired to the Owners satisfaction at the Contractor's expense.
- C. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.
- D. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather which may occur unexpectedly. Make all work areas watertight at the end of each day's work.
- E. Clean up all litter, refuse, rubbish, scrap materials and debris at least twice a day; at noon and at the end of the work day, so the roof and site are neat, orderly and workmanlike. Place the debris in a dumpster, and remove the dumpster from the site as soon as it is full or no longer being used.
- F. Carefully remove all residual debris when all work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.
- G. Clean the roof surface to remove all scuff marks and construction debris when all work is complete. Utilize Lestoil Cleaner and copious amounts of clean water.

3.13 ROOF INSPECTIONS BY MANUFACTURER

- A. Arrange for the roofing Manufacturer, or his authorized representative, to make a minimum of four inspections in accordance with the following schedule and submit a written report of each inspection to the Architect within one week following each inspection.
 - 1. First inspection during the first two days of new roof installation.
 - 2. Second inspection when roofing is approximately one third complete.
 - 3. Third inspection when roofing is approximately two thirds complete.
 - 4. Fourth inspection when all roofing and flashings are installed.
- B. Provide 48 hours advance written notice to the Owner and Architect, so they may have representatives attend the inspections.
- C. Payment requisitions will not be reviewed nor approved until the inspection reports are received.

END OF SECTION

SECTION 076200 SHEET METAL FLASHINGS & SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Applicable provisions of the Conditions of the Contract and Division 1, General Requirements, govern work in this Section.

1.2 DESCRIPTION OF WORK

- A. The work of this Section includes all plant, labor, materials, equipment, testing and services necessary to complete the work shown on the drawings, schedules and keynotes, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

- 1. Sheet metal work that is compatible with the roofing system specified, including cap and through wall flashings, hook strips, fascia, factory fabricated roof edge systems and miscellaneous flashings.

1.3 RELATED WORK SPECIFIED ELSEWHERE – Entire Project Specification with specific reference to those sections noted above and as follows:

- | | | |
|----|------------|------------------|
| A. | Division 4 | Masonry |
| B. | 061000 | Roof Carpentry |
| C. | 075419 | PVC Roofing |
| D. | 077200 | Roof Accessories |

1.4 APPROVAL REQUIREMENTS

- A. Fabricate and install roof perimeter flashings that comply with the NY State Uniform Fire Prevention and Building Code and with ANSI/SPRI ES-1 “Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems” requirements.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications:

- 1. A firm (Installer) with at least 5 continuous years experience performing work similar to that required for this project, employing personnel skilled in the work specified.
 - a. The Installer shall directly employ the personnel performing the work of this section.
 - b. The Installer shall have a supervisor on the roof when work is in progress. The Supervisor shall have a minimum of 5 years experience with work similar in nature and scope to this project, and speak fluent English.
 - 1. Submit the supervisor’s resume upon request.

2. The Installer shall provide a reference list of at least three previously completed projects of comparable size and similar design, within fifty miles of this project, which may be observed by representatives of the Owner:
 - a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number.
 - b. Submit the reference list upon request.
- B. Material Quality:
 1. Obtain each product from a single Manufacturer which has manufactured the same product in the United States of America for not less than 5 continuous years.
 2. Obtain copper and pre-finished sheet metal items from the same mill run to maintain consistent color hue and surface finish.
- C. Pre-Construction Conference: Meet at the project site about two weeks prior to starting work, with the Architect, Owner and other representatives concerned about the work, to discuss the following:
 1. How the building will be kept watertight as work progresses.
 2. How sheet metal work will be coordinated with the installation of the vapor barrier, thermal barrier, insulation, cover board, roofing, flashings, roof accessories and other items to provide a watertight assembly.
 3. Generally accepted industry practice and the Manufacturer's instructions for handling and installing his products.
 4. The condition of the substrate and other preparatory work needed.
 5. Incomplete submittals; note that progress payments will not be processed until all submittals are received and approved.
 6. The construction schedule, weather forecast, availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.
 7. A schedule for Owner and Architect inspections.

1.6 SUBMITTALS

- A. Submit the following items far enough in advance to obtain approval prior to performing any work on site:
 1. A pre-work site and building inspection report with photos to document conditions before work starts.

2. Manufacturer's technical literature for all materials.
 3. Test reports and certifications substantiating compliance with specification requirements, only if requested by the Architect.
 4. 2 foot long samples, of each sheet metal item, to show how it relates and fits on adjoining masonry and wood blocking assemblies, and with the roof, stripping, and flashings.
 5. 6 inch square pieces of each type of sheet metal to show surface finish, texture and color.
 6. A sample of the Contractor's guarantee form.
- B. Simultaneously provide all roof related technical submittals needed for this project, for all technical sections, collated by section. Incomplete submittals will not be reviewed.
1. Submittals shall be prepared and made by the firm that will perform the actual work.
 2. Provide electronic submittals via an on-line submittal exchange program if one is established for this project; if an on-line program is not established, provide the submittals on portable USB drives in pdf format, organized in folders by Section.
 - a. Do not make technical submittals via email
 - b. Do not include Safety Data Sheets with the technical submittals.
- C. Safety Data Sheets: Simultaneously provide all Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders for each building.
- D. Payment requisitions will not be processed until all submittals are received and approved.

1.7 JOB MOCK-UPS

- A. After the submittals are approved, prepare in actual job locations, mock-ups of cap and through wall flashings, hook strips, drip edges, fascia, gravel stops, factory fabricated roof edge systems, copings, gutters, leaders, flat and standing seam panels, ridge covers, wall and soffit panels, and all other items of sheet metal and related work, for inspection and approval by the Architect.
- B. Construct each mock-up of two full lengths of metal, fastened, connected and stripped-in to the related roofing system, to show the following:
1. Type, gauge, color, cross-sectional dimensions and shape, and joint and mitering techniques.
 2. Related masonry work, wood blocking, and the attachment techniques and fasteners for all wood and metal components.

3. Other sheet metal related materials and their installation techniques to fully define the detailing of each mock-up.
- C. Mock-ups shall be constructed to establish the minimum standard of materials and workmanship, and to assure that completed work which matches the mock-ups will be fully functional and serve the purpose for it has been designed.
- D. Approved mock-ups may be left in place and incorporated into the permanent installation. Rejected mock-ups shall be removed and replaced until an acceptable mock-up is approved.
- E. Do not proceed with the work until mockup approval by the Architect is documented in writing.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver material to the site in the Manufacturer's original and unopened packaging, with intact and legible labels which identify the products and Manufacturers,
- B. Cover all stored materials with watertight tarpaulins installed immediately upon delivery.
- C. Do not overload the structure when storing materials on the roof.
- D. Protect roof surfaces where material and equipment are placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.

1.9 GUARANTEE

- A. Provide a written Contractor's Guarantee which guarantees that all work will remain free of material and workmanship defects and in a watertight condition for five years beginning upon Final Completion:
 1. Defects include but are not limited to the following: peeling paint, leakage, adhesive separation, delamination, lifting, loosening, splitting, cracking, and undue expansion.
 2. Guarantee coverage shall include the repairs and modifications necessary to enable the work to perform as guaranteed.
 3. Guarantee coverage shall include removing and replacing materials installed as part of the original work, if removal is needed to affect guaranteed repairs.
 4. Guarantee coverage shall have no dollar limit.
- B. Provide one Contractor's Guarantee that covers "all work performed" when a single contractor is awarded work specified in multiple Sections.

- C. The Guarantee coverage shall take effect no more than 30 days before the completion of all punch list work.
- D. The Contractor's Surety Company may add a rider to the Performance Bond which clarifies that Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the five year term of the Contractor's Guarantee.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Name brand products are specified to establish a basis of design quality; equal products from other manufacturer's may be submitted and used after approval.
- B. Copper sheet: ASTM B370, 99.0 % pure copper, thickness 16 ounces per square foot. Use copper for all metal items not otherwise indicated
- C. Zinc-Tin coated copper: copper sheet, coated on both sides, with a smooth uniform coating of zinc and tin, base metal weight 16 ounces per square foot, cold rolled temper, available as Freedom Gray Copper by Revere.
- D. Solder:
 - 1. 50-50 tin and lead for plain copper, supplied in one pound bars with the alloy mixture stamped into the bar by the Manufacturer.
 - 2. Lead free / or pure tin solder for zinc-tin coated copper, Number 497 by Johnson Manufacturing.
- E. Flux:
 - 1. Water-Soluble Liquid Flux, Kester #3345 for iron soldering of brass and copper.
 - 2. Tin-bearing flux such as "Flux-N-Solder E127 with pure tin" by Johnson Manufacturing.
- F. Aluminum fascias, hook strips, gravel stops and miscellaneous trim: #3105-H14 alloy aluminum, minimum thickness .050 inches unless otherwise indicated, factory finished with a Fluoropolymer Kynar 500 finish, color as selected by the Architect, from the full range of custom and standard colors.
- G. Factory Fabricated Roof Edge System: Extruded aluminum anchor bars secured with #9 stainless steel screws spaced 12 inches on center and .050 inch thick Kynar 500 prefinished aluminum trim covers, independently tested to comply with the ANSI / SPRI ES-1 Wind Design Guide, provided by the roofing membrane manufacturer.
- H. Downspouts: Factory fabricated 3 by 4 inch sections of minimum .032 inch thick Kynar coated aluminum.
- I. Leader heads: Custom fabricated of Freedom Gray copper, and painted after fabrication to match the color of the adjoining downspouts.
- J. PVC coated metal: 25 gauge G90 galvanized steel factory coated with 20 mils of poly-vinyl chloride on the finished side, color as selected.

- K. Fasteners: fabricated of stainless steel, or material that matches the sheet metal being fastened.
- L. Underlayment: one ply of high temperature ice & water shield and one ply of 5 pound rosin paper.
- M. Glass Cloth: open mesh glass fabric coated on each side with plasticized asphalt as manufactured by Karnak Corporation or equal.
- N. Asphalt cement: Federal Specification SS-C-153B, Type 1, asbestos free grade.
- O. Sealant: High performance, solvent free, formulated and moisture curing silyl-terminated polyether sealant, ASTM C-920, Type S, Grade NS, Class 25, NovaLink construction sealant by ChemLink, color as selected.
- P. Ice and Water Shield: high temperature 30 mil thick slip resistant buytl based adhesive coated sheet, with a plastic release layer for peel and stick application directly to a prepared roof deck: Grace Ultra.

PART 3 - EXECUTION

3.1 GENERAL

- A. Accurately reproduce the details and design shown, and form profiles, bends and intersections, sharp, true and even. Fabricate sheet metal in the shop whenever possible, and form joints, laps, splices and connections to shed water and condensation in the direction of flow.
- B. Provide any miscellaneous flashing and sheet metal work not shown on the drawings but otherwise needed to leave the project complete and entirely watertight, neatly and carefully executed in a thorough and workmanlike manner.

3.2 INSPECTION

- A. Examine surfaces to receive work of this section and report any defects to the Owner. Commencement of work will be construed as complete acceptance of surfaces.

3.3 INSTALLATION

- A. Fabricate and install copper work in accordance with the current edition of "Copper and Common Sense" as published by the Revere Copper and Brass Company, unless otherwise indicated.
 - 1. Form all joints, except loose locked sealant filled expansion joints, to overlap 2 inches.
 - 2. Secure the joints with rivets spaced 1 inch on center positioned about 1/2 inch from the top edge of the joint, then sweat solder the joint.

3. Use solder only to fill and seal the joint, not for mechanical strength. Form soldered joints continuous, strong and free from defects, with well heated soldering irons. Do not use open flame torches for soldering.
4. Clean soldered joints daily, immediately after soldering, by washing them with soap and water applied with a soft bristle brush, then rinsing with clear water.
- B. Securely fasten and anchor all work, and make provisions for thermal expansion. Submit details of expansion joints for approval. Install fasteners through one edge of metal only, use a hook strip on the other edge.
- C. Use stainless steel pin Zamac type nail-in fasteners, or stainless steel screws and washers with neoprene inserts where fasteners will be exposed.

3.4 CAP FLASHINGS

- A. Install new copper cap flashings above all roof and roof flashing components, including copings, wall penetrating ducts and gravel stops. Install cap flashings built into masonry walls; as they are constructed - properly joined to all related materials in a watertight manner.
 1. Do not allow the mason to install the new cap flashings.
 2. Solder all joints in the new cap flashing, as described above, except form 2 inch wide flat locked sealant filled expansion joints a maximum of 32 feet on center.
 3. Form the flashing to turn up 2 inches inside the wall and finish with a hem on the bottom exposed edge.
 4. Fasten the top edge of the cap flashing to the back up masonry 12 inches on center.
 5. Install the new cap flashing under flexible type wall flashings where possible. Where it is not possible to lap the new cap flashing under an existing wall flashing, install a ply of glass cloth set in and coated with asphalt cement to connect the new cap flashing to the existing wall flashing.
 6. In the absence of an existing wall flashing, or at a solid masonry wall, turn up the new cap flashing 2 inches behind the first wythe of masonry.
 7. Install new cap flashings where shown on the drawings, and at a height of 10 to 12 inches above the roof surface.
 8. Install new cap flashings above parapet flashings and above eave metal at transitions with higher walls.
- B. Install new aluminum cap flashings on skylight and equipment curbs.

1. Form the cap flashing to extend at least 2 inches under the equipment or skylight, 4 inches over the base flashing, and finish with a 1/2 inch hem on the bottom edge.
2. Install a 1/2 inch thick by 2 inch wide continuous foam gasket between the cap flashing and mechanical equipment or skylight. Do not set the equipment or skylight in sealant.
3. Secure the equipment or skylight to the curb with stainless steel screws spaced 12 inches on center.

3.5 DRIP EDGES

- A. Fabricate drip edges to extend 1-1/2 inches past the roof edge, and turn down to ensure water cannot track back and run down the fascia. Secure the drip edge with roofing nails along the top edge, spaced 4 inches apart along the raw metal edge. Form joints in the drip edge with 6 inch wide concealed under plates which duplicate the profile of the drip edge. Set the underplates in a full bed of sealant.

3.6 HOOK STRIPS

- A. Form continuous hook strips with locks that engage the superimposed trim piece a minimum of 3/4 inch, and to cover the entire underside edge of the wood blocking and neatly extend to the building wall.
- B. Fasten hook strips along their bottom edge, just above the 45 degree bend, with nails spaced 4 inches on center into underlying wood blocking; Zamac type nail-in type fasteners spaced 8 inches on center into masonry surfaces, or screws spaced 8 inches on-center into sheet metal surfaces.

3.7 FASCIA

- A. Fabricate new fascia to engage the hook strip 3/4 inch minimum and extend to the top of the wood fascia blocking. Secure the fascia with a continuous hook strip along the bottom edge and roofing nails along the top edge spaced 8 inches apart, positioned to be covered by the roof edge trim. Form joints in the fascia with 6 inch wide concealed under plates which duplicate the profile of the fascia. Set the underplates in a full bed of sealant.

3.8 ROOF EDGE SYSTEM

- A. Install a factory fabricated roof edge system on all roof eaves.
 1. Extend the roof to lap over and down the face of the fascia trim, so it stops just short of the bottom edge of the anchor bar.
 2. Install the anchor bar straight, level and true, set in a full bed of sealant, and secure the bar with #9 by 2 inch long stainless steel screws spaced no more than 12 inches apart.

3. Pre-drill screw holes in the underlying metal fascia trim where extra fasteners are needed, and at corners and special conditions.
4. Install color matching under plates at each joint in the roof edge trim; set the under plates in a full bed of sealant.

3.9 FASCIA PANELS

- A. Install ice and water shield over the entire surface of the plywood substrate. Overlap ice and water shield plies and end laps, 3 inches minimum, to shed water.
- B. Install 'J' mold and trim pieces in full lengths, with the ends notched to form a telescoping 3inch overlap. Face the overlaps to shed water, and where visible from the ground, away from prominent building entrance locations. Set the trim overlap into a full bed of sealant which matches the color of the trim.
- C. Install panels in accordance with Manufacturer's installation instructions and shop drawings, so that they are weather tight, free of waves, warps, buckles, fastening stresses or distortions, with provisions for expansion and contraction.
- D. Install panels plumb, level, and straight with seams parallel, to achieve the design appearance indicated.
- E. Fasten the panels with concealed stainless steel screws in each seam spaced 6 inches on center.

3.10 CLEANING, PROTECTION AND WATERTIGHTNESS

- A. Inspect the interior and exterior of the building and grounds, and submit a written report with photos to document any pre-existing leaks or damage, prior to performing any other work on site.
- B. The Owner will conduct a similar inspection at the completion of the work, and the Contractor will be charged for all leaks and damage that were not documented in the Contractor's report, or repaired to the Owners satisfaction at the Contractor's expense.
- C. Provide the equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.
- D. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather - which may occur unexpectedly. Make all work areas watertight at the end of each day's work.
- E. Clean up all litter, refuse, rubbish, scrap materials and debris at least twice a day; at noon and at the end of the work day, so the roof and site are neat, orderly and workmanlike. Place the debris in a dumpster, and remove the dumpster from the site as soon as it is full or no longer being used.

- F. Carefully and thoroughly clean the entire roof to remove all residual debris when all work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.

END OF SECTION

SECTION 077200 ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Applicable provisions of the Conditions of the Contract and Division 1, General Requirements, govern work in this Section.

1.2 DESCRIPTION OF WORK

- A. The work of this Section includes all plant, labor, materials, equipment, testing and services necessary to complete the work shown on the drawings, schedules and keynotes, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

- 1. Roof specialties that are compatible with the roofing systems specified, including:

- a. Plastic skylights.
 - b. Glass skylights
 - c. Louvered penthouse ventilators.
 - d. Pre-fabricated curbs and equipment supports.
 - e. Factory fabricate pipe curb portals
 - f. Drains, drain pipes and couplings.
 - g. Pipe insulation and fitting covers.
 - h. Aluminum smoke vent hatches.
 - i. Aluminum access hatches.
 - j. Hatch safety rails.
 - k. Galvanized steel roof access ladders.
 - l. Gas line and equipment pipe supports.
 - m. Concrete pavers.

- 2. Prepare, prime and paint all roof top equipment, the access ladders, equipment support dunnage, bulkhead doors and frames (inside and outside) and miscellaneous rooftop items indicated.

1.3 RELATED WORK SPECIFIED ELSEWHERE – Entire Project Specification with specific reference to those sections noted above and as follows:

- | | | | |
|----|------------|------------------------------------|---|
| A. | Division 4 | Masonry | |
| B. | 061000 | Roof Carpentry | |
| C. | 075419 | PVC Roofing | |
| D. | 076200 | Sheet Metal Flashing & Specialties | - |

1.4 CODE APPROVAL REQUIREMENTS

- A. Fabricate and install roof accessories that comply with the NY State Uniform Fire Prevention and Building Code.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications:

1. A firm (Installer) with at least 5 continuous years experience performing work similar to that required for this project, employing personnel skilled in the work specified.
 - a. The Installer shall directly employ the personnel performing the work of this section.
 - b. The Installer shall have a supervisor on the roof when work is in progress. The Supervisor shall have a minimum of 5 years experience with work similar in nature and scope to this project, and speak fluent English.
 1. Submit the supervisor's resume upon request.
2. The Installer shall provide a reference list of at least three previously completed projects of comparable size and similar design, within fifty miles of this project, which may be observed by representatives of the Owner:
 - a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number, and the Contractor's Supervisor's name.
 - b. Submit the reference list upon request.
- B. Material Quality: Obtain each product from a single Manufacturer which has manufactured the same product in the United States of America for not less than 5 continuous years.
- C. Pre-Construction Conference: Meet at the project site between one and two weeks prior to starting work, with the Architect, Owner and other representatives concerned about the work, to discuss the following:
 1. How the building will be kept watertight as work progresses.
 2. How roof accessory work will be coordinated with the installation of the vapor barrier, thermal barrier, insulation, cover board, roofing, flashings, and other items to provide a watertight installation.
 3. Generally accepted industry practice and the Manufacturer's instructions for handling and installing his products.
 4. The condition of the substrate, curbs, penetrations and other preparatory work needed.
 5. Incomplete submittals; note that progress payments will not be processed until all submittals are received and approved.
 6. The construction schedule, forecast weather, availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.

7. A schedule for Manufacturer and Architect inspections.

1.6 SUBMITTALS

- A. Submit the following items far enough in advance to obtain approval prior to performing any work:
 1. A pre-work site and building inspection report with photos to document conditions before work starts.
 2. Manufacturer's installation instructions and technical data sheets for each item. Material sample submittals are not needed unless requested to show color and texture.
 3. Samples of the Contractor's and Manufacturer's guarantee/warranty forms.
 4. Test reports and certifications substantiating compliance with specification requirements if requested by the Architect.
- B. Simultaneously provide all roof related submittals needed for this project, for all technical sections, collated by section. Incomplete submittals will not be reviewed.
 1. Submittals shall be prepared and made by the firm that will perform the actual work.
 2. Provide electronic submittals via an on-line submittal exchange program if one is established for this project; if an on-line program is not established, provide the submittals on portable USB drives in pdf format, organized in folders by Section.
 - a. Do not make technical submittals via email
 - b. Do not include Safety Data Sheets with the technical submittals.
- C. Safety Data Sheets: Simultaneously provide all Safety Data Sheets needed for this project, for all specification sections - collated by section, in three ring binders. Provide two binders for each building.
- D. Payment requisitions will not be processed until all submittals are received and approved.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver material to the site in the Manufacturer's original and unopened packaging, with intact and legible labels which identify the products and Manufacturers,
- B. Cover all stored materials with watertight tarpaulins installed immediately upon delivery.
- C. Do not overload the structure when storing materials on the roof.
- D. Protect roof surfaces where material and equipment are placed on them, and where construction traffic occurs, with 6 mil fire retardant polyethylene, covered with 1-1/2 inch thick foam insulation, overlaid with 2 by 10 wooden planks.

1.8 GUARANTEE

- A. Provide a written Contractor's Guarantee which guarantees that all work will remain free of material and workmanship defects and in a watertight condition for five years beginning upon Final Completion:
 - 1. Defects include but are not limited to the following: peeling paint, leakage, adhesive separation, delamination, lifting, loosening, splitting, cracking, movement and undue expansion.
 - 2. Guarantee coverage shall include the repairs and modifications necessary to enable the work to perform as guaranteed.
 - 3. Guarantee coverage shall include removing and replacing materials installed as part of the original work, if removal is needed to affect repairs.
 - 4. Guarantee coverage shall have no dollar limit.
- B. Provide one Contractor's Guarantee that covers "all work performed" when a single contractor is awarded work specified in multiple Sections.
- C. The Guarantee shall take effect no more than 30 days before the satisfactory completion of all punch list work.
- D. The Contractor's Surety Company may add a rider to the Performance Bond which clarifies that Performance Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the entire five year term of the Contractor's Guarantee.
- E. Provide a Manufacturer's written warranty, which warrants the skylights and roof hatches will remain watertight for a minimum of 5 years, beginning upon final completion.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Name brand products are specified to establish the basis of design quality. Equal products from other manufacturers may be submitted for approval and used.
- B. Provide Manufacturer's standard units, modified as necessary to comply with the specified requirements. Fabricate each unit in a shop to the greatest extent possible, using the following components:
 - 1. Aluminum Sheet: ASTM B 209 alloy 3003, tempered for forming and performance; mill finish, except as otherwise noted.
 - 2. Extruded Aluminum: Standard extrusions alloy 6063-T52; 0.078 inch minimum thicknesses for primary framing and curb member legs, 0.062 inch thickness for secondary framing and covers; mill finish, except as otherwise indicated.
 - 3. Insulation: Rigid fiber glass boards where encapsulated inside metal skirts, rigid isocyanurate where covered with roof flashings on the exterior of curbs.
 - 4. Wood Nailers: Dimension grade Douglas Fir, not less than 1-1/2 inches thick.

5. Fasteners: Nonmagnetic stainless steel or hot dipped galvanized steel, to match the finish of the material being fastened.
6. Gaskets: Tubular neoprene or polyvinyl chloride, or block sponge neoprene.
7. Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

2.2 PLASTIC SKYLIGHTS

- A. Factory assembled dome and frame assemblies with welded corners manufactured by Kingspan / Bristolite or American Skylights are specified to establish a quality standard. Equal products are acceptable provided they comply with the following requirements:
 1. Glazing sheet thickness required for a minimum of 30 pounds per square foot external and 30 pounds per square foot internal loading; and to comply with the minimum thickness and wind pressure requirements of AAMA/WDMA/CSA 101/I.S.2/A440 as set forth in paragraph 2405.5 of the NYS Uniform Fire Prevention and Building Code.
 2. Outer Dome: Dome shaped polycarbonate meeting the following tests:
 - a. Burn Rate ASTM D635 - Not over 2.5
 - b. Smoke Developed ASTM D2843
 - c. Smoke Density Not over 75%
 3. Inner Panel: Clear multiwall polycarbonate panel meeting the following tests:
 - a. Burn Rate ASTM D635 - Not over 2.5
 - b. Smoke Developed ASTM D2843
 - c. Smoke Density Not over 75%
 4. Fall Protection: Fabricate the skylights so the dome and panel will not disengage from the frame upon impact of 755 foot pounds, and to comply with OSHA 1910.23 Fall Protection Guidelines.
 5. Energy Performance Ratings:
 - a. Maximum U-Value 0.50
 - b. Maximum Solar Heat Gain Coefficient (SHGC) of 0.40
- B. Curb Construction: Provide units with integral internal gutters and weep holes to drain condensation; fabricated with formed and extruded thermally broken welded aluminum frames and retaining angles for installation on field constructed curb assemblies.
- C. Safety Screens: 4 inch by 4 inch 6 gauge welded wire screens and 1/4 inch thick 1-1/2 by 1-1/2 steel perimeter angle support frames, fabricated to fit within the skylight curb - to protect the skylights from underside damage and increase fall protection.
 1. Prime and paint the screens flat white before installation.
 2. Install screens only at skylights above gymnasiums, and at over-sized skylights where the glazing doesn't provide fall protection.

2.3 PRE-FABRICATED CURBS AND EQUIPMENT SUPPORTS

- A. Factory fabricated of welded 14 gauge galvanized steel, insulated with minimum 1-1/2 inch thick 3 pound density rigid insulation, with nominal 2 by 2 inch wood nailers and T

bar reinforcing on sides longer than 36 inches; height to extend above the finished roof surface a minimum of 10 inches, Model ES-2 by Pate Inc.

- B. Where the roof deck slopes, provide tapered curbs to match the slope, and install the equipment level.

2.4 FACTORY FABRICATED PIPE CURB PORTALS

- A. Factory fabricated flashing systems, consisting of 9 inch high internally insulated galvanized steel curbs with 1-1/2 inch square wood nailers at the top edges, and 5 hole EPDM boots, with nipples that will accommodate pipes and conduits from 1/2 to 2-1/2 inches in diameter, with stainless steel hose clamps on each nipple - 5-Hole Pipe Portal Flashing System: C-555, by Portals Plus; or,
- B. Sigrist Pipe Chase Housings & Curbs as manufactured by Alta Products.

2.5 DRAINS, DRAIN PIPES, AND COUPLINGS

- A. Conventional cast iron bottom and side outlet roof drains, installed with drain receivers, under deck clamps, cast iron strainers, cast iron clamping rings and factory installed stainless steel gravel screens Series 1011 as manufactured by Jay R. Smith Manufacturing Company.
- B. Match the drain outlet size and style to the building drain line, except if the drain line is a copper pipe, then furnish the drain body with a threaded outlet and use a male adapter to connect the drain body to the drain line.
- C. Drain pipe: cast iron pipe with no hub fittings, minimum 3 inch diameter, and larger to match the existing building drain lines.
- D. No-hub couplings: heavy duty rubber neoprene sleeve couplings with full length Type 304 stainless steel shields and at least 4 worm drive clamps, conforming to ASTM A564.

2.6 PIPE INSULATION AND FITTING COVERS

- A. Insulation: minimum 1 inch thick pre-molded 3.5 lb. heavy density fiberglass pipe insulation with UL rated non-combustible service jackets.
- B. .030 inch thick factory fabricated white PVC "Smoke Safe" fitting and drain bowl covers as manufactured by the Speedline Corporation, with a maximum Flame Spread Value of 25 and a maximum Smoke Developed Value of 50 in accordance with ASTM E8450.

2.7 ALUMINUM SMOKE VENT HATCHES

- A. UL listed single and double leaf hatches constructed with welded double wall 11 gauge mill finish aluminum covers that incorporate insulation, and 12 inch high aluminum curbs complete with counter flashings, neoprene draft seals, 3-1/2 inch

deck flanges, interior and exterior handles and tamper resistant hinges contained within the hatch, as manufactured by The Bilco Company.

1. Smoke Vents above the elevator shafts shall have 24 inch high curbs with built in louvers on 3 sides.
2. Furnish the units with manual, fusible link and electric releases that can be reset without having to replace any parts.
 - a. Match the electric release voltage to the local smoke detector and alarm system.
- B. Furnish hatches with 4 inch by 4 inch 6 gauge galvanized steel welded wire safety screens supported on 1-1/2 by 1-1/2 by 1/4 inch thick steel perimeter angle support frames.
- C. Furnish the units in the sizes needed to fit the deck openings, and as indicated.

2.8 ALUMINUM ACCESS HATCHES

- A. Hatches constructed of welded 11 gauge mill finish aluminum, with 12 inch high curbs and integral cap flashings, heavy pintle hinges, compression spring operators, a spring latch with interior and exterior handles, an interior padlock hasp, and stainless steel hardware, as manufactured by the Bilco Company, in the sizes needed to fit the deck openings, and as indicated.

2.9 HATCH SAFETY RAILS

- A. Safety rails shall comply with OSHA Standard CFR 29 1910.23 and CFR 29 1910.27
- B. Safety rails shall be bolted to the exterior surface of the curb above the flashing with 3/8 inch diameter stainless steel bolts, constructed of 1-1/2 inch diameter hot rolled electrically welded tubing meeting ASTM A500 Grade B, sized and configured to provide a safety railing on four sides of the hatch 42 inches above the roof surface with a self closing gate supported with heavy duty hinges with 5/8 inch diameter pins - basis of design: Roof Hatch Safety Rails by SafePro Roof Top Fall Protection.
- C. Gate shall be fabricated of galvanized steel tubing, with no chains or latches.
- D. Gate shall be powder paint coated, color shall be as selected by the Architect

2.10 GALVANIZED STEEL ROOF ACCESS LADDERS

- A. Fabricate ladders from 1-1/4 inch inside diameter steel pipe rails, spaced 22 inches apart, and 3/4 inch solid steel rebar rungs spaced 12 inches on center. Fit the rungs into drilled holes in the centerline of the rails, weld and grind the welds smooth. Extend the ladder rails and form goose-neck returns to finish 42 inches above the roof surface.

1. Hot dip galvanize coat the ladder and mounting brackets after fabrication. Install with Type 316 stainless steel hardware.

2.11 GAS LINE, CONDUIT AND EQUIPMENT PIPE SUPPORTS

- A. Factory fabricated adjustable pipe supports as manufactured by Miro Industries, Inc. Model 20-Base Strut-12.

2.12 CONCRETE PAVERS

- A. 2 inches thick, 24 inches by 24 inches precast concrete pavers, natural buff color and finish, minimum 7500 psi compressive strength as manufactured by Hanover Architectural Products.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Field measure existing openings. Comply with manufacturer's instructions and recommendations. Coordinate with the installation of roof deck, other substrates to receive specialty units, vapor barriers, roof insulation, roofing and flashing to ensure that each element of the work performs and fits properly, and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.

3.2 PLASTIC SKYLIGHTS

- A. Install the skylights on field constructed curbs: Remove the existing skylight and curb assembly where present, using care not to damage the roof deck or skylight well liner. Re-support ceiling and shaft components that are attached to the skylight curb or shaft liner.
- B. Construct or extend the existing curb to finish 10 inches above the roof surface. Install new base and cap flashings, and restore & finish the shaft liner to match the original construction. Install the new skylight on top of a 1/2 inch by 2 inch foam gasket.
- C. Safety Screens: Install new safety screens to fit inside the curbs at skylights installed above gymnasiums and to meet OSHA Fall Protection Guidelines where oversize plastic skylights lack integral fall protection. Wire brush, prime and install two finish coats of paint on the screens prior to installation. Fasten the screens with 3/8 inch diameter lag bolts spaced 12 inches on center around the entire perimeter of the screens.

3.3 PRE-FABRICATED CURB AND EQUIPMENT SUPPORTS

- A. Install curb assemblies directly on the structural deck or block solid under the assembly to achieve the height shown and to install the curb assembly level.

- B. Install new base and cap flashings prior to installing the mechanical equipment. Set mechanical equipment on 1/2 inch thick anti vibration pads.

3.4 FACTORY FABRICATED PIPE CURB PORTALS

- A. Install factory fabricated pipe portal flashing systems at all HVAC units, and where more than one pipe or conduit penetrates the roof.
 - 1. Install the portal curbs on wood blocking that matches the thickness of the roof insulation.
 - 2. Disconnect and reconnect refrigerant, power, control and condensate lines and pipes as needed to install the pipes through the flashing nipples.
 - a. Install water cut off sealant between the lines / pipes and EPDM nipples, and then install a hose clamp on each nipple.
 - b. Remove and replace nipples that are incorrectly cut too large.

3.5 DRAINS, DRAIN PIPES AND COUPLINGS

- A. Install new drains where roof work is indicated.
 - 1. Remove the existing drains and flashings; where applicable, use care not to break or disturb the drain pipes within the building.
 - 2. Modify the existing drain lines to properly connect to the new drain assemblies.
 - 3. Enlarge the hole in the deck and reinforce the deck to accommodate the new drain, and install the drain recessed below the roof surface to achieve maximum drainage.
 - 4. Support the drain with a stamped sump drain receiver, secure it with an under deck clamp and patch the deck around the new drain.
 - 5. Connect the new drain to the existing drain line to conform to all applicable codes, and insulate the underside of the drain body and drain line.
- B. Connect the fittings and sections of cast iron pipe using heavy duty no-hub couplings.
- C. Install new drain pipes to slope 1/4 inch per foot, and support each section of pipe with a hanger, supported on a structural member or strut, on each side of every coupling. Do not rely on the couplings to support any weight. Do not hang the drain pipes from the roof deck.
- D. Install overflow drain line downspout nozzles on the ends of all overflow pipes, positioned against the facade, into core drilled holes. Secure each nozzle with 3 stainless steel machine screws set in expansion shields.

3.6 PIPE INSULATION AND FITTING COVERS

- A. Install insulation on all horizontal drain piping, and on new vertical pipes installed to connect the new drains to the existing lines.
- B. Install insulation on the undersides of the new drains.
- C. Install white PVC fitting and drain bowl covers, and wrap the joints between fitting covers and pipe insulation jackets with 3 inch wide white PVC tape.

3.7 ROOF HATCHES AND GUARD RAILS

- A. Block solid under the hatch curb to support it at the level of the new roof; extend and restore the shaft liner.
- B. Orient the hatches for proper egress, and install new flashings.
- C. Install guard rails, fastened to the hatch frame, above the roof flashings.

3.8 SMOKE VENT HATCHES

- A. Install the new smoke vent curbs on solid wood blocking that matches the height of the new roof.
- B. Connect the smoke vent hatches to a local smoke detector and the existing smoke alarm system. Test the smoke hatches to the satisfaction of the Architect and Owner.
- C. Install new safety screens to fit inside the curb openings. Wire brush, prime and install two finish coats of paint prior to installation. Fasten the screens with 5/16 inch diameter lag bolts / expansion bolts / epoxy set bolts spaced 12 inches on center around the entire perimeter of the screens.

3.9 GALVANIZED STEEL ROOF ACCESS LADDERS

- A. Install ladders at the interior and exterior locations shown. Support and secure each ladder at the top and bottom and at intermediate points spaced a maximum of 5 feet on center. Use bolted steel brackets, anchored with 1/2 inch diameter stainless steel epoxy set bolts. Space the ladders to provide 7 inches of toe clearance. Extend the rails 42 inches and goose-neck form them to provide additional support at the top of the ladder.

3.10 GAS LINE AND EQUIPMENT PIPE SUPPORTS

- A. Install pipe supports spaced five feet on center over a concrete paver and a walkway pad.
- B. Fasten pipes and conduits to the new pipe supports with new stainless steel clamps.

3.11 MISCELLANEOUS

- A. Provide and install any sealants needed, where shown or required.

- B. Perform miscellaneous mechanical and electrical work using skilled and licensed tradesmen.
- C. Provide new material, couplings, transition pieces, blocking, fasteners and the similar accessories needed to complete the work.

3.12 CLEANING, PROTECTION AND WATERTIGHTNESS

- A. Inspect the interior and exterior of the building and grounds, and submit a written report with photos to document any pre-existing leakage or damage, prior to performing any work.
- B. The Owner will conduct a similar inspection at the completion of the work, and the Contractor will be charged for all leaks and damage that weren't documented in the Contractor's report, or repaired to the Owners satisfaction at the Contractor's expense.
- C. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.
- D. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather - which may occur unexpectedly. Make all work areas watertight at the end of each day's work.
- E. Clean up all litter, refuse, rubbish, scrap materials and debris at least twice a day; at noon and at the end of the work day, so the roof and site presents a neat, orderly and workmanlike appearance. Place the debris in a dumpster, and remove the dumpster from the site as soon as it is full or no longer being used.
- F. Carefully and thoroughly clean the entire roof to remove all residual debris when all work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.

3.13 TESTING

- A. Test the new smoke hatches with the Architect or Owner present, to demonstrate it is functional, particularly with regard to security, alarm signal operation, and venting. If faults are evidenced, make the needed corrections and repeat the test until no faults occur.

END OF SECTION

SECTION 078100 - APPLIED FIREPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes sprayed fire-resistive materials (SFRM).
- B. Locations of sprayed fire-resistive materials includes the following:
 - 1. Steel columns, wide-flange and hollow structural section types, where indicated
 - 2. Roof construction including deck, beams and joists where indicated.
 - 3. Floor construction including deck, beams and joists where indicated
 - 4. Any other area indicated on the Drawings.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site
 - 1. Review products, design ratings, restrained and unrestrained conditions, densities, thicknesses, bond strengths, and other performance requirements.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. UL Designs: For each UL Design proposed for use.
- D. Shop Drawings: Framing plans, schedules, or both, indicating the following:
 - 1. Extent of fireproofing for each construction and fire-resistance rating.
 - 2. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
 - 3. Minimum fireproofing thicknesses needed to achieve required fire-resistance rating of each structural component and assembly.
 - 4. Treatment of fireproofing after application.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and testing agency.
- B. Product Certificates: For each type of fireproofing.
- C. Evaluation Reports: For fireproofing, from ICC-ES.
- D. Preconstruction Test Reports: For fireproofing.
- E. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to set quality standards for materials and execution and for preconstruction testing.
 - 1. Build mockup of each type of fireproofing and different substrate as shown on Drawings.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- C. Coordination: Coordinate installation of spray fireproofing with installation of ceiling-mounted supports and hangars for mechanical and electrical equipment installed by others.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups of fireproofing.
 - 1. Provide test specimens and assemblies representative of proposed materials and construction.
- B. Preconstruction Adhesion and Compatibility Testing: Test for compliance with requirements for specified performance and test methods.
 - 1. Bond Strength: Test for cohesive and adhesive strength according to ASTM E 736. Provide bond strength indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
 - 2. Density: Test for density according to ASTM E 605. Provide density indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
 - 3. Verify that manufacturer, through its own laboratory testing or field experience, attests that primers or coatings are compatible with fireproofing.
 - 4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 5. For materials failing tests, obtain applied-fireproofing manufacturer's written instructions for corrective measures including the use of specially formulated bonding agents or primers.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply fireproofing when ambient or substrate temperature is 44 deg F (7 deg C) or lower unless temporary protection and heat are

provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.

- B. Ventilation: Ventilate building spaces during and after application of fireproofing, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fireproofing dries thoroughly.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.
- B. Source Limitations: Obtain fireproofing from single source.
- C. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E 119 or UL 263 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Steel members are to be considered unrestrained unless specifically noted otherwise.
- D. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction and the following VOC limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Primers, Sealers, and Undercoaters: 200 g/L.
 - 2. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
- E. Asbestos: Provide products containing no detectable asbestos.

2.2 SPRAYED FIRE-RESISTIVE MATERIALS

- A. SFRM: Manufacturer's standard, factory-mixed, lightweight, dry formulation, complying with indicated fire-resistance design, and mixed with water at Project site to form a slurry or mortar before conveyance and application.
 - 1. Basis of Design Product: Provide Isolatek International; Cafco Blaze-Shield II or equal.
 - 2. Bond Strength: Minimum 150-lbf/sq. ft. (7.18-kPa) cohesive and adhesive strength based on field testing according to ASTM E 736.
 - 3. Density: Not less than 15 lb/cu. ft. (240 kg/cu. m) and as specified in the approved fire-resistance design, according to ASTM E 605.
 - 4. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E 605, whichever is thicker, but not less than 0.375 inch (9 mm).
 - 5. Combustion Characteristics: ASTM E 136.

6. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 10 or less.
 - b. Smoke-Developed Index: 10 or less.
7. Compressive Strength: Minimum 1,440 lbf/sq. in. (68.9 kPa) according to ASTM E 761.
8. Corrosion Resistance: No evidence of corrosion according to ASTM E 937.
9. Deflection: No cracking, spalling, or delamination according to ASTM E 759.
10. Effect of Impact on Bonding: No cracking, spalling, or delamination according to ASTM E 760.
11. Air Erosion: Maximum weight loss of 0.025 g/sq. ft. (0.270 g/sq. m) in 24 hours according to ASTM E 859.
12. Fungal Resistance: Treat products with manufacturer's standard antimicrobial formulation to result in no growth on specimens per ASTM G21.
13. Sound Absorption: NRC of 0.75 according to ASTM C423 for Type A mounting according to ASTM E795.
14. Finish: Spray-textured finish.
15. UL Designs:
 - a. As required to achieve 1-hour fire-rating at columns.
 - b. As required to achieve 1-hour fire-rating at roof and floor beams, decking and joists.
16. Adjust thickness of sprayed on material for columns and beams (lintels) with W/D ratio less than the W/D ratio of the specified assembly, as described in UL Fire Resistance Directory, Design Information Section at the front of the directory.

2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Substrate Primers: Primers approved by fireproofing manufacturer and complying with one or both of the following requirements:
 1. Primer and substrate are identical to those tested in required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 2. Primer's bond strength in required fire-resistance design complies with specified bond strength for fireproofing and with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction, based on a series of bond tests according to ASTM E 736.
- C. Bonding Agent: Product approved by fireproofing manufacturer and complying with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction.

- D. Metal Lath: Expanded metal lath fabricated from material of weight, configuration, and finish required, according to fire-resistance designs indicated and fireproofing manufacturer's written recommendations. Include clips, lathing accessories, corner beads, and other anchorage devices required to attach lath to substrates and to receive fireproofing.
- E. Reinforcing Fabric: Glass- or carbon-fiber fabric of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by fireproofing manufacturer.
- F. Reinforcing Mesh: Metallic mesh reinforcement of type, weight, and form required to comply with fire-resistance design indicated; approved and provided by fireproofing manufacturer. Include pins and attachment.
- G. Patching Material: Product approved by fireproofing manufacturer and complying with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction; Cafco Fiber Patch or equal.

2.4 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design. Verify compliance with the following:
 - 1. Substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fireproofing with substrates under conditions of normal use or fire exposure.
 - 2. Objects penetrating fireproofing, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
 - 3. Substrates receiving fireproofing are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fireproofing application.
- B. Verify that concrete work on steel deck has been completed before beginning fireproofing work.
- C. Verify that roof construction, installation of roof-top HVAC equipment, and other related work is complete before beginning fireproofing work.
- D. Conduct tests according to fireproofing manufacturer's written recommendations to verify that substrates are free of substances capable of interfering with bond.
- E. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

2.5 PREPARATION

- A. Cover other work subject to damage from fallout or overspray of fireproofing materials during application.
- B. Clean substrates of substances that could impair bond of fireproofing.
- C. Prime substrates where included in fire-resistance design and where recommended in writing by fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.
- D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of fireproofing. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.
- E. For areas with spray material on beams only, and exposed steel deck, cover deck to limit overspray of materials. Remove protective covering upon completion

2.6 APPLICATION

- A. Construct fireproofing assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, sealers, topcoats, finishing, and other materials and procedures affecting fireproofing work.
- B. Comply with fireproofing manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fireproofing; as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- C. Coordinate application of fireproofing with other construction to minimize need to cut or remove fireproofing.
 - 1. Do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place.
 - 2. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until application of fireproofing is completed.
- D. Metal Decks:
 - 1. Do not apply fireproofing to underside of metal deck substrates until concrete topping, if any, has been completed.
 - 2. Do not apply fireproofing to underside of metal roof deck until roofing has been completed; prohibit roof traffic during application and drying of fireproofing.
- E. Install auxiliary materials as required, as detailed, and according to fire-resistance design and fireproofing manufacturer's written recommendations for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by fireproofing manufacturer.

- F. Spray apply fireproofing to maximum extent possible. Following the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by fireproofing manufacturer.
- G. Extend fireproofing in full thickness over entire area of each substrate to be protected.
- H. Install body of fireproofing in a single course unless otherwise recommended in writing by fireproofing manufacturer.
- I. For applications over encapsulant materials, including lockdown (post-removal) encapsulants, apply fireproofing that differs in color from that of encapsulant over which it is applied.
- J. Where sealers are used, apply products that are tinted to differentiate them from fireproofing over which they are applied.
- K. Provide a uniform finish complying with description indicated for each type of fireproofing material and matching finish approved for required mockups.
- L. Cure fireproofing according to fireproofing manufacturer's written recommendations.
- M. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, and tested and corrections have been made to deficient applications.
- N. Finishes: Where indicated, apply fireproofing to produce the following finishes:
 - 1. Manufacturer's Standard Finishes: Finish according to manufacturer's written instructions for each finish selected.
- O. The substrate shall have a minimum ambient temperature before and after application as specified in the approved manufacturer's written instructions. The area for application shall be ventilated during and after application as required by the approved manufacturer's written instructions.

2.7 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections as required by the BCNYS, Subsection 1705.13, "Sprayed Fire-Resistant Materials."
- B. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fireproofing for the next area until test results for previously completed applications of fireproofing show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design. See Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.
- C. Fireproofing will be considered defective if it does not pass tests and inspections.

1. Remove and replace fireproofing that does not pass tests and inspections, and retest.
2. Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.

D. Prepare test and inspection reports.

2.8 CLEANING, PROTECTING, AND REPAIRING

- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
- B. Protect fireproofing, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fireproofing will be without damage or deterioration at time of Substantial Completion.
- C. As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.
- D. Repair fireproofing damaged by other work before concealing it with other construction.
- E. Repair fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION 078100

SECTION 078123 – INTUMESCENT FIREPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes mastic and intumescent fire-resistive coatings (MIFRC).

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review products, design ratings, restrained and unrestrained conditions, thicknesses, and other performance requirements.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Material List: Provide an inclusive list of required intumescent 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.
- B. UL Designs: For each UL Design proposed for use.
- C. Shop Drawings: Structural framing plans indicating the following:
 - 1. Extent of fireproofing for each construction and fire-resistance rating.
 - 2. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
 - 3. Minimum fireproofing thicknesses needed to achieve required fire-resistance rating of each structural component and assembly.
 - 4. Treatment of fireproofing after application.
- D. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard dimensions.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of fireproofing.
- C. Evaluation Reports: For fireproofing, from ICC-ES.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements..
- B. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Build mockup of each type of fireproofing and different substrate as shown on Drawings.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 PROJECT CONDITIONS

- A. Apply waterborne coatings only when temperatures of surfaces to be coated and surrounding air are between 50 and 90 deg F (10 and 32 deg C).
- B. Ventilation: Ventilate building spaces during and after application of fireproofing, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fireproofing dries thoroughly.

PART 2 - PRODUCTS

2.1 INTUMESCENT COATING MATERIALS, GENERAL

- A. Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.
- B. Source Limitations: Obtain fireproofing from single source.
- C. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E 119 or UL 263 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Steel members are to be considered unrestrained unless specifically noted otherwise
- D. Low-Emitting Materials: Products shall comply with VOC content limits of authorities having jurisdiction and the following VOC limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Flat Paints and Coatings: 50 g/L.
 - 2. Nonflat Paints and Coatings: 150 g/L.
 - 3. Primers, Sealers, and Undercoaters: 200 g/L.
 - 4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.

- E. Asbestos: Provide products containing no detectable asbestos.

2.2 MASTIC AND INTUMESCENT FIRE-RESISTIVE COATINGS

- A. Mastic and Intumescent Fire-Resistive Coating: Manufacturer's standard, water-based, factory-mixed formulation, and complying with indicated fire-resistance design:
 - 1. Basis of Design Product: CAFCO SprayFilm WB 5 manufactured by Isolatek International, or the following equal (listed in the UL Designs indicated):
 - a. ISOLATEK Type WB 5 manufactured by Isolatek International
 - 2. Application: Designated for "interior general purpose" use by a qualified testing agency acceptable to authorities having jurisdiction.
 - 3. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design.
 - 4. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 5. Hardness: Not less than 80, Type D durometer, according to ASTM D 2240.
 - 6. VOC Content: Zero.
 - 7. UL Design No.:
 - a. Architecturally Exposed Steel Including Beams and Columns: UL X650, UL N614 for a one hour rating.
 - 8. Alternative Manufacturers: Subject to compliance with requirements, equal MIFRC products of the following manufacturers may be provided. Submit alternative UL Designs for approval prior to providing the alternative products.
 - a. Albi Manufacturing, Division of StanChem Inc.
 - b. Carboline Company, subsidiary of RPM International, Fireproofing Products Div.
 - c. International Paint Limited, subsidiary of Akzo Nobel N. V.

2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Substrate Primers: Primers approved by fireproofing manufacturer and complying with required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Refer to Division 09 Section "Painting" for additional information on prime paint.
- C. Decorative Topcoat: Finish paint specified in Division 09 Section "Painting". Topcoat shall be suitable for application over applied fireproofing; of type recommended in writing by fireproofing manufacturer for each fire-resistance design.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design. Verify compliance with the following:
 - 1. Substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fireproofing with substrates under conditions of normal use or fire exposure.
 - 2. Objects penetrating fireproofing, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
 - 3. Substrates receiving fireproofing are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fireproofing application.
- B. Conduct tests according to fireproofing manufacturer's written recommendations to verify that substrates are free of substances capable of interfering with bond.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Cover other work subject to damage from fallout or overspray of fireproofing materials during application.
- B. Clean substrates of substances that could impair bond of fireproofing.
- C. Prime substrates where included in fire-resistance design and where recommended in writing by fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.
- D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of fireproofing. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

3.3 APPLICATION

- A. Construct fireproofing assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, topcoats, finishing, and other materials and procedures affecting fireproofing work.

- B. Comply with fireproofing manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fireproofing; as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- C. Coordinate application of fireproofing with other construction to minimize need to cut or remove fireproofing.
 - 1. Do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place.
 - 2. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until application of fireproofing is completed.
- D. Install auxiliary materials as required, as detailed, and according to fire-resistance design and fireproofing manufacturer's written recommendations for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by fireproofing manufacturer.
- E. Spray apply fireproofing to maximum extent possible. Following the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by fireproofing manufacturer.
- F. Extend fireproofing in full thickness over entire area of each substrate to be protected.
- G. Install body of fireproofing in a single course unless otherwise recommended in writing by fireproofing manufacturer.
- H. Provide a uniform finish complying with description indicated for each type of fireproofing material and matching finish approved for required mockups.
- I. Cure fireproofing according to fireproofing manufacturer's written recommendations.
- J. Do not install enclosing or concealing construction or apply finish paint coat until after fireproofing has been applied, inspected, and tested and corrections have been made to deficient applications.
- K. Finishes: Apply fireproofing to produce surface finish matching approved mock-up.
- L. Field Painting: Refer to Division 09 Section "Painting".

3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 - 1. Test and inspect as required by the IBC, 1704.11.
- B. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fireproofing for the next area until test results for previously completed applications of fireproofing show compliance with requirements. Tested

values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.

- C. Fireproofing will be considered defective if it does not pass tests and inspections.
 - 1. Remove and replace fireproofing that does not pass tests and inspections, and retest.
 - 2. Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.
- D. Prepare test and inspection reports.

3.5 CLEANING, PROTECTING, AND REPAIRING

- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
- B. Protect fireproofing, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fireproofing will be without damage or deterioration at time of Substantial Completion.
- C. As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.
- D. Repair fireproofing damaged by other work before concealing it with other construction.
- E. Repair fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION 078123

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in fire-resistance-rate horizontal assemblies.
3. Penetrations in non-fire-resistance-rate horizontal assemblies.
4. Penetrations in smoke barriers, smoke partitions and smoke tight partitions.

B. Related Sections:

1. Section 078446 "Fire-Resistive Joint Systems" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

1.2 ACTION SUBMITTALS

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

B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.

1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has

resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

- B. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:
 - 1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
 - b. Classification markings on penetration firestopping correspond to designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."
 - 2) Intertek ETL SEMKO in its "Directory of Listed Building Products."
 - 3) FM Global in its "Building Materials Approval Guide."

- C. Preinstallation Conference: Conduct conference at Project site.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.6 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.
- C. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Penetration Firestop Systems specified in the Schedule in Part - 3 include:
 - a. Fire Barrier Products, 3M Fire Protection Products
 - b. RectorSeal Corporation.
 2. Subject to compliance with specified requirements, provide Penetration Firestop Systems (XHEZ) listed in Volume II of the UL Fire Resistance Directory (BXRH), by one of the following:
 - a. Hilti, Inc.
 - b. Nelson Firestop Products.
 - c. RectorSeal Corporation.
 - d. Specified Technologies Inc.
 - e. 3M Fire Protection Products.
 - f. Wiremold/Legrand

2.2 PENETRATION FIRESTOPPING

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
1. Fire-resistance-rated walls include fire walls, fire-barrier walls, smoke-barrier walls, and fire partitions.
 2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
1. Horizontal assemblies include floors and floor/ceiling assemblies.
 2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
 3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
- D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.

1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at 0.30-inch wg (74.7 Pa) at both ambient and elevated temperatures.
- E. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.
- F. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- G. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 1. Sealants: 250 g/L.
 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 3. Sealant Primers for Porous Substrates: 775 g/L.
- H. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-wool-fiber or rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.

2.3 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.
- E. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

2.4 MIXING

- A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

- A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.
- C. Install fill materials for firestopping by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping.

Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections.
- B. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.
- C. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. For penetrations in non-fire rated horizontal assemblies, smoke barriers, smoke partitions and smoke tight partitions, provide systems tested for 1 hour unless otherwise noted.
- C. Basis of Design Assemblies: Subject to compliance with requirements, provide the design indicated below or a comparable UL design by one of manufacturer's listed in Part 2 above.

1. Schedule of construction components, type of penetrant, and U.L. Penetration Firestop Systems include, but are not limited to the following:
2. Schedule of construction components, type of penetrant, and U.L. Penetration Firestop Systems include, but are not limited to the following:

	P E N E T R A N T						
	Metal Conduit	Cable Tray⁴	Cables	Non-Insul. Metal Pipe	Insul. Pipe	FR Polypropylene Pipe	Insul. Metal Duct
GWB Stud Wall, or Shaft Wall up to 2 Hr Rating	W-L-1001	W-L-4004	W-L-3001	W-L-1001	W-L-5011	W-L-2002	W-L-7006 ³
CMU Wall up to 2 Hr Rating	C-AJ-1044	C-AJ-4003	C-AJ-3030	C-AJ-1044	C-AJ-5001	C-AJ-2001	C-AJ-7003 ³ , 7016 ³
Concrete Floor / Metal Deck 1 Hr Rated F and T-Rating²	C-AJ-1008	N/A	C-AJ-3029	C-AJ-1008	C-AJ-5002	F-A-2002	C-AJ-7009 ⁵
Concrete Floor / Metal Deck 2 Hr Rated F and T-Rating²	C-AJ-1008	N/A	C-AJ-3029	C-AJ-1008	C-AJ-5060	F-A-2002	N/A
Concrete Floor / Metal Deck up to 2 Hr F Rated¹	F-A-1002	N/A	C-AJ-3030	C-AJ-1044	C-AJ-5001	F-A-2002	N/A

KEY TO NOTES

1. Penetration within wall cavity.
2. Penetration that does not fall within wall cavity, T-Rating required.
3. Up to 1 hour rating, submit engineered judgement firestopping system for this combination of penetrant, wall/floor assembly, and fire rating. Install fire dampers in

2-hour walls in accordance with manufacturer's instructions and testing agency requirements.

4. Where cable tray extends through wall.
5. For floor penetrations not enclosed above and below the floor with shaft wall.

D. Membrane Penetrations:

1. Firestop membrane penetrations by cables, pipes and conduit similar to through wall penetrations.
2. Provide putty pad box wrap firestopping for membrane penetrations in rated walls for electrical back boxes over 16 sq. inches, where any back boxes are located within 24 inches horizontal of another back box, or when total area of back boxes exceeds 100 sq in. in 100 sq. ft. of wall area.

- E. Where another type of construction or penetrant is encountered, or if field conditions vary from those described in the U.L. System listed (i.e. annular space is greater/smaller, insulation type varies, etc.), provide firestopping systems which are appropriate, and U.L. tested, for that condition.

END OF SECTION 078413

SECTION 078446 - FIRE-RESISTIVE JOINT SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Joints in or between fire-resistance-rated constructions.
2. Joints at exterior curtainwall/floor intersections
3. Joints in smoke barriers.

B. Related Sections:

1. Section 078413 "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers.

1.2 ACTION SUBMITTALS

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

B. Product Schedule: For each fire-resistive joint system. Include location and design designation of qualified testing agency.

1. Where Project conditions require modification to a qualified testing agency's illustration for a particular fire-resistive joint system condition, submit illustration, with modifications marked, approved by fire-resistive joint system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Installer Certificates: From Installer indicating fire-resistive joint systems have been installed in compliance with requirements and manufacturer's written recommendations.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fire-resistive joint systems.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A firm experienced in installing fire-resistive joint systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its fire-resistive joint

system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

- B. Fire-Test-Response Characteristics: Fire-resistive joint systems shall comply with the following requirements:
 - 1. Fire-resistive joint system tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Fire-resistive joint systems are identical to those tested per testing standard referenced in "Fire-Resistive Joint Systems" Article. Provide rated systems complying with the following requirements:
 - a. Fire-resistive joint system products bear classification marking of qualified testing agency.
 - b. Fire-resistive joint systems correspond to those indicated by reference to designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."

- C. Preinstallation Conference: Conduct conference at Project site.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure fire-resistive joint systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.6 COORDINATION

- A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- B. Coordinate sizing of joints to accommodate fire-resistive joint systems.
- C. Notify Owner's testing agency at least seven days in advance of fire-resistive joint system installations; confirm dates and times on day preceding each series of installations.

PART 2 - PRODUCTS

2.1 FIRE-RESISTIVE JOINT SYSTEMS

- A. Where required, provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which fire-resistive joint systems are installed. Fire-resistive joint systems shall

accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

- B. Joints in or between Fire-Resistance-Rated Construction: Provide fire-resistive joint systems with ratings determined per ASTM E 1966 or UL 2079:
1. Joints include those installed in or between fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies.
 2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of construction they will join.
 3. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Grace Construction Products.
 - b. Hilti, Inc.
 - c. RectorSeal Corporation.
 - d. Specified Technologies Inc.
 - e. 3M Fire Protection Products.
 - f. Tremco, Inc.; Tremco Fire Protection Systems Group.
- C. Joints at Exterior Curtain-Wall/Floor Intersections: Provide fire-resistive joint systems with rating determined by ASTM E 119 based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa) or ASTM E 2307.
1. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the floor assembly.
 2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Grace Construction Products.
 - b. Hilti, Inc.
 - c. Johns Manville.
 - d. RectorSeal Corporation.
 - e. Specified Technologies Inc.
 - f. 3M Fire Protection Products.
 - g. Tremco, Inc.; Tremco Fire Protection Systems Group.
- D. Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079.
1. L-Rating: Not exceeding 5.0 cfm/ft (0.00775 cu. m/s x m) of joint at 0.30 inch wg (74.7 Pa) at both ambient and elevated temperatures.
 2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Grace Construction Products.
 - b. Hilti, Inc.
 - c. Johns Manville.
 - d. RectorSeal Corporation.
 - e. Specified Technologies Inc.

- f. 3M Fire Protection Products.
 - g. Tremco, Inc.; Tremco Fire Protection Systems Group.
- E. Exposed Fire-Resistive Joint Systems: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- F. VOC Content: Fire-resistive joint system sealants shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Architectural Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.
- G. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install fill materials and to maintain ratings required. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing agency for systems indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.
 - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by fire-resistive joint system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent fill materials of fire-resistive joint system from contacting adjoining surfaces that will remain exposed on completion of the Work

and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates.

3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
 - 2. Apply fill materials so they contact and adhere to substrates formed by joints.
 - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Identify fire-resistive joint systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of joint edge so labels will be visible to anyone seeking to remove or penetrate joint system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning - Fire-Resistive Joint System - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing agency.
 - 4. Date of installation.
 - 5. Manufacturer's name.
 - 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections.

- B. Where deficiencies are found or fire-resistive joint systems are damaged or removed due to testing, repair or replace fire-resistive joint systems so they comply with requirements.
- C. Proceed with enclosing fire-resistive joint systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint system manufacturers and that do not damage materials in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure fire-resistive joint systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

3.7 FIRE-RESISTIVE JOINT SYSTEM / FIRESTOP JOINT SYSTEM SCHEDULE

- A. Where UL-classified firestop joint systems are indicated, they refer to alphanumeric designations listed in UL's "Fire Resistance Directory" under product Category XHBN.

Firestop Joint System Location	Basis-of-Design	Assembly Rating	Nominal Joint Width	Movement Capabilities ²
Floor-to-Wall				
Rated concrete masonry wall construction intersection with adjacent floor construction	FW-D-1012, FW-D-1013	1 hour or 2 hours ¹	As indicated, or required by tested assembly	Class II
Head-of-Wall				
Rated gypsum wall construction intersection with steel floor deck above	HW-D-0087, or HW-D-0089	1 hour or 2 hours ¹	As indicated, or required by tested assembly	Class II or III,
Rated gypsum wall construction intersection with concrete floor deck above	HW-D-0083, HW-D-209	1 hour or 2 hours ¹	As indicated, or required by tested assembly	Class II

Rated concrete masonry wall construction intersection with steel floor deck above	HW-D-0081, or HW-D-0098	1 hour or 2 hours ¹	As indicated, or required by tested assembly	Class II
Rated concrete masonry wall construction intersection with concrete floor deck above	HW-D-0268, HW-D-0097	1 hour or 2 hours ¹	As indicated, or required by tested assembly	Class II
Bottom-of-Wall				
Rated gypsum wall construction intersection with concrete floor	BW-S-0002	1 hour or 2 hours ¹	As indicated, or required by tested assembly	Static

1. Rating to match wall construction.
2. Class UL2079

- A. Where another type of construction is encountered, or if field conditions vary from those described in the U.L. System listed (i.e. annular space is greater/smaller, insulation type varies, etc.), provide firestopping systems which are appropriate, and U.L. tested, for that condition.

3.8 PERIMETER FIRE-CONTAINMENT-FIRESTOP SYSTEMS

- A. Where perimeter Fire-Containment-Firestop systems are indicated, they refer to alphanumeric designations listed in UL's "Fire Resistance Directory" under product Category XHDG.

Perimeter Fire-Containment, Firestop System Location	Basis-of-Design	Integrity Rating	Insulation Rating	Linear opening Width
Aluminum Curtainwall	CW-D-2046	[1 hour] [2 hours]	[1/4] hour	8 inches (203 mm), maximum
Gypsum Sheathed Curtainwall	CW-S-1001	[1-1/2 hour]	[3/4] [1] hour	8 inches (203 mm), maximum

END OF SECTION 078446

ATTACHMENT: FIRESTOP JOINT SYSTEMS SUBMITTAL SHEET

3.9 FIRESTOP JOINT SYSTEMS SUBMITTAL SHEET

- A. **HEAD-OF-WALL FIRESTOPPING:** Fill in the U.L. Design number and attach copy of U.L. Test. Insert n/a if condition is not applicable.

1. Gypsum wall construction intersection with floor deck above: _____.
Gypsum wall construction intersection with roof deck above: _____.
2. Concrete masonry wall construction intersection with floor deck above: _____.
3. Concrete masonry wall construction intersection with roof deck above: _____.

- B. **FLOOR-TO-WALL FIRESTOPPING:** Fill in the U.L. Design number and attach copy of U.L. Test. Insert n/a if condition is not applicable.

1. Concrete masonry wall construction intersection with adjacent floor construction: _____.

- C. **BOTTOM-OF-WALL FIRESTOPPING:** Fill in the U.L. Design number and attach copy of U.L. Test. Insert n/a if condition is not applicable.

1. Gypsum wall construction intersection with floor deck: _____. Gypsum wall construction intersection with roof deck above: _____.
2. Concrete masonry wall construction intersection with floor _____.
3. Concrete masonry wall construction intersection with roof deck above: _____.

- D. **CURTAIN WALL FIRESTOPPING:** Fill in the design number and copy test. Insert n/a if condition is not applicable.

1. Aluminum mullion and glass spandrel panel curtainwall intersection with adjacent floor construction:
2. Gypsum sheathed curtainwall intersection with adjacent floor construction: _____.

- E. **OTHER:** Where another type of construction or penetrant is encountered, attach a separate sheet listing each condition and attach copy of the U.L. Test.

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes joint sealants for the following locations:
1. Exterior joints in the following vertical surfaces and nontraffic horizontal surfaces:
 - a. Control and expansion joints in cast-in-place concrete
 - b. Joints in brick veneer wall surfaces.
 - c. Joints at cast stone units.
 - d. Joints in EIFS wall panels
 - e. Joints in composite metal wall panels.
 - f. Joints between different materials listed above
 - g. Perimeter joints between materials listed above and frames of aluminum entrance and storefront framing, aluminum curtainwall framing and frames of doors, louvers and windows.
 - h. Control and expansion joints in ceiling and overhead surfaces.
 - i. Other joints as indicated.
 2. Exterior joints in the following horizontal traffic surfaces:
 - a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
 - b. Other joints as indicated.
 3. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior openings where indicated.
 - c. Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
 - d. Perimeter joints between interior wall surfaces and frames of interior doors, windows, storefront and entrance framing, curtainwall framing, and elevator entrances.
 - e. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - f. Tile control and expansion joints
 - g. Openings and joints in sound-rated partitions.
 - h. Other joints as indicated.
 4. Interior joints in the following horizontal traffic surfaces:
 - a. Control and expansion joints in tile flooring.
 - b. Control and expansion joints in cast-in-place concrete slabs.
 - c. Other joints as indicated.

B. Related Sections include the following:

1. Sealants used in glazing are specified in Division 08 "Glazing."
2. Coordinate work of this section with all sections referencing it.

1.2 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for initial selection purposes in form of manufacturer's standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view.
- C. Samples for verification purposes of each type and color of joint sealant required. Install joint sealant samples in 1/2-inch (13-mm)) wide joints formed between two 6-inch (150-mm) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

1.4 INFORMATIONAL SUBMITTALS

- A. Certificates from manufacturers of joint sealants attesting that their products comply with specification requirements and are suitable for the use indicated.
- B. Qualification data complying with requirements specified in "Quality Assurance" article. Include list of completed projects with project names addresses, names of Architects and Owners, plus other information specified.
- C. Compatibility and adhesion test reports from elastomeric sealant manufacturer indicating that materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed to obtain adhesion.
- D. Product test reports for each type of joint sealants indicated, evidencing compliance with requirements specified.
- E. Preconstruction field test reports indicating which products and joint preparation methods demonstrate acceptable adhesion to joint substrates.
- F. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an installer who has successfully completed at least three (3) joint sealer applications similar in type and size to that of this project within the last five (5) years. All workers used for work of this Section shall be experienced in the techniques of sealant application and shall be completely familiar with the published recommendations of the manufacturer of the joint sealant materials being used.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Preconstruction Field Testing: Prior to installation of joint sealants, field-test their adhesion to joint substrates as follows:
 - 1. Locate test joints where indicated or, if not indicated, as directed by Architect.
 - 2. Conduct field tests for each application indicated below:
 - a. Each type of elastomeric sealant and joint substrate indicated.
 - b. Each type of non-elastomeric sealant and joint substrate indicated.
 - 3. Notify Architect one week in advance of the dates and times when mock-ups will be erected.
 - 4. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
 - 5. Test Method: Test joint sealants by hand pull method described below:
 - a. Install joint sealants in 60 inches (1500 mm)) joint lengths using same materials and methods for joint preparation and joint sealant installation required for completed Work. Allow sealants to cure fully before testing.
 - b. Make knife cuts horizontally from one side of joint to the other followed by 2 vertical cuts approximately 2 inches (50 mm) long at side of joint and meeting horizontal cut at top of 2-inch (50-mm) cuts. Place a mark 1 inch (25 mm) from top of 2-inch (50-mm) piece.
 - c. Use fingers to grasp 2-inch (50-mm) piece of sealant just above 1-inch (25-mm) mark; pull firmly down at a 90-degree angle or more while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
 - 6. Report whether or not sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.
 - 7. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.
- D. Field-Constructed Mock-Ups: Prior to installation of joint sealants, apply elastomeric sealants as follows to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution:

1. Joints in field-constructed mock-ups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants specified in this Section.

- E. Pre-Installation Conference: Conduct conference at Project site to comply with requirements of the Division 01 Section covering this activity.
- F. Random Field Tests: Periodically test sealants, in place, for adhesion, using methods recommended by sealant manufacturer. Promptly replace any sealant that does not adhere, fails to cure, or fails to perform as specified by the sealant manufacturer.
- G. Field Water Test: Perform two field water tests on completed areas including as many conditions as possible. If leakage occurs during testing, repair as required, and re-test area and also test two additional locations.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:
 1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40 deg F (4 deg C).
 2. When joint substrates are wet.
- B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.
- C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

1.8 COORDINATION

- A. Coordinate the work with all sections referencing this section.

1.9 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.
- B. Manufacturer's Warranty: Provide written warranty agreeing to repair or replace, at no cost to Owner, defective materials for twenty (20) years, and workmanship for two (2) years from the Date of Substantial Completion. Defective materials and workmanship shall include, but are not limited to:
 1. Deterioration, aging or weathering of the work;
 2. Water leakage and/or air leakage;
 3. Sealant loss of adhesion, loss of cohesion, cracking or discoloration;
 4. Staining or discoloration of adjacent surfaces;
 5. Joint failure due to building or joint movement up to the limits prescribed by the manufacturer;
 6. Cracks or bubbles on sealant surface.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Colors: Provide color of exposed joint sealants to comply with the following:
 1. Provide selections made by Architect from manufacturer's standards or custom colors to match Architect's samples, as directed by Architect.
- C. Additional Movement Capability: Where additional movement capability is specified, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements of ASTM C 920 for Uses indicated.
- D. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):
 1. Architectural Sealants: 250 g/L.
 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 3. Sealant Primers for Porous Substrates: 775 g/L.
- E. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project

2.2 LATEX JOINT SEALANT

- A. Acrylic-Emulsion Sealant: Manufacturer's standard, one part, nonsag, mildew-resistant, paintable latex acrylic-emulsion sealant complying with ASTM C 834, formulated to be paintable and recommended for exposed applications on interior locations involving joint movement of not more than plus or minus 5 percent.
 - 1. Available Products: Subject to compliance with requirements, latex joint sealants that may be incorporated in the Work include, but are not limited to, the following:
 - a. AC-20; Pecora Corporation.
 - b. Tremflex 834; Tremco.
 - c. ALEX PLUS; DAP .
- B. Uses: General interior use, paintable.

2.3 MILDEW-RESISTANT SILICONE JOINT SEALANT

- A. Single-Component Mildew-Resistant Silicone Sealant: Manufacturer's standard, non-modified, one-part, silicone sealant; complying with ASTM C 920, Type S, Grade NS, Class 25, Uses NT, G, A, and, as applicable to non-porous joint substrates indicated, O. Formulate sealant with fungicide and specifically intended for sealing interior joints with nonporous substrates and subject to in-service exposure to conditions of high humidity and temperature extremes.
 - 1. Available Products: Subject to compliance with requirements, silicone joint sealants that may be incorporated in the Work include, but are not limited to, the following:
 - a. 786 Mildew Resistant; Dow Corning.
 - b. Sanitary 1700; GE Silicones.
 - c. 898 Silicone Sanitary Sealant; Pecora Corporation.
 - d. Tremsil 600 White; Tremco.
- B. Uses: Interior use in wet locations, and all toilet and shower rooms.

2.4 NONSAG URETHANE JOINT SEALANT

- A. Multicomponent Nonsag Urethane Sealant: Manufacturer's standard, non-modified, multi-part, nonsag urethane sealant; complying with ASTM C 920, Type M, Grade NS, Class 25, Uses NT, M, G, A, and as applicable to joint substrates indicated, O.
 - 1. Available Products: Subject to compliance with requirements, urethane joint sealants that may be incorporated in the Work include, but are not limited to, the following:
 - a. Dynatrol II, Pecora Corporation
 - b. Sikaflex-2c NS, Sika Corporation
 - c. Dymeric 240FC; Tremco.
 - d. Masterseal NP 2; Master Builders Solutions Div., BASF
- B. Uses: Interior use for exposed concrete or masonry wall control joints

2.5 SILICONE JOINT SEALANT

- A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100, for Use G, A, M, O; non-staining and field-tintable.
 - 1. Basis of Design Product: Provide Pecora Corporation "890FTS" sealant or equal manufactured by one of the following:
 - a. Dow Corning Corporation.
 - b. GE Advanced Materials - Silicones
 - c. Sika Corporation, Construction Products Division
 - d. Tremco Incorporated
- B. Additional Movement Capability: 100 percent movement in extension and 50 percent in compression for a total of 150 percent movement.
- C. Uses: General exterior use.

2.6 POURABLE URETHANE JOINT SEALANT

- A. Multicomponent Pourable Urethane Sealant: Manufacturer's standard, non-modified, two-part, urethane sealant; complying with ASTM C 920, Type M, Grade P, Class 25, Uses T, M, A and, as applicable to joint substrates indicated, O.
 - 1. Available Products: Subject to compliance with requirements, urethane joint sealants that may be incorporated in the Work include, but are not limited to, the following:
 - a. NR-200 Urethpan, Pecora Corporation
 - b. Sikaflex 2c SL, Sika Corporation
 - c. Masterseal SL 2; Master Builders Solutions Div., BASF
- B. Uses: Interior or exterior use for level pavement or slab joints.

2.7 NONSAG URETHANE JOINT SEALANT

- A. Multi-Part Non-Sag Urethane Sealant: Except as otherwise indicated, provide manufacturer's standard, non-modified, two-part, urethane sealant; complying with ASTM C 920, Type M, Grade NS, Class 25, Uses T, M, A and, as applicable to joint substrates indicated, O.
 - 1. Available Products: Subject to compliance with requirements, urethane joint sealants that may be incorporated in the Work include, but are not limited to, the following:
 - a. Sikaflex 2c NS; Sika Corp
 - b. Dynatred, Pecora Corporation
 - c. Masterseal NP 2; Master Builders Solutions Div., BASF
- B. Uses: Interior or exterior use for pavement or slab joints where slope exceeds one percent.

2.8 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant: Non-sag (gun grade), non-flammable, latex-based sealant designed to limit sound transmission through interior STC-rated partitions. Sealant remains flexible and adhered to metal, wood, plaster, gypsum, and concrete after drying.
 - 1. Maintains the STC rating of partitions with intersections and penetrations sealed with product: Tested by independent, accredited, NVLAP facility according to ASTM E 90.
 - 2. Products: Provide one of the following:
 - a. QuietZone Acoustic Sealant by Owens Corning.
 - b. OSI GreenSeries SC-175 Draft & Acoustical Sound Sealant by Henkel Corporation
 - c. Pecora AIS-919: Acoustical and Insulation Latex Sealant by Pecora Corporation
 - d. Smoke 'N' Sound Acoustical Sealant by Specified Technologies Inc.
- B. Uses: At penetrations through and intersections of sound-rated wall, floor and ceiling assemblies in order to preserve their ability to reduce airborne sound impact noise transmission.

2.9 PREFORMED FOAM SEALANTS

- A. Preformed Foam Sealants: Manufacturer's standard preformed, precompressed, impregnated open-cell foam sealant manufactured from high-density urethane foam impregnated with a nondrying, water repellent agent; factory-produced in precompressed sizes and in roll or stick form to fit joint widths indicated and to develop a watertight and airtight seal when compressed to the degree specified by manufacturer; and complying with the following requirements:
 - 1. Properties: Permanently elastic, mildew-resistant, nonmigratory, nonstaining, and compatible with joint substrates and other joint sealants.
 - 2. Impregnating Agent: Chemically stabilized acrylic.
 - 3. Density: Manufacturer's standard.
 - 4. Backing: None.
 - 5. Available Products: Subject to compliance with requirements, preformed foam sealants that may be incorporated in the Work include, but are not limited to, the following:
 - a. "Emseal," Emseal Corp.
 - b. "Emseal Greyflex," Emseal Corp.
 - c. "Wil-Seal 150," Wil-Seal Construction Foams Div., Illbruck.
 - d. "Wil-Seal 250," Wil-Seal Construction Foams Div., Illbruck.

2.10 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

- B. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding strips of flexible plastic foam of material indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
 - 1. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, nonoutgassing in unruptured state.
 - 2. Manufacturer: Provide Cera-Rod manufactured by W.R. Meadows, Inc., or equivalent.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.11 JOINT FILLERS FOR EXTERIOR CONCRETE SLABS

- A. General: Provide joint fillers of thickness and depth indicated, or if not indicated 1/2" thick by depth of joint.
- B. Bituminous Fiber Joint Filler: Provide preformed strips of with asphalt binder encased between two layers of saturated felt or glass-fiber felt, complying with ASTM D 1751.
 - 1. Protect top edge of joint filler during concrete placement with a metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint and seal with sealant.

2.12 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions

affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
 - 3. Remove laitance and form release agents from concrete.
 - 4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - a. Do not leave gaps between ends of joint fillers.
 - b. Do not stretch, twist, puncture, or tear joint fillers.
 - c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.
 2. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.
- D. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
1. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 - a. Use masking tape to protect adjacent surfaces of recessed tooled joints.
- F. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, and to comply with sealant manufacturer's directions for installation methods, materials, and tools that produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in conformance with sealant manufacturer's recommendations.
- 3.4 CLEANING
- A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.
- 3.5 PROTECTION
- A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or

deteriorated joint sealants immediately so that and installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 079500 - EXPANSION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. Types of joints for which architectural joint systems are specified include the following:
 - 1. Interior pedestrian traffic joints.
 - 2. Interior wall and ceiling joints.
 - 3. Exterior wall expansion joint.
- B. Related Sections include the following:
 - 1. Division 07 Section "Joint Sealants" for elastomeric sealants and preformed compressed-foam sealants without metal frames.
 - 2. Division 07 Sections "Sheet Metal Flashing and Trim" and "Roofing Accessories" for expansion joint covers at roof.

1.2 DEFINITIONS

- A. Architectural Joint System: Any filler or cover used to span, fill, cover, or seal a joint, except expanding foam seals and poured or foamed in-place sealants.
- B. Cyclic Movement: Periodic change between widest and narrowest joint widths in an automatically mechanically controlled system.
- C. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist passage of flame and hot gases through a movement joint.
- D. Maximum Joint Width: Widest linear gap a joint system tolerates and performs its designed function without damaging its functional capabilities.
- E. Minimum Joint Width: Narrowest linear gap a joint system tolerates and performs its designed function without damaging its functional capabilities.
- F. Movement Capability: Value obtained from the difference between widest and narrowest widths of a joint opening typically expressed in numerical values (mm or inches) or a percentage of nominal value of joint width.
- G. Nominal Joint Width: Width of linear gap indicated as representing the conditions existing when architectural joint systems will be installed or, if no nominal joint width is indicated, a width equal to the sum of maximum and minimum joint widths divided by two.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide factory-fabricated architectural joint systems capable of withstanding the types of loads and of accommodating the kinds of movement, and the other functions for which they are designed including those specified below, without failure. Types of failure include those listed in Appendix X3 of ASTM E 1399.
 - 1. Pedestrian Traffic Joints: Support pedestrian traffic across joint.
 - 2. Exterior Joints: Maintain continuity of weather enclosure.
 - 3. Joints in Fire-Resistance-Rated Assemblies: Maintain fire-resistance ratings of assemblies.
 - 4. Joints in Smoke Barriers: Maintain integrity of smoke barrier.
 - 5. Other Joints: Where indicated, provide joint systems that prevent penetration of water, moisture, and other substances deleterious to building components or content.
 - 6. Joints in Surfaces with Architectural Finishes: Serve as finished architectural joint closures.

1.4 SUBMITTALS

- A. Product Data: Include manufacturer's product specifications, construction details, material and finish descriptions, and dimensions of individual components and seals.
- B. Shop Drawings: For each joint system specified, provide the following:
 - 1. Placement Drawings: Include line diagrams showing entire route of each joint system, plans, elevations, sections, details, joints, splices, locations of joints and splices, and attachments to other Work. Where joint systems change planes, provide Isometric Drawings depicting how components interconnect to achieve continuity of joint covers and fillers.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each exposed metal and elastomeric material of joint system indicated.
 - 1. Include similar Samples of material for joints and accessories involving color selection.
- D. Samples for Verification: Full-size units 6 inches (150 mm) long of each type of joint system indicated; in sets for each finish, color, texture, and pattern specified, showing the full range of variations expected in these characteristics.
- E. Product Test Reports: From a qualified testing agency indicating architectural joint systems comply with requirements, based on comprehensive testing of current products.
- F. Research/Evaluation Reports: Evidence of architectural joint system's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain architectural joint systems through one source from a single manufacturer. Coordinate compatibility with adjoining joint systems specified in other Sections.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of architectural joint systems and are based on the specific systems indicated. Other manufacturers' systems complying with requirements may be considered. Refer to Division 01 Section "Product 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.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Products: The design for each architectural joint system specified in Part 2 "Architectural Joint Systems" Article below is based on the products named. Subject to compliance with requirements, provide either the named products or comparable products by one of the following:
 - 1. M M Systems
 - 2. Balco, Inc.
 - 3. Construction Specialties, Inc.
 - 4. Inpro
 - 5. Watson Bowman Acme.

2.2 MATERIALS

- A. Aluminum: ASTM B 221 (ASTM B 221M), alloy 6063-T5 for extrusions; ASTM B 209 (ASTM B 209M), alloy 6061-T6 for sheet and plate.
 - 1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
- B. Preformed Seals: Single or multicellular extruded elastomeric seals designed with or without continuous, longitudinal, internal baffles. Formed to be installed in frames or with anchored flanges, in color indicated or, if not indicated, as selected by Architect from manufacturer's standard colors.
- C. Strip Seals: Elastomeric membrane or tubular extrusions with a continuous longitudinal internal baffle system throughout complying with ASTM E 1783; used with compatible frames, flanges, and molded-rubber anchor blocks.
- D. Compression Seals: Preformed, elastomeric extrusions having internal baffle system complying with ASTM E 1612 in sizes and profiles indicated or as recommended by manufacturer.

- E. Fire Barrier: Manufacturer's standard for fire ratings indicated on Drawings.
- F. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, flexible moisture barrier and filler materials, drain tubes, lubricants, adhesives, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.3 ARCHITECTURAL JOINT SYSTEMS

- A. General: Provide joint systems of design, basic profile, materials, and operation indicated. Provide units with the capability to accommodate joint widths indicated and variations in adjacent surfaces.
 - 1. Furnish units in longest practicable lengths to minimize number of end joints. Provide hairline mitered corners where joint changes directions or abuts other materials.
 - 2. Include closure materials and transition pieces, tee-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous joint systems.
 - 3. Frames for Strip Seals: Designed with semiclosed cavity that provides a mechanical lock for seals of type indicated.
 - 4. Fire Barrier: Provide manufacturer's standard fire barriers material where indicated on the Drawings, for fire ratings indicated.
- B. Interior Wall-to-Wall and Ceiling-to-Ceiling Architectural Joint System: Metal frames and covers for interior wall-to-wall application.
 - 1. Basis-of-Design Products: Construction Specialties, Inc. Model ASM Series or equal by one of the following:
 - a. M M Systems .
 - b. Balco, Inc.
 - 2. Nominal Joint Width: 2 inches, unless otherwise indicated on the Drawings.
 - 3. Type of Movement Capability: 50% Expansion and contraction.
 - 4. Exposed Cover Material: Aluminum, clear anodized finish.
 - 5. Concealed Frame Material: Aluminum, mill finish.
- C. Interior Floor-to-Floor Architectural Joint System, for Large Joints: Metal frame and recessed center plate for interior, pedestrian traffic joints. Units shall have recessed side frames for minimal visual impact.
 - 1. Basis-of-Design Product: Model SGR Series by Construction Specialties or equal by one of the following:
 - a. M M Systems
 - b. Balco, Inc.

2. Nominal Joint Width: As indicated for each location.
 3. Center Plate: Provide resilient flooring material or stainless steel center plate, depending on the final floor finish selection.
 4. Frame and Plate Material: Aluminum extrusions, mill finish.
- D. Interior Floor-to-Floor Architectural Joint System, for Smaller Joints: Metal frame and flush gasketed center cover for interior, pedestrian traffic joints. Units shall have surface mounted metal side frames for minimal bump.
1. Basis-of-Design Product: Model GFST Series by Construction Specialties or equal by one of the following:
 - a. M M Systems
 - b. Balco, Inc.
 2. Nominal Joint Width: 2" unless otherwise indicated on Drawings.
 3. Center Gasket: Elastomeric extrusion in colors as selected by Architect.
 4. Frame and Plate Material: Aluminum extrusions, mill finish.
- E. Exterior Expansion Joint / Waterproofing Joint System: Manufacturer's standard preformed, precompressed, impregnated open-cell foam sealant manufactured from high-density urethane foam impregnated with a nondrying, water repellent agent; factory-produced in precompressed sizes and in roll or stick form to fit joint widths indicated and to develop a watertight and airtight seal when compressed to the degree specified by manufacturer. Seal shall combine factory-applied, low-modulus silicone surface and a backing of acrylic-impregnated expanding foam into a unified hybrid sealant system, and comply with the following requirements:
1. Properties: Permanently elastic, mildew-resistant, nonmigratory, nonstaining, and compatible with substrates indicated.
 2. Density: Manufacturer's standard.
 3. Movement Capability: 100% expansion and contraction
 4. Thickness As indicated on Drawings for each location
 5. Color of Exposed Material: As selected by Architect to match adjacent wall color.
 6. Basis of Design Product: Provide Seismic Colorseal by Emseal Joint Systems, LTD, a SIKA company, or equal products manufactured by one of the following:
 - a. MM Systems Corporation.
 - b. Sandell Manufacturing Co., Inc.
 - c. Watson Bowman Acme Corporation.

2.4 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.5 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to architectural joint system manufacturer's written instructions.
- B. Coordinate and furnish anchorages, Placement Drawings, and instructions for installing joint systems to be embedded in or anchored to concrete or to have recesses formed into edges of concrete slab for later placement and grouting-in of frames.
- C. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary to secure joint systems to in-place construction, including threaded fasteners with drilled-in expansion shields for masonry and concrete where anchoring members are not embedded in concrete. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of joint systems.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for handling and installing architectural joint assemblies and materials, unless more stringent requirements are indicated.
- B. Coordinate installation of architectural joint assembly materials and associated work so complete assemblies comply with assembly performance requirements.
- C. Terminate exposed ends of exterior architectural joint assemblies with factory-fabricated termination devices to maintain waterproof system.
- D. Install factory-fabricated transitions between building expansion-joint cover assemblies and roof expansion-joint assemblies to provide continuous, uninterrupted, watertight construction.
- E. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required to install joint systems.
 - 1. Install joint cover assemblies in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
 - 2. Allow adequate free movement for thermal expansion and contraction of metal to avoid buckling.
 - 3. Set covers in horizontal surfaces at elevations that place exposed surfaces flush with adjoining finishes.
 - 4. Locate wall, ceiling, and soffit covers in continuous contact with adjacent surfaces.
 - 5. Securely attach in place with required accessories.

- 6. Locate anchors at interval recommended by manufacturer, but not less than 3 inches (75 mm) from each end and not more than 24 inches (600 mm) o.c.
- F. Continuity: Maintain continuity of joint systems with a minimum number of end joints and align metal members. Cut and fit ends to produce joints that will accommodate thermal expansion and contraction of metal to avoid buckling of frames. Adhere flexible filler materials, if any, to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- G. Joint Systems with Seals: Seal end joints within continuous runs and joints at transitions according to manufacturer's written instructions to provide a watertight installation.

3.3 CLEANING AND PROTECTION

- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

END OF SECTION 079500

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the following hollow-metal work:
 - 1. Steel doors
 - 2. Steel door frames
 - 3. Fire-rated door and frame assemblies.
 - 4. Transom frames, borrowed lite frames and sidelite frames.
 - 5. Fire-rated frames
 - 6. Metal sidelite panels matching doors, fire-rated.
- B. Related Requirements:
 - 1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.
 - 2. Section 088000 "Glazing" for glazing inserted in hollow metal doors and frames..

1.2 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to SDI A250.8.

1.3 COORDINATION

- A. Coordinate anchorage installation 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.
- B. Coordinate preparation of shop drawings for hollow metal doors and frames with door hardware submittals specified in Section 087100. Shop drawings for work of this section will not be reviewed and approved until the hardware submittals in Section 087100 are submitted and approved.

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.
- B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

- C. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For door inspector.
1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1
 2. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4
- B. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.
- C. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.
- D. Field quality control reports.

1.7 QUALITY ASSURANCE

- A. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies complies with qualifications set forth in NFPA 80, Section 5.2.3.1
- B. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies complies with qualifications set forth in NFPA 101, Section 7.2.1.15.4

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented 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 vertically under cover at Project site with head up. Place on minimum 4-inch- (102-mm-) high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Ceco Door Products; an Assa Abloy Group company.
 - 2. Curries Company; an Assa Abloy Group company.
 - 3. Republic Doors and Frames.
- B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
- B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.
- C. Exterior Door and Frame Performance Criteria for Air Infiltration: Maximum 0.2 CFM/SQ FT when tested in accordance with NFRC 400.
- D. Thermally Rated Door Assemblies: Provide exterior door assemblies with U-factor of not more than 0.40 deg Btu/F x h x sq. ft. (2.27 W/K x sq. m) when tested according to ASTM C518.

2.3 INTERIOR DOORS AND FRAMES

- A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3. Provide for interior door and frame locations.

1. Physical Performance: Level A according to SDI A250.4.
2. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches (44.5 mm).
 - c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 16 gage 0.053 inch (1.3 mm), except as noted below.
 - 1) Metallic-coated, with minimum A40 (ZF120) coating at the following locations: As scheduled
 - d. Edge Construction: Model 1, Full Flush
 - e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.
 - f. Basis of Design Product: Regent Door by Ceco Doors, or equal.
3. Frames:
 - a. Materials: Minimum thickness of 16 gage, 0.053 inch (1.3 mm), uncoated, steel sheet for the following locations:
 - 1) Wood doors, unless otherwise indicated.
 - b. Materials: Minimum thickness of 14 gage, 0.067 inch (1.7 mm), uncoated, steel sheet (except provide metallic coated where door is metallic coated) for the following locations:
 - 1) Level 3 steel doors
 - 2) Wood doors at all leafs wider than 36-inches (914-mm), and all electrical rooms, storage rooms, machine rooms, mechanical rooms, and maintenance areas
 - c. Construction: Full profile welded.
4. Exposed Finish: Prime door and frames

2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Maximum-Duty Doors and Frames: SDI A250.8, Level 4.
 1. Physical Performance: Level A according to SDI A250.4.
 2. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches (44.5 mm.)
 - c. Faces: Metallic-coated steel sheet, minimum thickness of 14 gage, 0.067 inch (1.7 mm), with minimum A60 (ZF180) coating.
 - d. Edge Construction: Model 2, Seamless (continuously welded seams, edge filled, dressed smooth).

- e. Core: Manufacturer's standard polystyrene, polyurethane, or polyisocyanurate core at manufacturer's discretion, to meet performance criteria specified.
 - f. Basis of Design Product: Trio-E Energy Efficient Door by Ceco Doors or equal.
3. Frames:
- a. Materials: Metallic-coated steel sheet, minimum thickness of 14 gage, 0.067 inch (1.7 mm), with minimum A60 (ZF180) coating.
 - b. Construction: Full profile welded.
 - c. Basis of Design Product: Mercury Thermal Break Frame by Ceco Doors or equal.
4. Exposed Finish: Prime door and frames

2.5 FRAME ANCHORS

A. Jamb Anchors:

- 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (51 mm) wide by 10 inches (254 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
- 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
- 3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch (1.0 mm), and as follows:

- 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
- 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at finish floor surface.

2.6 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

- D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- G. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.
- H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- I. Glazing: Comply with requirements in Sections 088000 "Glazing".
- J. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.7 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 metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors and Panels:
 - 1. Steel-Stiffened Door Cores: Provide minimum thickness 0.026 inch (0.66 mm), steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches (152 mm) apart. Spot weld to face sheets no more than 5 inches (127 mm) o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
 - 2. Fire Door Cores: As required to provide fire-protection ratings indicated.
 - 3. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches (3.2 mm in 51 mm).
 - 4. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets.

5. Bottom Edge Closures: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets.
 6. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
 7. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- C. Hollow-Metal Frames: 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.
1. 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.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
 5. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 16 inches (406 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c., to match coursing, and as follows:
 - 1) Two anchors per jamb up to 60 inches (1524 mm) high.
 - 2) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
 - 3) Four anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.
 - 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.
 - b. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches (1524 mm) high.
 - 2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
 - 3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
 - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
 - c. Postinstalled Expansion Type: Locate anchors not more than 6 inches (152 mm) from top and bottom of frame. Space anchors not more than 26 inches (660 mm) o.c.

6. Head Anchors: Two anchors per head for frames more than 42 inches (1067 mm) wide and mounted in metal-stud partitions.
7. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
- F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
 1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 4. Provide loose stops and moldings on inside of hollow-metal work.
 5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 6. Where Pyrostop glazing is scheduled to be inserted into openings in hollow metal doors provide door manufacturer's special window kit to accommodate thickness of glazing unit; Type 8 window kit by Curries, or equal.

2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.9 ACCESSORIES

- A. Louvers: Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.020-inch- (0.5-mm-) thick, cold-rolled steel sheet set into 0.032-inch- (0.8-mm-) thick steel frame.
 - 1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
- B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- C. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 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 SDI A250.11 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
 6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 7. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.
- C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Steel Doors:
 - a. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
 - b. Between Edges of Pairs of Doors: 1/8 inch (3.2 mm) to 1/4 inch (6.3 mm) plus or minus 1/32 inch (0.8 mm).

- c. At Bottom of Door: 3/4 inch (19.1 mm) plus or minus 1/32 inch (0.8 mm).
 - d. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
- 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- 3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.
 - 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

3.4 FIELD QUALITY CONTROL

- A. Inspection Agency: Engage a qualified inspector to perform inspections and commissioning activities and to furnish reports to Architect.
- B. Inspections:
 - 1. Fire-Rated Door Inspections: Inspect each fire-rated door according to NFPA 80, Section 5.2.
 - 2. Egress Door Inspections: Inspect each door in Assembly occupancies equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.
- C. Commissioning: Commissioning of all doors shall be performed by the installer supervised by an Architectural Hardware Consultant who is thoroughly knowledgeable of the various components and systems. Include the following:
 - 1. Testing of opening force, closing device, complete closure of the door within clearance tolerances, and full engagement of latch(es) where required by door type.
 - 2. Verify cleanliness of labels, fusible links and other components that cannot be painted.
 - 3. Functional testing of automatic-closing or power-operated fire door assemblies and electrically controlled latching hardware or release devices shall be coordinated with all components of the electrically controlled system.
 - 4. After all doors have been commissioned and prior their acceptance, the Architect, in consultation with the Owner, will select doors (at least one for each operational type) whose full range operation shall be demonstrated by the Contractor to the satisfaction of the Architect.
- D. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- E. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

- F. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80.
- G. Prepare and submit separate inspection report for each egress door assembly indicating compliance with each item listed in NFPA 101.
- H. Prepare and submit commissioning report of all doors.

3.5 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 Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-core doors with wood-veneer faces for transparent finish.
2. High STC solid-core doors with wood-veneer faces for transparent finish.
3. Factory finishing flush wood doors.
4. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:

1. Division 08 Section "Hollow Metal Doors and Frames" for steel door frames.
2. Division 08 Section "Glazing" for glass view panels in flush wood doors

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications. For acoustical doors, include test report for acoustical performance.

- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Dimensions and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware.
3. Dimensions and locations of cutouts.
4. Undercuts.
5. Requirements for veneer matching.
6. Doors to be factory finished and finish requirements.
7. Fire-protection ratings for fire-rated doors.
8. STC ratings of acoustical wood doors.
9. Provide schedule of doors based on door schedule included in contract documents

- C. Samples for Initial Selection: For factory-finished doors.

- D. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.

2. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.
3. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edges representing actual materials to be used.
 - a. Provide Samples for each species of veneer and solid lumber required.
 - b. Finish veneer-faced door Samples with same materials proposed for factory-finished doors.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For door inspector.
 1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1
 2. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4
- B. Sample Warranty: For special warranty.
- C. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.
- D. Field quality control reports.

1.5 QUALITY ASSURANCE

- A. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies complies with qualifications set forth in NFPA 80, Section 5.2.3.1
- B. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies complies with qualifications set forth in NFPA 101, Section 7.2.1.15.4

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during remainder of construction period.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.
- B. Contractor's Responsibilities: Replace doors where Contractor's work contributed to rejection or to voiding of manufacturer's warranty

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Marshfield – Algoma by Masonite Architectural
 - 2. Oshkosh Door Company.
 - 3. VT Industries, Inc. (formerly Eggers)
- B. Source Limitations:
 - 1. Obtain flush wood doors from single manufacturer.

2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."
 - 1. Provide AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.
 - 2. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.
- B. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do not contain urea formaldehyde.
- C. Fire-Rated Wood Doors: Doors 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 NFPA 252 or UL 10C. After 5 minutes into the NFPA 252 test, the neutral pressure level in the furnace shall be established at 40 inches (1016 mm) or less above the sill. Provide "Category A" Positive Pressure Tested doors for all fire-rated wood doors.

1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
 2. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
 3. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile; UL category A. Comply with specified requirements for exposed edges.
 4. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
- D. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.
- E. Particleboard-Core Doors:
1. Particleboard: ANSI A208.1, Grade LD-2, made with binder containing no urea-formaldehyde.
 2. Blocking: Provide wood blocking in particleboard-core doors as follows:
 - a. 5-inch (125-mm) top-rail blocking, in doors indicated to have closers.
 - b. 5-inch (125-mm) bottom-rail blocking, in doors and doors indicated to have kick, mop, or armor plates.
 - c. 4-1/2-by-10-inch (114-by-250-mm) lock blocks and 5-inch (125-mm) midrail blocking, in doors indicated to have exit devices.
- F. Structural-Composite-Lumber-Core Doors:
1. Structural Composite Lumber: WDMA I.S.10.
 - a. Screw Withdrawal, Face: 700 lbf (3100 N).
 - b. Screw Withdrawal, Edge: 400 lbf (1780 N).
- G. Mineral-Core Doors:
1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
 2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware, and as follows:
 - a. 5-inch (125-mm) top-rail blocking.
 - b. 5-inch (125-mm) bottom-rail blocking, in doors indicated to have protection plates.
 - c. 5-inch (125-mm) midrail blocking, in doors indicated to have armor plates.
 - d. 4-1/2-by-10-inch (114-by-250-mm) lock blocks and 5-inch (125-mm) midrail blocking, in doors indicated to have exit devices.
 3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 - a. Screw-Holding Capability: 550 lbf (2440 N) per WDMA T.M.-10.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Solid-Core Doors:
 - 1. Grade: Custom, with Grade A faces.
 - 2. Species: White Maple
 - 3. Cut: Plain sawn/sliced.
 - 4. Match between Veneer Leaves: Book match.
 - 5. Assembly of Veneer Leaves on Door Faces: Balance match.
 - 6. Exposed Vertical Edges: Same species as faces - edge Type A
 - 7. Core:
 - a. Non-Rated Doors: Particleboard except provide doors with either glued-wood-stave or structural-composite-lumber cores instead of particleboard cores for doors with full light or 2 lights
 - b. Fire-Rated Doors: Mineral core.
 - 8. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
 - 9. WDMA I.S.1-A Performance Grade: Extra Heavy Duty
 - 10. STC Rating for Acoustical Doors: Minimum 43.
 - 11. Basis of Design Doors: Marshfield – Algoma Aspiro Series by Masonite Architectural, or equal.
 - 12. Basis of Design Door, Acoustical Rated: Marshfield – Algoma Aspiro Series by Masonite Architectural, or equal with the following:
 - a. STC: 45 and 51 as scheduled.
 - b. Non-fire-rated and fire-rated doors as scheduled.
 - c. Pair of doors and single door as scheduled.

2.4 LIGHT FRAMES AND LOUVERS

- A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.
 - 1. Wood Species: Same species as door faces.
 - 2. Profile: Manufacturer's standard shape.
 - 3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.
- B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.
- C. Where Pyrostop glazing is scheduled to be inserted into openings in wood doors provide door manufacturer's special window kit to accommodate thickness of glazing unit.

2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

- B. Align and fit doors in frames with uniform clearances and bevels as indicated below. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - 1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 5/8 inch (16 mm) from bottom of door to top of threshold unless otherwise indicated.
 - a. Comply with NFPA 80 for fire-rated doors.
 - 2. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
 - 3. Bevel fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- C. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
- D. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining. Openings: Factory cut and trim openings through doors.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 08 Section "Glazing."

2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Transparent Finish:
 - 1. Grade: Premium.
 - 2. Finish: WDMA TR-6 and AWS system 11 catalyzed polyurethane.
 - 3. Staining: Masonite "Nutmeg".
 - 4. Effect: Semifilled finish, produced by applying an additional finish coat to partially fill the wood pores.
 - 5. Sheen: Satin

PART 3 - EXECUTION

3.1 EXAMINATION

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

2. Reject doors with defects.

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

3.2 INSTALLATION

- A. Hardware: For installation, see Division 08 Section "Door Hardware."

- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

1. Install fire-rated doors according to NFPA 80.
2. Install smoke- and draft-control doors according to NFPA 105.

- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 FIELD QUALITY CONTROL

- A. Inspection Agency: Engage a qualified inspector to perform inspections and commissioning activities and to furnish reports to Architect.

- B. Inspections:

1. Fire-Rated Door Inspections: Inspect each fire-rated door according to NFPA 80, Section 5.2.
2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.

- C. Commissioning: Commissioning of all doors shall be performed by the installer supervised by an Architectural Hardware Consultant who is thoroughly knowledgeable of the various components and systems. Include the following:

1. Testing of opening force, closing device, complete closure of the door within clearance tolerances, and full engagement of latch(es) where required by door type.
2. Verify cleanliness of labels, fusible links and other components that cannot be painted.
3. Functional testing of automatic-closing or power-operated fire door assemblies and electrically controlled latching hardware or release devices shall be coordinated with all components of the electrically controlled system.
4. After all doors have been commissioned and prior their acceptance, the Architect, in consultation with the Owner, will select doors (at least one for each operational type) whose full range operation shall be demonstrated by the Contractor to the satisfaction of the Architect.

- D. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

- E. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
 - F. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80.
 - G. Prepare and submit separate inspection report for each egress door assembly indicating compliance with each item listed in NFPA 101.
 - H. Prepare and submit commissioning report of all doors.
- 3.4 ADJUSTING
- A. Operation: Rehang or replace doors that do not swing or operate freely.
 - B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 082250 - POLYESTER FACED DOORS AND ALUMINUM FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Fiberglass reinforced polyester (FRP) faced doors
 - 2. Aluminum frames for FRP doors, including frames for sidelites and transoms.
 - 3. Installation of hardware (except surface mounted hardware).
- B. Related sections include the following:
 - 1. Division 07 Section "Joint Sealants" for joint sealants installed as part of aluminum entrance and storefront systems.
 - 2. Division 08 Section "Door Hardware."
 - 3. Division 08 Section "Glazing."

1.2 SYSTEM DESCRIPTION

- A. General: Provide polyester faced doors and aluminum framing systems capable of withstanding loads and thermal and structural movement requirements indicated without failure, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Thermal Movements: Provide polyester faced doors and aluminum framing systems, including anchorage, that accommodate thermal movements of systems and supporting elements resulting from the following maximum change(range) in ambient and surface temperatures without buckling, damaging stresses on glazing, failure of joint sealants, damaging loads on fasteners, failure of doors or other operating units to function properly, and other detrimental effects.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- C. Structural-Support Movement: Provide polyester faced doors and aluminum framing systems that accommodate structural movements including, but not limited to, sway and deflection.
- D. Dimensional Tolerances: Provide polyester faced doors and aluminum framing systems that accommodate dimensional tolerances of building frame and other adjacent construction.

1.3 SUBMITTALS

- A. Product data including specifications, standard details, and installation recommendations for polyester faced doors and panels and aluminum frames including test reports certifying that products have been tested and comply with performance requirements, details of core and edge construction, trim for openings, and finish.
- B. Shop drawings showing fabrication and installation of polyester faced doors, panels and frames. Include elevations of door design types, details of construction, location and installation requirements of door hardware and reinforcements, and details of openings.
 - 1. Provide schedule of doors indicating sizes, locations, and other pertinent information using same reference numbers for details and openings as those on contract drawings.
- C. Samples for initial selection purposes in form of manufacturer's color charts showing full range of colors available for doors and panels.
- D. Samples for Verification Purposes: Submit 6" square samples of each color of face sheet specified and 12" long sections of aluminum extrusions with specified finish system applied. Where normal color and texture variations are to be expected, include 2 or more units in each set of samples showing limits of such variations.

1.4 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide doors and frames produced by single manufacturer for entire Project.
- B. Manufacturer Qualifications: Provide product series that has produced by the manufacturer for at least five years, for similar building type and size as this project.
- C. Installer's Qualifications: Firm with not less than 4 years successful experience installing systems similar to those required.
- D. Fire Performance Characteristics: Where indicated, provide class "A" fiber reinforced polyester faces with the following surface burning characteristics as determined by testing identical products per ASTM E 84 by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction.
 - 1. Flame Spread: 25 or less.
 - 2. Smoke Developed: 450 or less.
- E. Design Criteria: The construction documents are based on a specific polyester door faced and aluminum frame system. Other manufacturer's system of similar and equivalent nature will be acceptable when, in Architect's judgement, differences do not materially detract from design concept or intended performance.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver doors cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to surface finishes.

- B. Inspect doors upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover. Place units on minimum 4-inches high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4-inches spaces between stacked doors to promote air circulation.
- D. Identify each door and frame with individual opening numbers which correlate with designation system used on shop drawings for door, frames, and hardware, using temporary, removable or concealed markings.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Check openings by field measurement before fabrication to ensure proper fitting of work; show measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay in work.
- B. Coordinate work of this section with that specified in Section 087100 to ensure proper installation of hardware.

1.7 WARRANTY

- A. Product Warranty: Provide manufacturer's standard written warranty agreeing to repair or replace polyester faced doors which fail in materials or workmanship within time period indicated below. Warranty shall include door manufacturer's guarantee that hardware installed by factory will be installed correctly and not come loose within time period indicated below.
 - 1. Warranty period for doors and finish, and hardware installed by factory is ten years after date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Provide polyester faced doors, panels and aluminum frames manufactured by one of following:
 - 1. Special-Lite, Inc.
 - 2. Tubelite, Inc.
 - 3. Commercial Door Systems.

2.2 MATERIALS

- A. Aluminum Members: Alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish; comply with ASTM B 221 for extrusions and ASTM B 209 for sheet and plate.
- B. Steel Reinforcement: Complying with ASTM A 36 (ASTM A 36M)) for structural shapes, plates, and bars; ASTM A 611 for cold-rolled sheet and strip; or ASTM A 570 (ASTM A 570M) for hot-rolled sheet and strip.
- C. Fiberglass Reinforced Polyester Face Material: 0.120" minimum thickness, with color integral through full thickness of face sheet. Provide sandstone textured finish for doors and panels. Face material meeting the following performance criteria:
 - 1. Impact Strength of Face Sheets: ASTM D 256, Izod Impact Strength, 15 foot pounds per inch of notch.
 - 2. Abrasion Resistance of Face Sheets: ASTM D 1242, 25 cycles of Taber Abraser with CH-17 wheel with a 1000 gram load, not to exceed 0.029 percent weight loss.
 - 3. Hardness of Face Sheets: ASTM D 2583, Barcol Meter Hardness Test, not less than 55.
 - 4. Humidity Resistance of Face Sheets: ASTM D 570, water absorption not more than 0.40 percent weight gain after 24-hour immersion.
 - 5. Ultra-Violet Degradation: Only slight color change, and negligible change in surface gloss and other physical properties after exposure to 500,000 Langleys.
 - 6. Fire-Resistance and Flammability: Provide Class A rated faces for door faces of interior doors and for interior face of exterior doors and panels.
 - 7. Product: SpecLite 3 FRP by Special Lite, or equivalent.
 - 8. Per 2015 IBC 2603.4.1.7 for non-rated swing doors with plastic foam cores- provide a thermal barrier of not less than 0.032" thick aluminum or steel with basic thickness of not less than 0.016" between the foam core and FRP skin; or complying with NFPA 275 - per IBC 2603.4.
- D. Core Material: Urethane foam of 5 pounds per cubic foot density for doors and panels.
- E. Fasteners: Aluminum or stainless steel materials warranted by manufacturer to be non-corrosive and compatible with aluminum components, hardware, anchors and other components.
- F. Brackets and Reinforcements: Manufacturer's high-strength aluminum extrusions. Provide manufacturer's standard reinforcement for each type of hardware required.
- G. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.
- H. Spacers, Setting Blocks, Gaskets, and Bond Breakers: Manufacturer's standard permanent, nonmigrating types in hardness recommended by manufacturer, compatible with sealants, and suitable for system performance requirements.
- I. Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint type.

- J. Sealants and joint fillers for joints at perimeter of entrance and storefront systems as specified in Division 07 Section "Joint Sealants."
- K. Glazing: 1" insulating glass units as specified in Division 08 Section "Glazing."

2.3 DOORS

- A. General: Provide manufacturer's standard flush and wide stile style doors as indicated on Drawings constructed of aluminum stiles and rails joined with steel tie rods, with polyester face sheets and foamed-in-place urethane inner core. Minimum thermal rating U-factor of 0.09.
 - 1. Basis of Design Product: Provide Sandstone FRP Flush Door Model SL-20 by Special Lite, or equivalent.
 - 2. Color shall be as selected by Architect.
- B. Provide extruded aluminum 2-7/16" tubular stiles designed to accept specified hardware and a minimum extruded aluminum 2-5/16" top and bottom rails with legs for interlocking rigidity weather bar. Minimum thickness of 1/16 inches at face and 1/8 inch at hinge and concealed vertical stiles.
 - 1. Meeting Stiles: Pile brush weatherseals. Extrude meeting stile to include integral pocket to accept pile brush weatherseals.
 - 2. Bottom of Door: Install bottom weather bar with nylon brush weatherstripping into extruded interlocking edge of bottom rail.
- C. Lock polyester face sheets in on all four sides by extruded interlocking edges which are integral part of stiles and rails. Snap in or applied door edge trim is not acceptable.
- D. Miter or mortise and tenon corner joints and mechanically fasten with reinforcing brackets that incorporate concealed minimum 3/8" galvanized steel tie-rods at top and bottom with aviation type nuts.
- E. Internally reinforce doors to receive specified hardware with .125 inch thick aluminum.
- F. Foam-in-place core after the door is completely assembled.
- G. Manufacture doors with cutouts for required vision lites. Provide screw-applied aluminum stops to match perimeter door rails.

2.4 FRAMES

- A. Standard Frame: Provide tubular extruded aluminum frame members, 2 by 4-1/2 inch in size unless otherwise indicated on drawings, with minimum 1/8 inch thick walls and closed back. Fabricate with mechanical joints using heavy inserted reinforcing plates and concealed tie-rods or j-bolts. Supply with 1/2 by 1-1/4 inch door stop, with heavy duty weathering pile included.

1. Provide Tube Frame with Applied Stops, Model SL-245, by Special Lite, or equivalent.
2. Finish: Clear anodized.

2.5 HARDWARE

- A. Hardware is specified in Section 087100.

2.6 FABRICATION

- A. Factory-prefit and premachine doors for all hardware and to fit frame opening sizes indicated with the following uniform clearances and bevels:
 1. Clearances: Not more than 1/8 inch at jambs and heads except between pairs of doors not more than 1/4 inch. Not more than 3/4 inch at bottom.
 2. Comply with final hardware schedules and door frame shop drawings and with hardware templates.
 3. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory premachining.
- B. Complete fabrication, assembly, installation of hardware, finishing and other work before shipment to project site. Disassemble components only as necessary for shipment and installation. Field stick framing is not acceptable.
- C. Factory install vision lites and panels.
- D. Install hinges and all other hardware, with the exception of any surface-applied hardware such as door closer and locksets or push/pull hardware, at the manufacturer's plant.
 1. Locate hardware as indicated on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware on Standard Steel Doors and Frames," published by Door and Hardware Institute.
- E. Separate dissimilar metals with zinc chromate primer, bituminous paint, or other separator to prevent corrosion.
- F. Maintain accurate relation of planes and angles, hairline fit contacting members.
- G. Conceal fasteners where possible provide countersunk flat or oval heads for exposed screws and bolts.

2.7 ALUMINUM FINISHES

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

components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

- C. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- D. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and supports, with the Installer present, for compliance with requirements indicated, installation tolerances, and other conditions that affect installation of polyester faced doors. Correct unsatisfactory conditions before proceeding with the installation.
- B. Examine door frames prior to hanging door:
 - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
 - 2. Reject doors with defects.
- C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions for protecting, handling, and installing FRP doors and aluminum framing systems. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints.
- B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install framing components plumb and true in alignment with established lines and grades without warp or rack of framing members.
- D. Install doors and frames plumb and true in alignment with established lines and grades without warp or rack. Lubricate operating hardware and other moving parts according to hardware manufacturers' written instructions.
 - 1. Install surface-mounted hardware according to manufacturer's written instructions using concealed fasteners to greatest extent possible.

2. Install frames with anchors appropriate for wall conditions to anchor framing to wall materials. A minimum of five anchors up to 7'- 4" on jamb members, and one additional anchor for each 12 inches over that height.
- E. Construction Tolerances: Install doors and frames to comply with the following tolerances:
1. Variation from Plane: Do not exceed 1/16 inch in 12 feet of length or 1/8 inch in any total length.
 2. Offset from Alignment: The maximum offset from true alignment between two identical members abutting end to end in line shall not exceed 1/16 inch.
 3. Diagonal Measurements: The maximum difference in diagonal measurements shall not exceed 1/8 inch.
 4. Offset at Corners: The maximum out-of-plane offset of framing at corners shall not exceed 1/32 inch.
- F. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
1. Zinc or cadmium plate steel anchors and other unexposed fasteners after fabrication.
 2. Paint dissimilar metals where drainage from them passes over aluminum.
 3. Paint aluminum surfaces in contact with mortar, concrete or other masonry with alkali resistant coating.
 4. Paint wood and similar absorptive material in contact with aluminum and exposed to the elements or otherwise subject to wetting, with two coats of aluminum house paint. Seal joints between the materials with sealant.
- G. Drill and tap frames and doors and apply surface-mounted hardware items. Comply with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible. Refer to Section 087100 for additional installation requirements.
- H. Install perimeter sealant to comply with requirements of Division 07 Section "Joint Sealants," unless otherwise indicated.
- 3.3 ADJUSTING, CLEANING AND PROTECTION
- A. Adjust operating hardware to function properly, for smooth operation without binding, and for weathertight closure.
 - B. Clean complete system, inside and out, promptly after installation, exercising care to avoid damage to coatings.
 - C. Institute protective measures required throughout remainder of construction period to ensure polyester faced doors will be without damage and deterioration, other than normal weathering, at time of acceptance.

END OF SECTION 082250

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wall access doors and frames for interior locations.
2. Fire-rated wall access doors and frames for interior locations
3. Ceiling access doors and frames for interior locations.
4. Fire-rated ceiling access doors and frames for interior locations.

B. Locations and Quantities of Access Doors: Not all access doors are shown on the Drawings. It is the intent of this section that access doors be provided wherever access is required for operation and maintenance of concealed equipment, dampers, valves, controls or similar devices.

C. Cylinders for access doors are specified in Division 08 Section "Door Hardware."

D. Related Requirements:

1. Division 07 Section "Roof Accessories" for roof hatches.
2. Division 23 Section "Air Duct Accessories" for heating and air-conditioning duct access doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

B. Shop Drawings:

1. Include plans, elevations, sections, details, and attachments to other work.
2. Detail fabrication and installation of access doors and frames for each type of substrate.

C. Samples: For each door face material, at least 3 by 5 inches (75 by 125 mm) in size, in specified finish.

D. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

1.3 COORDINATION

A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed equipment, and indicate on schedule specified in "Submittals" Article

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. NFPA 252 or UL 10B for fire-rated access door assemblies installed vertically.
2. NFPA 288 for fire-rated access door assemblies installed horizontally.

2.2 PRODUCTS, GENERAL

- A. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.

2.3 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Babcock-Davis.
2. J. L. Industries, Inc.; Div. of Activar Construction Products Group.
3. Karp Associates, Inc.
4. Larsen's Manufacturing Company.
5. Milcor Inc.
6. Nystrom, Inc.

- B. Flush Access Doors, with Exposed Trim, for CMU Surfaces: Units consisting of frame with exposed trim, door, hardware, and complying with the following requirements

1. Basis-of-Design Product: Karp Model DSC-214M, Universal Flush Access Door.
2. Assembly Description: Fabricate door to fit flush to frame. Provide flange integral with frame, 3/4 inch (19 mm) wide, overlapping surrounding finished surface.
3. Locations: Provide at non-rated concrete block walls.
4. Uncoated Steel Sheet for Door: Nominal 0.074 inch (1.9 mm), 14 gage.
 - a. Finish: Factory prime.
5. Stainless-Steel Sheet for Door for Toilet Rooms, Shower Rooms, and Other Wet Areas: Nominal 0.074 inch (1.9 mm), 14 gage; No. 4 finish.
6. Frame Material: Nominal 0.060 inch (1.52 mm), 16 gage
7. Hinges: Concealed continuous piano hinge.
8. Latches: Self-latching key-operated bolt type, with interior release; for locking.

- C. Trimless, Flush Access Doors for Gypsum Board Surfaces: Units consisting of frame, concealed edge trim, door, hardware, and complying with the following requirements:

1. Basis-of-Design Product: Karp KDW for drywall
 2. Assembly Description: Fabricate door to fit flush to frame. Provide frame with gypsum board beads for concealed flange installation.
 3. Locations: Provide at non-rated gypsum board walls and ceilings.
 4. Uncoated Steel Sheet for Door: Nominal 0.074 inch (1.9 mm), 14 gage.
 - a. Finish: Factory prime.
 5. Stainless-Steel Sheet for Door for Toilet Rooms, Shower Rooms, and Other Wet Areas: Nominal 0.074 inch (1.9 mm), 14 gage; No. 4 finish.
 6. Frame Material: Nominal 0.060 inch (1.52 mm), 16 gage.
 7. Hinges: Concealed continuous piano hinge.
 8. Latches: Self-latching key-operated bolt type, with interior release; for locking.
- D. Recessed Doors for Acoustical Ceiling Tiles: Units consisting of frame with no exposed trim, recessed door to receive tile, hardware, and complying with the following requirements.
1. Basis-of-Design Product: Karp, Model DSC-210, Recessed Acoustical Ceiling Tile Access Doors.
 2. Locations: Provide at non-rated acoustical ceilings tiles.
 3. Uncoated Steel Sheet for Door: Nominal 0.060 inch (1.52 mm), 16 gage thick steel sheet; recessed 1-inch (25.4 mm).
 - a. Finish: Factory prime.
 4. Stainless-Steel Sheet for Door for Toilet Rooms, Shower Rooms, and Other Wet Areas: Nominal 0.060 inch (1.52 mm), 16 gage; No. 4 finish.
 5. Frame Material: Nominal 0.074 inch (1.9 mm), 14 gage.
 6. Hinges: Concealed, pivoting-rod type.
 7. Latches: Self-latching key-operated bolt type, with interior release; for locking.
- E. Insulated, Fire-Rated Access Doors for Drywall Walls and Ceilings: Units consisting of frame with gypsum board bead concealed edge trim, self-latching insulated door, and hardware, and complying with the following requirements:
1. Basis-of-Design Product: Karp, Model KRP-350FR, Insulated Fire Rated Access Door, with Drywall Bead, for Walls and Ceilings.
 2. Assembly Description: Fabricate door to fit flush to frame, with a core of mineral-fiber insulation enclosed in sheet metal. Provide self-latching door with automatic closer and interior latch release.
 3. Locations: Provide at rated gypsum board walls and ceilings.
 4. Fire-Resistance Ratings:
 - a. Walls: 1-1/2 hours.
 - b. Ceilings: 3 hours.
 5. Uncoated Steel Sheet for Door: 20 ga., 0.0359-inch- (0.91-mm-) thick steel sheet, welded pan type, filled with 2-inch (50 mm) thick fire-rated mineral-fiber insulation.
 - a. Finish: Factory prime.
 6. Stainless-Steel Sheet for Door for Toilet Rooms, Shower Rooms, and Other Wet Areas: Same gage and style as steel door; with No. 4 finish.

7. Frame Material: 16 ga., 0.0598-inch- (1.52-mm-) thick steel sheet, 1-inch (25.4 mm) wide, surrounded by galvanized drywall bead.
 8. Hinges: Concealed continuous piano hinge.
 9. Hardware: Self-latching key-operated bolt type, with interior release; for locking.
- F. Insulated, Fire-Rated Access Doors for CMU Walls: Units consisting of frame with exposed edge trim, self-latching insulated door, and hardware, and complying with the following requirements:
1. Basis-of-Design Product: Karp, Model KRP-150FR, Insulated Fire Rated Access Door, with Exposed Flange, for Walls and Ceilings.
 2. Assembly Description: Fabricate door to fit flush to frame, with a core of mineral-fiber insulation enclosed in sheet metal. Provide flange integral with frame, 1 inch (25 mm) wide, overlapping surrounding finished surface. Provide self-latching door with automatic closer and interior latch release.
 3. Locations: Provide at rated concrete block walls.
 4. Fire-Resistance Ratings:
 - a. Walls: 1-1/2 hours.
 5. Uncoated Steel Sheet for Door: 20 ga., 0.0359-inch- (0.91-mm-) thick steel sheet, welded pan type, filled with 2-inch (50 mm) thick fire-rated mineral-fiber insulation.
 - a. Finish: Factory prime.
 6. Stainless-Steel Sheet for Door for Toilet Rooms, Shower Rooms, and Other Wet Areas: Same gage and style as steel door; with No. 4 finish.
 7. Frame Material: 16 ga., 0.0598-inch- (1.52-mm-) thick steel sheet, 1-inch (25.4 mm) wide exposed trim.
 8. Hinges: Concealed continuous piano hinge.
 9. Hardware: Self-latching key-operated bolt type, with interior release; for locking.
- G. Hardware:
1. Lock: Cylinder, keyed alike for project
 2. Lock for Fire Rated Access Doors: Rim cylinder.
 - a. Lock Preparation: Prepare door panel to accept cylinder specified in Section 087100 "Door Hardware."

2.4 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

- D. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304. Remove tool and die marks and stretch lines or blend into finish.
- E. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
- F. Aluminum Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.
- G. Frame Anchors: Same type as door face.
- H. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.5 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.
 - 1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
 - 2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded metal lath and exposed casing bead welded to perimeter of frames.
 - 3. Provide mounting holes in frames for attachment of units to metal or wood framing.
 - 4. Provide mounting holes in frame for attachment of masonry anchors.
- D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.
- E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
 - 1. Non-Rated Doors: For cylinder locks, furnish two keys per lock and key all locks alike.
 - 2. Fire-Rated Doors: Cylinder and keys are specified in Section 087100 "Door Hardware."

2.6 FINISHES

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

- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Steel and Metallic-Coated-Steel Finishes:
 - 1. Factory Prime: Apply manufacturer's standard, VOC-free, electrostatic-applied powder coat finish immediately after surface preparation and pretreatment.
- E. Stainless-Steel Finishes:
 - 1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
 - 2. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - a. Run grain of directional finishes with long dimension of each piece.
 - b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
 - c. Directional Satin Finish: No. 4.
- F. Aluminum Finishes:
 - 1. Mill finish and factory primed, as specified.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
- C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

SECTION 083326 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following types of overhead coiling doors:
 - 1. Insulated service doors, motor operated.
- B. Related Sections include the following:
 - 1. Division 26 Sections for disconnect switches and circuit breakers for powered operators.

1.2 DEFINITIONS

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

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide overhead coiling doors capable of withstanding the effects of gravity loads and stresses without evidencing permanent deformation of door components.
 - 1. Exterior Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft. (960 Pa), acting inward and outward.
- B. Operation-Cycle Requirements: Design overhead coiling door components and operator to operate for not less than 100,000 cycles.
- C. Air Infiltration Performance: Provide overhead coiling doors with maximum air infiltration rate of 1.0 CFM/SQ FT when tested in accordance with NFRC 400 or with ASTM E283 at 1.57psf.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type and size of overhead coiling door and accessory. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes. Provide roughing-in diagrams, operating instructions, and maintenance information. Include the following:
 - 1. Setting drawings, templates, and installation instructions for built-in or embedded anchor devices.
 - 2. Summary of forces and loads on walls and jambs.

3. Motors: Show nameplate data and ratings; characteristics; mounting arrangements; size and location of winding termination lugs, conduit entry, and grounding lug; and coatings.
 - B. Shop Drawings: For special components and installations not dimensioned or detailed in manufacturer's data sheets.
 1. Wiring Diagrams: Detail wiring for power, signal, and control systems. Differentiate between manufacturer-installed and field-installed wiring and between components provided by door manufacturer and those provided by others.
 - C. Samples for Initial Selection: Manufacturer's color charts showing full range of colors available for units with factory-applied finishes
- 1.5 INFORMATIONAL SUBMITTALS
- A. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- 1.6 QUALITY ASSURANCE
- A. Installer Qualifications: Engage an experienced installer who is an authorized representative of the overhead coiling door manufacturer for both installation and maintenance of units required for this Project.
 - B. Source Limitations: Obtain overhead coiling doors through one source from a single manufacturer.
 1. Obtain operators and controls from the overhead coiling door manufacturer.
 - C. Listing and Labeling: Provide electrically operated fixtures specified in this Section that are listed and labeled.
 1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.
- 1.7 WARRANTY
- A. Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, for the following period:
 1. Door Assemblies: Two years.
 2. Motors: One year

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Products: Provide specified products of Cornell Iron Works Inc. or equal from one of the following manufacturers:
1. The Cookson Company.
 2. Raynor Garage Doors
 3. Pacific Rolling Door Co.
 4. Overhead Door Corporation.
 5. Wayne-Dalton Corp.
 6. Windsor Door; A United Dominion Company.

2.2 DOOR CURTAIN MATERIALS AND CONSTRUCTION

- A. Basis of Design Product: Thermiser Insulated Rolling Door Model ESD20 by Cornell in aluminum, or equal.
- B. Door Curtain: Fabricate overhead coiling door curtain of interlocking slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of material thickness recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
1. Aluminum Door Curtain Slats: Double skin interlocking roll formed interior and exterior metal slats with foamed-in-place insulation between slats.
 - a. Profile: Manufacturer's standard flat-profile slats
 - b. Thickness: Minimum .050".
 - c. Insulation: 7/8" thick closed cell pressure foamed in place urethane insulation, Min R value of 8. Foam shall meet the following criteria:
 - 1) Flame Spread Index of 0
 - 2) Smoke Developed Index of 10 as tested per ASTM E84
 - 3) CFC-free process with an Ozone Depletion Potential rating of 0
 - 4) Meets foam plastic insulation requirements of the 2012 IBC®, section 2603.
 - d. Finish: Three-Coat PVDF.
 2. Vision Panels: 10" x 1-1/2" clear panels, spaced 6" apart, in number and location as indicated on Drawings..
- C. Service Door Windlocks and Endlocks: Malleable-iron castings galvanized after fabrication, secured to curtain slats with galvanized rivets, or high-strength nylon. Provide locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement
- D. Service Door Bottom Bar: Consisting of 2 angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch (38 by 38 by 3 mm) thick, either galvanized or stainless-steel extrusions to suit type of curtain slats.
- E. Service Door Curtain Jamb Guides: Fabricate curtain jamb guides of steel angles, or channels and angles, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Build up units with not less than 3/16-inch-

(5-mm-) thick, galvanized steel sections complying with ASTM A 36 (ASTM A 36M), and ASTM A 123. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain and a continuous bar for holding windlocks.

2.3 HOODS AND ACCESSORIES

- A. Hood: Form to entirely enclose coiled curtain and operating mechanism at opening head. Contour to suit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Provide closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sag.
- B. Weatherseals: Provide replaceable, adjustable, continuous, compressible weather-stripping gaskets fitted to bottom and top of doors, unless otherwise indicated. At door head, use 1/8-inch- (3-mm-) thick, replaceable, continuous sheet secured to inside of hood.
 - 1. In addition, provide replaceable, adjustable, continuous, flexible, 1/8-inch- (3-mm-) thick seals of flexible vinyl, rubber, or neoprene at door jambs for a weathertight installation.
- C. Fabricate locking device assembly with lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bar to engage through slots in tracks.
 - 1. Locking Bars: Single-jamb side, operable from inside only.
 - 2. Provide lock cylinder to match cylinders and keying of building as specified in Division 08 Section "Door Hardware."

2.4 COUNTERBALANCING MECHANISM

- A. General: Counterbalance doors by means of adjustable-tension steel helical torsion spring, mounted around a steel shaft and contained in a spring barrel connected to door curtain with required barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of hot-formed, structural-quality, welded or seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. (2.5 mm/m) of span under full load.
- C. Provide spring balance of one or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast-steel barrel plugs to secure ends of springs to barrel and shaft.
- D. Fabricate torsion rod for counterbalance shaft of cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

- E. Brackets: Provide mounting brackets of manufacturer's standard design, either cast-iron or cold-rolled steel plate with bell-mouth guide groove for curtain.

2.5 MOTOR DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
 - 1. Comply with NFPA 70.
 - 2. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24 V, ac or dc.
 - 3. Cycle Requirements: Maximum 20 times per day.
- B. Disconnect Device: Provide hand-operated disconnect or mechanism for automatically engaging chain and sprocket operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- C. Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency auxiliary operator.
- D. Motor-Operator Type: Provide wall-, hood-, or bracket-mounted, jackshaft-type door operator unit consisting of electric motor, enclosed lubricated gear drive, and chain and sprocket secondary drive.
- E. Electric Motors: Provide high-starting torque, reversible, continuous-duty, Class A insulated, electric motors complying with NEMA MG 1; with overload protection; sized to start, accelerate, and operate door in either direction from any position, at not less than 6 in/sec (15 cm/s) and not more than 9 in/sec (23 cm/s), without exceeding nameplate ratings or service factor.
 - 1. Electrical Characteristics: Polyphase, 120V, 60Hz. Coordinate wiring requirements and electrical characteristics of motors with building electrical system.
 - 2. Provide motor rating (hp) as recommended by manufacturer for size and type of door.
- F. Limit Switches: Provide adjustable switches, interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- G. Remote-Control Station: Provide momentary-contact, three-button control station with push-button controls labeled "Open," "Close," and "Stop."
 - 1. Interior units, full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.

- H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation by use of disconnect cable for auxiliary push-up operation.
- I. Obstruction Detection Device: Provide each motorized door with indicated external automatic safety sensor capable of protecting full width of door opening. Activation of sensor immediately stops and reverses downward door travel.
 - 1. Sensor Edge: Provide each motorized door with an automatic safety sensor edge, located within astragal mounted to bottom bar. Contact with sensor immediately stops and reverses downward door travel. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.
 - a. Provide electrically actuated automatic bottom bar.

2.6 FINISHES, GENERAL

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

2.7 ALUMINUM FINISHES

- A. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- B. Superior-Performance Organic Finish, Three-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat.
 - 1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Color and Gloss: As selected by Architect from industry custom or standard full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.

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

3.2 INSTALLATION

- A. General: Install door and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports according to Shop Drawings, manufacturer's written instructions, and as specified.
- B. Install overhead coiling doors, hoods, and operators at the mounting locations indicated for each door.
- C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

3.3 ADJUSTING

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

3.4 DEMONSTRATION

- A. Startup Services: Engage a factory-authorized service representative to perform startup services and to train Owner's maintenance personnel as specified below:
 - 1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 2. Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, preventive maintenance, and procedures for testing and resetting release devices.
 - 3. Schedule training with Owner with at least 7 days' advance notice.

END OF SECTION 083326

SECTION 083450 - ELEVATOR DOOR SMOKE CONTAINMENT SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes smoke detector activated elevator door smoke containment curtain and control system designed to provide a tight- fitting, smoke- and draft- control assembly.
- B. Related Sections include the following:
 - 1. Division 14 Section "Hydraulic Elevators" for coordination with the door opening.
 - 2. Division 26 Electrical Sections for 120v and control circuit power including conduit, boxes, conductors, wiring devices, and emergency power.
- C. Products Supplied but Not Installed under this Section:
 - 1. 10K ohm Resistor.

1.2 PERFORMANCE REQUIREMENTS

- A. Air Leakage: Less than 3 cfm (0.001416 cm/s) per sf of door opening at 0.1 in. (25 Pa) water pressure differential at ambient temperature and 400 deg. F (204 deg. C) tested per IBC 714.2.3

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include door width and height, jamb width, jamb and head projection, curtain width, mounting height, housing width, and motor locations. Show and identify related work performed under other Sections of these Specifications.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Product Certificates: For each elevator door smoke containment system, signed by product manufacturer.
- E. Qualification Data: For Manufacturer and Installer.
- F. Product Test Reports: Based on evaluation of manufacturer's tests performed by a qualified testing agency, for each elevator door smoke containment system.
- G. Maintenance Data: For elevator door smoke containment systems to include in operation and maintenance manuals.

- H. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Standards: Manufacturer shall maintain a quality control program in accordance with ICBO-ES Acceptance Criteria AC 77.
- B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of systems for this Project.
- C. Manufacturer's Qualifications: Minimum five (5) years experience in producing smoke containment systems of the type specified.
- D. Source Limitations: Obtain all components of elevator door smoke containment system, including operators and controls, through one source from a single manufacturer.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100.
- F. Certifications:
 - 1. Manufacturer's ICBO Evaluation Report.
 - 2. Testing Laboratory Label.
 - 3. UL Listing.

1.5 WARRANTY

- A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of elevator door smoke containment systems that fail in materials or workmanship within specified warranty period.
 - 1. Failure include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Faulty operation of operators and hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal use.
 - 2. Warranty Period: One (1) year from date of Substantial Completion.

1.6 OWNER'S INSTRUCTIONS

- A. Maintenance and Testing:
 - 1. Perform minimum semi-annual maintenance and testing on each smoke containment system as required by the manufacturer's warranty, code agency evaluation reports, and as required by local authority having jurisdiction.
 - 2. Backup Battery: Test semi-annually and replace every three (3) years.
 - 3. Retain permanent record of tests.

- B. Required Replacement: Smoke containment screen requires replacement following exposure to temperatures exceeding 200 degrees F (93 degrees C).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: The design for the elevator door smoke containment systems is based on Model 600 manufactured by Smoke Guard Corporation. Subject to compliance with requirements, provide the named product or an approved equivalent product.

2.2 COMPONENTS

- A. Curtain:
 - 1. Film: Minimum 1 mil (0.025 mm) thick transparent polyamide film reinforced with 100 denier nomex yarn at 0.25 in. (6.35 mm) each way.
 - 2. Magnetic Strips: Flexible multi-pole strips attached to longitudinal edges of film with low modulus silicone adhesive.
- B. Housing: 20-gage stainless steel container and door with concealed hinges, and latch.
- C. Auxiliary Rails:
 - 1. Material: 16-gage, ASTM A 240/240M, Type 430, ferritic stainless steel.
 - 2. Size: 2-inch (50 mm) wide by depth required to project beyond face of elevator door frame, unless otherwise indicated.
- D. Rewind Motor: Top mount, NFPA 70, 12v DC.
- E. Release Mechanism: Comply with UL Standard No. 508 or 864.
- F. Control Station: Metal box with battery backup, power disconnect with integral circuit breaker, step down power transformer (120v AC to 12v DC), and controller circuit board.
 - 1. Emergency Power Supply: 12v DC battery with charger.
- G. Wall Switch: Provide switch to rewind curtain into housing, system status indicators, keyed curtain deployment switch, and keyed to silence function.
 - 1. Color: Selected by Architect from manufacturer's full range of colors.

2.3 IDENTIFICATION

- A. Label each smoke containment system with following information:

1. Manufacturer's name.
2. Maximum leakage rating at specified pressure and temperature conditions.
3. Label of quality control agency.

2.4 STAINLESS STEEL FINISHES

- A. General: Remove or blend stretch lines and tool and die marks into finish.
 1. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
- B. Satin Finish: No. 4.
- C. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, supports, and other conditions affecting performance of elevator door smoke containment systems.
 1. Verify related work performed under other Sections is complete and in accordance with approved Shop Drawings.
 2. Verify wall surfaces and elevator door frames are acceptable for installation of smoke containment system components.
 3. If applicable, verify existing field painted elevator door frames to be used for curtain adherence have been repainted in accordance with smoke containment system manufacturer's instructions or they have the original factory paint.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Do not install damaged components.
- B. Install smoke containment system components plumb, rigid, properly aligned, and securely fastened in place; comply with manufacturer's installation instructions, Contract Drawings, and approved Shop Drawings..

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent inspecting agency to perform field tests and inspections and prepare test reports. Follow manufacturer's cycle test procedures.
 1. Notify Owner's Representative, local Fire Marshal, alarm sub-contractor and

- elevator service company minimum one (1) week in advance of scheduled testing.
- 2. Complete maintenance service record.

- B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and adjust operating hardware items just before final inspection. Leave work in complete and proper operating condition.
- B. Remove and replace defective work, including defective or damaged curtains, housings, rails, bases, and frames that are warped, bowed, or otherwise unacceptable.
- C. Clean all surfaces promptly after installation. Remove excess sealant compounds, dirt, and other substances. Repair damaged finish to match original finish.

3.5 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - a. Test elevator door smoke containment system closing mechanism activated by detector or alarm-connected fire-release system. Reset elevator door smoke containment system closing mechanism after successful test.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain elevator door smoke containment systems.

END OF SECTION 083450

SECTION 084126 - ALL-GLASS ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Interior all-glass entrance systems with doors.
2. Interior all-glass storefront systems.

B. Related Sections include the following:

1. Division 07 Section "Joint Sealants" for joint sealants installed at interface of all-glass systems and other building components.
2. Division 08 Section "Door Hardware" for surface-applied hardware not part of door package.

1.2 PERFORMANCE REQUIREMENTS

A. Provide systems, including anchorage, capable of withstanding loads indicated without structural failure, deflection exceeding specified limit, support components transferring stresses to glazing, and glazing-to-glazing or glazing-to-support contact as determined by structural analysis.

1. Wind Loads: Resist wind positive and negative pressures calculated according to International Building Code and NYS Building Code:
 - a. Interior Wind Loads: 5 psf
2. Deflection Normal to Glazing Plane: Limited to 1/175 of clear span or 3/4 inch (19 mm), whichever is smaller.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details, including the following:

1. Plans, elevations, and sections.
2. Details of fittings and glazing.
3. Hardware quantities, locations, and installation requirements.
4. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

- C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
 - 1. Metal Finishes: 6-inch- (150-mm-) long sections of patch fittings, rails, and other items.
 - 2. Glass: 6 inches (150 mm) square, showing exposed-edge finish.
- D. Qualification Data: For professional engineer.

1.4 QUALITY ASSURANCE

- A. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in State of New York and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of all-glass entrances and storefronts that are similar to those indicated for this Project in material, design, and extent

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with all-glass systems by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating all-glass systems without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of all-glass systems that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Structural failures.
 - 2. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 3. Failure of operating components to function normally.
- B. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Vetro System by Metrowall or equal by one of the following:

1. CR Laurence Co., Inc.
2. DORMA.
3. Forms+Surfaces.

2.2 MATERIALS

- A. Glass: Clear tempered glazing, as specified in Section 088000.
1. Thickness: 1/2"
 2. Glazing Gaskets: Black
- B. Aluminum: ASTM B221 (ASTM B221M), Alloy 6063, T5 Temper.

2.3 COMPONENTS

- A. Glazed Interior Entrances and Storefront Framing: Extruded aluminum mullions with integrated seal and hi-bond tape.
1. Frame Profile Height: 1-3/4"
 2. Frame Profile Width: 2-1/2"
 3. Material: Aluminum
 4. Finish: Black anodized or painted matte black
 5. Glazing: Clear tempered glazing, as scheduled in Section 088000.
- B. Door Frames: Aluminum extrusions with integral glass seals
1. Extruded aluminum channel to receive snap-on doorjamb & face trim, factory prepared to receive specified hinges & strike plates (1 3/4" face x 2 5/8" wide).
 2. Steel connection plate for attachment to top & bottom channels.
 3. Extruded aluminum wall starter channel for attachment at wall locations.
 4. Extruded aluminum snap on jamb & header with integral brush seals.
 5. Extruded aluminum snap on face trim channels.
- C. Wall Trim Channel
1. Extruded aluminum channel to receive snap-on face trim with integral seals for glass & light & sound seal at wall (1 3/4" face x 2 5/8" wide).
 2. Extruded aluminum snap on face trim channels.
- D. Horizontal Mullion: Extruded aluminum mullion (7/8" face dimension) adhered to glass with high bond tape.
- E. Doors: Wide stile swinging glass doors.
1. Full Length Top Rail: 5"
 2. Full Length Bottom Rail: 10"
 3. Full Length Side Rails: 5".
 4. Material: Aluminum
 5. Finish: Black anodized or painted matte black.

F. Glass Joints

1. Extruded aluminum mullion.
2. Micro shim glass as required for proper alignment.

2.4 HARDWARE

- A. General: Heavy-duty hardware units in sizes, quantities, and types recommended by manufacturer for all-glass entrances indicated. For exposed parts, match fitting metal and finish.
- B. Refer to Section 087100 for door hardware required.

2.5 FABRICATION

- A. Provide holes and cutouts in glass to receive hardware, fittings, rails, and accessories.
- B. Factory assemble components and factory install hardware to greatest extent possible.

2.6 ALUMINUM FINISH

- A. Colored Anodic Finish: AAMA 611, Class II, 0.4 mills, or thicker.
 1. Color: Black.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install all-glass systems and associated components according to manufacturer's written instructions.
- B. Set units level and plumb.
- C. Maintain uniform clearances between adjacent components.
- D. Lubricate hardware and other moving parts according to manufacturer's written instructions.

3.3 ADJUSTING AND CLEANING

- A. Adjust doors and hardware to produce smooth operation and tight fit at contact points.
- B. Remove excess sealant and glazing compounds and dirt from surfaces.

END OF SECTION 084126

SECTION 084229 - SLIDING AUTOMATIC ENTRANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Interior bi-parting, power-operated automatic entrance door assemblies, including sidelights.
- B. Related Sections include the following:
 - 1. Division 08 Section "Door Hardware" for hardware to the extent not specified in this Section.
 - 2. Division 08 Section "Glazing" for materials and installation requirements of glazing for automatic entrance doors.

1.2 DEFINITIONS

- A. Activation Device: Device that, when actuated, sends an electrical signal to the door operator to open the door.
- B. Safety Device: Device that prevents a door from opening or closing.

1.3 PERFORMANCE REQUIREMENTS

- A. Opening-Force Requirements:
 - 1. Power-Operated Doors: Not more than 50 lbf required to manually set door in motion if power fails.
 - 2. Breakaway Device for Power-Operated Doors: Not more than 50 lbf required for a breakaway door or panel to open.
- B. Entrapment-Prevention Force:
 - 1. Power-Operated Sliding Doors: Not more than 30 lbf required to prevent stopped door from closing.
- C. Operating Temperature Range: Automatic entrances shall operate within minus 30 to plus 130 deg F.

1.4 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for automatic entrance doors.

- B. Shop Drawings: Include plans, elevations, sections, details, hardware mounting heights, and attachments to other work.
 - 1. Wiring Diagrams: Power, signal, and control wiring.
- C. Samples for Verification: For each type of exposed finish required, prepared on minimum 6" x 6" aluminum substrate.
- D. Schedule: Provide a schedule of automatic entrances prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of emergency-exit automatic entrance door, signed by product manufacturer.
- B. Qualification Data: For Installer, Inspector, and manufacturer.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for automatic entrance door assemblies.
- D. Maintenance Data: For door operators and control systems to include in maintenance manuals.
- E. Warranties: Special warranties specified in this Section.
- F. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation and maintenance of units required for this Project and who employs a Certified Inspector.
 - 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
- B. Manufacturer Qualifications: A manufacturer with company certificate issued by AAADM indicating that manufacturer has a Certified Inspector on staff.
- C. Certified Inspector Qualifications: Certified by AAADM.
- D. Source Limitations: Obtain automatic entrance door assemblies and sidelights through one source from a single manufacturer.
- E. Product Options: Drawings indicate sizes, profiles, and dimensional requirements of automatic entrance door assemblies and are based on the specific system indicated. Refer to Division 01 Section "Product 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.
 - F. Welding: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code--Aluminum."
 - G. Power-Operated Door Standard: BHMA A156.10.
 - H. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - I. Emergency-Exit Door Requirements: Comply with requirements of Building Code of NY State and authorities having jurisdiction for automatic entrance doors serving as a required means of egress.
 - J. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
- 1.7 PROJECT CONDITIONS
- A. Field Measurements: Verify openings to receive automatic entrance door assemblies by field measurements before fabrication and indicate measurements on Shop Drawings.
 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating automatic entrance door assemblies without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions..
- 1.8 COORDINATION
- A. Templates: Obtain and distribute, to the parties involved, templates for doors, frames, and other work specified to be factory prepared for installing automatic entrance doors. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing automatic entrance doors to comply with indicated requirements.
 - B. Electrical System Roughing-in: Coordinate layout and installation of automatic entrance door assemblies with connections to power supplies.
 - C. Coordinate anchorage installation for automatic entrances. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.
- 1.9 WARRANTY

- A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of automatic entrance door assemblies that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Faulty operation of operators, controls, and hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal use.
 - 2. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Provide Dura-Glide 2000 by Stanley Access Technologies, LLC; Division of Stanley Security Solutions or equal by one of the following:
 - 1. Besam Entrance Solutions; ASSA ABLOY
 - 2. DORMA Automatics; Div. of DORMA Group North America.
 - 3. Nabco Entrances Inc.
 - 4. Horton Automatics

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
 - 2. Sheet and Plate: ASTM B 209 (ASTM B 209M).
 - 3. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.
- B. Sealants and Joint Fillers: Refer to Division 7 Section "Joint Sealants."
- C. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout; complying with ASTM C 1107; of consistency suitable for application.
- D. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos; formulated for 30-mil (0.76-mm) thickness per coat.

2.3 AUTOMATIC ENTRANCE DOOR ASSEMBLIES

- A. General: Provide manufacturer's standard automatic entrance door assemblies including doors, sidelites, framing, headers, carrier assemblies, roller tracks, door operators, activation and safety devices, and accessories required for a complete installation.

B. Sliding Automatic Entrance Doors:

1. Configuration: Biparting-sliding doors, with two sliding leaves and sidelites on each side.
 - a. Traffic Pattern: Two way.
 - b. Emergency Breakaway Capability: Doors only.
 - c. Mounting: Between jambs.
2. Activation Device: Motion detector mounted on each side of door header to detect pedestrians in activating zone and to open door.
3. Safety Devices: Presence detector mounted at threshold level to detect pedestrians in presence zone and to prevent door from closing.
4. Finish: Finish framing, door(s) , sidelite(s), and header with two or three coat PVDF paint in color selected by Architect.

2.4 COMPONENTS

- A. Framing and Transom Members: Manufacturer's standard extruded aluminum, minimum 0.125 inch thick and reinforced as required to support imposed loads.
1. Nominal Size: 1-3/4 by 4-1/2 inches.
 2. Extruded Glazing Stops and Applied Trim: Minimum 0.062-inch wall thickness.
- B. Stile and Rail Doors: Manufacturer's standard 1-3/4-inch- thick glazed doors with minimum 0.125-inch- thick, extruded-aluminum tubular stile and rail members. Mechanically fasten corners with reinforcing brackets that are welded, or incorporate concealed tie-rods that span full length of top and bottom rails.
1. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
 2. Stile Design: Narrow stile; 2-inch nominal width.
 3. Bottom Rail Design: 10 inch nominal height
- C. Sidelites: Manufacturer's standard 1-3/4-inch- (45-mm-) deep sidelites with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular stile and rail members matching door design.
1. Glazing Stops and Gaskets: Same materials and design as for stile and rail door.
 2. Muntin Bars: Horizontal tubular rail members for each sidelite; match stile design.
- D. Glazing: 1/4" tempered insulating glass, as specified in Division 08 Section "Glazing."
- E. Headers: Fabricated from minimum 0.125-inch- (3.2-mm-) thick extruded aluminum and extending full width of automatic entrance door units to conceal door operators, carrier assemblies, and roller tracks. Provide hinged or removable access panels for service and adjustment of door operators and controls. Secure panels to prevent unauthorized access.
1. Mounting: Concealed, with one side of header flush with framing.

2. Capacity: Capable of supporting doors up to 220 lb per leaf over spans up to 14 feet without intermediate supports.
- F. Carrier Assemblies and Overhead Roller Tracks: Manufacturer's standard carrier assembly that allows vertical adjustment of at least 1/8 inch; consisting of urethane with precision steel lubricated ball-bearing wheels operating on a continuous roller track. Support panels from carrier assembly by load wheels and anti-riser wheels with factory adjusted cantilever and pivot assembly. Minimum two ball-bearing load wheels and two anti-rise rollers for each active leaf. Minimum load wheel diameter shall be 2 1/2 inch; minimum anti-rise roller diameter shall be 2 inch.
- G. Threshold: None required.
- H. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- I. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials,
- J. Signage: As required by cited BHMA standard.
 1. Application Process: Door manufacturer's standard process.
 2. Provide sign materials with instructions for field application after glazing is installed.

2.5 DOOR OPERATORS AND CONTROLS

- A. General: Provide operators and controls, which include activation and safety devices, according to BHMA standards, for condition of exposure, and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated.
- B. Electromechanical Operators: Self-contained overhead unit powered by a minimum of 1/4 horsepower, permanent-magnet DC motor with gear reduction drive, microprocessor controller; and encoder.
 1. Operation: Power opening and power closing.
 2. Features:
 - a. Adjustable opening and closing speeds.
 - b. Adjustable open check and close check speeds.
 - c. Adjustable hold-open time between 0 and 30 seconds.
 - d. Obstruction recycle.
 - e. On/Off switch to control electric power to operator.
 - f. Energy conservation switch that reduces door-opening width.
 - g. Closed loop speed control with active braking and acceleration.
 - h. Adjustable obstruction recycle time delay.
 - i. Self-adjusting stop position.
 - j. Self-adjusting closing compression force
 - k. Onboard sensor power supply.
 - l. Onboard sensor monitoring.
 - m. Optional Switch to open/Switch to close operation.

- n. Fire alarm interface, configurable to safely open or close the entrance on signal from fire alarm system.
- 3. Mounting: Concealed.
- 4. Drive System: Synchronous belt type
- C. Electrical Requirements: 120 VAC, 50/60 cycle, single phase with dedicated 5 amp circuit per operator.
- D. Electrical Control System: Electrical control system shall include a microprocessor controller and a high-resolution position encoder. The encoder shall monitor revolutions of the operator shaft and send signals to microprocessor controller to define door position and speed.
 - 1. The high-resolution encoder shall have a resolution of not less than 1024 counts per revolution. Systems utilizing external magnets and magnetic switches are not acceptable.
 - 2. Electrical control system shall include a 24 VDC auxiliary output rated at 1 amp.
- E. Performance Data: The microprocessor shall collect, and store performance data as follows:
 - 1. Counter: A non-resettable counter to track operating cycles.
 - 2. Event Reporting: Unit shall include non-volatile event and error recording including number of occurrences of events and errors, and cycle count of most recent events and errors.
 - 3. LED Display: Display presenting the current operating state of the controller.
- F. Controller Protection: The microprocessor controller shall incorporate the following features to ensure trouble free operation:
 - 1. Automatic reset upon power up.
 - 2. Main fuse protection.
 - 3. Electronic surge protection.
 - 4. Internal power supply protection.
 - 5. Resettable sensor supply fuse protection.
 - 6. Motor protection, over-current protection.
- G. Soft Start/Stop: A "soft-start" "soft-stop" motor driving circuit shall be provided for smooth normal opening and recycling.
- H. Obstruction Recycle: Provide system to recycle the sliding panels when an obstruction is encountered during the closing cycle. If an obstruction is detected, the system shall search for that object on the next closing cycle by reducing door closing speed prior to the previously encountered obstruction location, and will continue to close in check speed until doors are fully closed, at which time the doors will reset to normal speed. If obstruction is encountered again, the door will come to a full stop. The doors shall remain stopped until obstruction is removed and operate signal is given, resetting the door to normal operation.

- I. Programmable Controller: Microprocessor controller shall be field programmable.
 - 1. The following parameters may be adjusted:
 - a. Operating speeds and forces as required to meet specified ANSI/BHMA standard.
 - b. Adjustable and variable features specified.
 - c. Reduced opening position.
 - 2. Manual programming shall be available through local interface which has a two-digit display with a selection control including three push buttons.
- J. Combined Activation and Safety Sensors: Combined activation and safety sensors shall, in a single housing, detect motion and presence in accordance with ANSI/BHMA A156.10. Motion shall be detected using K-band microwave technology, presence by active infrared reflection technology.
 - 1. Mounting Height: Up to 11.5 feet above finish floor
 - 2. Temperature Range: Between -31°F and 131°F in all environmental conditions
 - 3. Relays: Form C, 50V at 0.3A for both activation and safety. Hold time of less than 0.5 seconds.
 - 4. Detection Pattern: When detection is made in the activation zone, and the entrance opens, the safety zone shall extend through the threshold on each side; creating an X-pattern. When activation and safety zones are cleared and the entrance closes the sensor will ignore the X-pattern safety zones.
 - 5. Combined motion and presence sensors shall be equal to or better than X-Zone Sensor by Optex.
- K. Photoelectric Beams: In addition to the threshold sensor include a minimum of two (2) doorway holding beams. Photoelectric beams shall be pulsed infrared type, including sender receiver assemblies for recessed mounting.
- L. Presence Sensor Monitoring: Sliding automatic entrances control system shall include a means to verify the functionality of all active presence sensors in accordance with ANSI/BHMA A156.10. A detected fault shall cause automatic operation to cease until the fault is corrected.

2.6 HARDWARE

- A. General: Provide units in sizes and types recommended by automatic entrance door and hardware manufacturers for entrances and uses indicated. Finish exposed parts to match door finish.
- B. Emergency Breakaway Hardware: Provide release hardware that allows panel to swing out in direction of egress to full 90 degrees from any position in sliding mode. Maximum force to open panel shall be 50 lbf (222 N) Interrupt powered operation of panel operator while in breakaway mode.

1. Emergency breakaway feature shall include at least one adjustable detent device mounted in the top of each breakaway panel to control panel breakaway force.
 2. Limit Arms: Limit arms shall be provided to control swing of sliding or non-sliding panels on break-out; swing shall not exceed 90 degrees. Limit arms shall be spring loaded to prevent shock, and include adjustable friction damping.
- C. Deadlocks: Manufacturer's standard deadbolt operated by exterior cylinder and interior thumb turn; with minimum 1 inch (25 mm) long throw bolt; ANSI/BHMA A156.5, Grade 1.
1. Cylinders: As specified in Section 087100 - Door Hardware.
 2. Hook Latch: Laminated-steel hook, mortise type.
 3. Two-Point Locking: Provide locking system that incorporates a device in the stile of active door leaves that automatically extends a flush bolt into overhead carrier assembly.
- D. Control Switch: Provide manufacturer's standard header mounted rocker switches and door position switch to allow for full control of the automatic entrance door. Controls to include, but are not limited to:
1. One-way traffic
 2. Reduced Opening
 3. Open/Closed/Automatic
- E. Power Switch: Sliding automatic entrances shall be equipped with a two position On/Off rocker switch to control power to the door.
- F. Sliding Weather Stripping: Manufacturer's standard replaceable components complying with AAMA 701; made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
- G. Weather Sweeps: Manufacturer's standard adjustable nylon brush sweep mounted to underside of door bottom

2.7 FABRICATION

- A. General: Factory fabricate automatic entrance door assembly components to designs, sizes, and thicknesses indicated and to comply with indicated standards.
1. Form aluminum shapes before finishing.
 2. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
 3. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws, finished to match framing.
 - a. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
 - b. Reinforce members as required to receive fastener threads.

4. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
- B. Framing: Provide automatic entrances as prefabricated assemblies. Complete fabrication, assembly, finishing, hardware application, and other work before shipment to Project site.
1. Fabricate tubular and channel frame assemblies with manufacturer's standard welded or mechanical joints. Provide subframes and reinforcement as required for a complete system to support required loads.
 2. Perform fabrication operations in manner that prevents damage to exposed finish surfaces.
 3. Form profiles that are sharp, straight, and free of defects or deformations.
 4. Prepare components to receive concealed fasteners and anchor and connection devices.
 5. Fabricate components with accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.
 6. Fabricate exterior components to drain condensation and water passing joints within system to the exterior.
 7. Provide anchorage and alignment brackets for concealed support of assembly from the building structure.
 8. Allow for thermal expansion of exterior units.
- C. Doors: Factory fabricated and assembled in profiles indicated. Reinforce as required to support imposed loads and for installing hardware.
- D. Door Operators: Factory fabricated and installed in headers, including adjusting and testing.
- E. Glazing: Fabricate framing with minimum glazing edge clearances for thickness and type of glazing indicated, according to GANA's "Glazing Manual."
- F. Hardware: Factory install hardware to the greatest extent possible; remove only as required for final finishing operation and for delivery to and installation at Project site. Cut, drill, and tap for factory-installed hardware before applying finishes.
- G. Activation and Safety Devices: Factory install activation and safety devices in doors and headers as required by BHMA A156.10 for type of door and direction of travel.
- 2.8 ALUMINUM FINISHES
- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

- C. Two or Three-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish with suspended mica flakes containing not less than 70 percent PVDF resin by weight in both color coats. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

- 1. Color: As selected by Architect from manufacturer's full range

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, header support, and other conditions affecting performance of automatic entrances.
- B. Examine roughing-in for electrical systems to verify actual locations of power connections before automatic entrance installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install automatic entrances according to manufacturer's written instructions and cited BHMA standard for direction of pedestrian travel, including signage, controls, wiring, and connection to the building's power supply.
 - 1. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.
 - 2. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
 - 3. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- B. Entrances: Install automatic entrance doors plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
 - 1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.
 - 2. Set headers, carrier assemblies, tracks, operating brackets, and guides level and true to location with anchorage for permanent support.
 - 3. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within system to exterior.
 - 4. Level recesses for recessed thresholds using nonshrink grout.
- C. Door Operators: Connect door operators to electrical power distribution system.

- D. Controls: Install and adjust activation and safety devices according to manufacturer's written instructions and cited BHMA standard for direction of pedestrian travel. Connect control wiring according to Division 26 specifications.
- E. Glazing: Install glazing as specified in Division 08 Section "Glazing."
- F. Sealants: Comply with requirements specified in Division 07 Section "Joint Sealants" to provide weathertight installation.
 - 1. Set framing members, thresholds, bottom-guide track system, and flashings in full sealant bed.
 - 2. Seal perimeter of framing members with sealant.
- G. Signage: Apply signage on both sides of each door as required by cited BHMA standard for direction of pedestrian travel.
- H. Wiring Within Automatic Entrance Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's written limitations on bending radii. Provide and use lacing bars and distribution spools.

3.3 FIELD QUALITY CONTROL

- A. Certified Inspector: Engage a Certified Inspector to test and inspect components, assemblies, and installations, including connections.
- B. Perform the following tests and inspections:
 - 1. Test and inspect each automatic entrance, using AAADM inspection forms, to determine compliance of installed systems with applicable BHMA standards.
- C. Automatic entrances will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.4 ADJUSTING

- A. Adjust door operators, controls, and hardware for smooth and safe operation, for weathertight closure, and complying with requirements in BHMA A156.10.
- B. Lubricate operating hardware and other moving parts.
- C. Readjust door operators and controls after repeated operation of completed installation equivalent to 3 days' use by normal traffic (100 to 300 cycles). Lubricate hardware, operating equipment, and other moving parts.
- D. Occupancy Adjustment: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project outside normal occupancy hours for this purpose.

3.5 CLEANING AND PROTECTION

- A. Clean glass and aluminum surfaces promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Repair damaged finish to match original finish.
 - 1. Comply with requirements in Division 08 Section "Glazing" for cleaning and maintaining glass.

3.6 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of automatic entrance Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper automatic entrance operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 1. Engage a Certified Inspector to perform safety inspection after each adjustment or repair and at end of maintenance period. Furnish completed inspection reports to Owner.
 - 2. Perform maintenance, including emergency callback service, during normal working hours.
 - 3. Include 24-hour-per-day, 7-day-per-week, emergency callback service.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain automatic entrances.

END OF SECTION 084229

SECTION 084413 - GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Glazed aluminum curtain wall, captured 4 sides.
 - 2. Manual-swing aluminum doors and door frames.
 - 3. Installation of operable vents in curtainwall framing.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 07 Section "Joint Sealants" for joint sealants installed as part of glazed aluminum curtain wall system.
 - 2. Division 08 Section "Aluminum Windows" for operable vents, including rescue windows, installed in curtainwall framing system
 - 3. Division 08 Section "Glazing."

1.2 ACTION SUBMITTALS

- A. Product Data for each product specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- B. Shop Drawings prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of glazed aluminum curtain-wall systems.
 - 1. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
 - 2. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 - 3. For entrances, include hardware schedule and indicate operating hardware types, functions, quantities, and locations. Indicate routing of wiring for electrified hardware in vertical members.
 - 4. Include interface and other details of operable windows installed in curtainwall framing.
- C. Delegated-Design Submittal: For glazed aluminum curtain walls, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Cutaway Sample of each vertical-to-horizontal intersection of system, made from 12-inch (300-mm) lengths of full-size components and showing details of the following:
 - 1. Joinery.
 - 2. Anchorage.
 - 3. Expansion provisions.

4. Glazing.
5. Flashing and drainage.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data:

1. For Installer.
2. For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the state in which Project is located.

B. Energy Performance Certificates: For glazed aluminum curtain walls, accessories, and components from manufacturer.

1. Basis for Certification: NFRC-certified energy performance values for each glazed aluminum curtain wall.

C. Product test reports from a qualified independent testing agency evidencing compliance of glazed aluminum curtain wall system with requirements based on comprehensive testing of manufacturer's current system.

D. Quality-Control Program: Developed specifically for Project, including fabrication and installation, in accordance with recommendations in ASTM C1401. Include periodic quality-control reports.

E. Sample Warranties: For special warranties.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For glazed aluminum curtain walls to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of glazed aluminum curtain wall systems that are similar to those indicated for this Project in material, design, and extent.

B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

C. Source Limitations: Obtain glazed aluminum curtain wall system, glass vent windows, and aluminum-framed entrance doors and framing from one source and by a single manufacturer for the Project.

D. Welding Standards: Comply with applicable provisions of AWS D1.2, "Structural Welding Code--Aluminum."

1. Engage welders who have satisfactorily passed AWS qualification tests for welding processes involved and who are currently certified for these processes.
- E. Mockups: Prior to installing glazed aluminum curtain wall system, construct mockups for each form of construction and finish required to verify selections made under Sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for Work.
1. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect.
 2. Include operable vents and glazing in mock-up.
 3. Notify Architect 7 days in advance of the dates and times when mockups will be constructed.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Obtain Architect's approval of mockups before start of Work.
 6. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 7. Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.
- F. Preinstallation Conference: Conduct conference at Project site. Review methods and procedures related to glazed aluminum curtain wall system including, but not limited to, the following:
1. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
 2. Review structural loading limitations.
 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Review required inspecting, testing, and certifying procedures.
 5. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions.
 6. Review requirements for coordinating installation of curtainwall framing with installation of electrical wiring and electrified hardware concealed in framing members
- 1.6 PROJECT CONDITIONS
- A. Field Measurements: Verify dimensions by field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabrication without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions.

1.7 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty: Submit a written warranty executed by the manufacturer agreeing to repair or replace components of a glazed aluminum curtain wall system that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
 - 1. Warranty Period: 10 years from date of Substantial Completion for:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Failure of system to meet specified performance requirements.
 - c. Failure of operating components to function normally.
 - d. Water leakage through fixed glazing and frame areas.
 - e. Sealant failure.
 - f. Excessive noise or vibration of system
 - 2. Warranty Period: 20 years from date of Substantial Completion.
 - a. Deterioration of metal finishes beyond normal weathering.
 - 3. Warranty Period for Doors: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in "Quality Assurance" Article above, to design glazed aluminum curtain walls.
- B. General Performance: Comply with performance requirements specified, as determined by testing of glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Glazed aluminum curtain walls 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.
 - 2. Glazed aluminum curtain wall system, including anchorage, shall accommodate dimensional tolerances of building frame and other adjacent construction.
 - 3. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.

- e. Failure of operating units.
- f. Sealant failure.

C. Structural Loads:

- 1. Wind Loads: As indicated on Structural Drawings.
- 2. Other Design Loads: As indicated on Structural Drawings

D. Deflection of Framing Members:

- 1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans of up to 13 feet 6 inches (4.1 m) and to 1/240 of clear span plus 1/4 inch (6.35 mm) for spans of greater than 13 feet 6 inches (4.1 m) or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19.1 mm), whichever is less, or 3/4 inches (19 mm), whichever is smaller, unless otherwise indicated.
- 2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch (3.2 mm), whichever is smaller.

E. Structural: Test in accordance with ASTM E330/E330M as follows:

- 1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
- 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
- 3. Duration: As required by design wind velocity, but not less than 10 seconds.

F. Air Infiltration: Provide glazed aluminum curtain wall system with permanent resistance to air leakage through system of not more than 0.06 cfm/sq. ft. (0.3 L/s/sq. m) of fixed wall area when tested according to ASTM E 283 at a static-air-pressure difference of 6.2 lbf/sq. ft. (300 Pa).

- 1. Entrance Doors: Air leakage of not more than 1.0 cfm/lin. ft. of perimeter crack for single (3'-0" x 7'-0") door and pair of doors (6'-0" x 7'-0"), when tested in accordance with ASTM E 283 at a static-air-pressure difference of 1.57 lbf/sq. ft.

G. Water Penetration under Static Pressure: Test in accordance with ASTM E331 as follows:

- 1. No evidence of water penetration through fixed glazing and framing areas when tested in accordance with a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 20 lbf/sq. ft.

H. Thermal Movements: Provide glazed aluminum curtain wall system, including anchorage, that accommodates thermal movements of system and supporting elements resulting from the following maximum change (range) in ambient and surface temperatures without buckling, damaging stresses on glazing, failure of joint sealants, damaging loads on fasteners, noise or vibration, and other detrimental effects.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- I. Condensation Resistance: Provide condensation-resistance factor (CRF) of not less than the amounts indicated below when tested according to AAMA 1503.1.
 1. Aluminum Curtainwall System: 77 (framing) and 71 (glass)
 2. Doors: 49 (frame) and 68 (glass).
- J. Average Thermal Conductance: When tested according to AAMA 507 or NFRC 100 the overall U-factor (project specific) shall be no more than the following:
 1. Aluminum Curtain Wall System: 0.32
 2. Doors: 0.53.

2.2 MANUFACTURERS

- A. Manufacturers: Provide specified products of Kawneer Company, Inc., an Arconic Company or equivalent products by one of the following:
 1. EFCO Corporation
 2. YKK AP America Inc.
 3. Tubelite

2.3 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with the requirements of standards indicated below.
 1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
 2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221 (ASTM B 221M).
 3. Extruded Structural Pipe and Tubes: ASTM B 429.
- B. Steel Reinforcement: ASTM A 36 (ASTM A 36M) for structural shapes, plates, and bars; ASTM A 611 for cold-rolled sheet and strip; or ASTM A 570 (ASTM A 570M) for hot-rolled sheet and strip.
- C. Glazing as specified in Division 08 Section "Glazing."
- D. Glazing Gaskets: EPDM sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers; in hardness recommended by manufacturer.
- E. Glazing sealants and fillers as specified in Division 08 Section "Glazing."
- F. Framing system gaskets and joint fillers as recommended by manufacturer for joint type.
- G. Sealants and joint fillers for joints within glazed aluminum curtain wall system as specified in Division 07 Section "Joint Sealants."

- H. Firestop materials as specified in Division 07 Section "Fire-Resistive Joint Systems."
- I. Insulating Materials: Provide fiberglass batts for stuffing in openings and cracks as specified in Division 07 Section "Thermal Insulation."
- J. Weather Stripping: Manufacturer's standard replaceable weather compression weather stripping of molded PVC complying with ASTM D 2287 requirements.
- K. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

2.4 COMPONENTS

- A. Curtain Wall System: Manufacturer's standard extruded-aluminum framing members for multi-story curtainwall application of thickness required and reinforced as required to support imposed loads. Provide outside glazed system, with pressure plate, captured horizontal and vertical mullions.
 - 1. Provide mullion configuration with pockets at the inside glazing face to receive fixed resilient elastomeric glazing seal; flexible silicone-compatible elastomer thermal barrier that provides a minimum of 1/4" separation; EPDM exterior glazing seals secured by extended pressure plates fastened to tongue of back member; provisions to lead moisture accumulation to exterior at all sealed horizontals; and a cover that snaps over pressure plate to show only a sharp, uninterrupted exterior profile.
 - 2. Glazing Plane: Front
 - 3. Aluminum vertical and horizontal main frame extrusions shall have a minimum wall thickness of .070.
 - 4. Frame components shall be mechanically fastened by means of extruded aluminum shear blocks attached to vertical mullions.
 - 5. Provide entrance framing members compatible with glass framing in appearance and provide single acting entrance frames with positive barrier weathering
 - 6. Provide heavy wall entrance door frames as required to support 2-1/4" heavy wall doors
 - 7. Dimensions of Framing Members: Provide framing with vertical and horizontal framing members having a nominal face dimension of 2 inches, and overall depth of 6 inches (new Classroom addition) or 7-1/2 inches (elsewhere), as indicated on Drawings for each location.
 - 8. Finish: Three-Coat PVDF
 - 9. Basis of Design Product: Provide 4-sided captured system 1620UT Wall System by Kawneer Company, Inc., an Arconic Company, or equal products by one of the following:
 - a. EFCO Corp
 - b. YKK
 - c. Tubelite

- B. Doors: Manufacturer's standard thermally broken glazed doors, for manual swing operation.
1. Door Construction: 2-1/4 inch overall thickness, with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded.
 2. Thermal Break: Thermal break shall be IsoPour™ utilizing two continuous rows of polypropylene with a nominal 7/32" (5.5 mm) separation consisting of a two-part, chemically curing high density polyurethane which is mechanically and adhesively bonded to the aluminum at door rails and stiles.
 3. Glazing Stops and Gaskets: Provide manufacturer's standard snap-on extruded-aluminum glazing stops and preformed gaskets. Provide nonremovable glazing stops on outside of door. Glazing moldings shall be minimum .05" thick.
 4. Door Design: Wide stile; 5 inches wide.
 - a. Top Rail: 5 inches wide.
 - b. Mid Rail (Where indicated): 5 inches wide.
 - c. Bottom Rail: 10 inches wide
 5. Finish: Three-Coat PVDF
 6. Basis of Design Product: Provide 500T Insulpour Thermal Entrance Doors by Kawneer Company, Inc., an Arconic Company or equal products of one of the following:
 - a. EFCO Corp.
 - b. YKK
 - c. Tubelite
- C. Brackets and Reinforcements: Provide manufacturer's standard high-strength aluminum brackets and reinforcements. Provide nonstaining, nonferrous shims for aligning system components.
1. Provide all required accessories (fasteners, clips, brackets, supports, etc.) required for adjustment and installation as required by field conditions.
- D. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Finish exposed portions to match glazed aluminum curtain wall.
1. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended by manufacturer.
 2. Where fasteners anchor into aluminum less than 0.125 inch (3.2 mm) thick, provide reinforcement to receive fastener threads.
 3. Use concealed fasteners, unless otherwise indicated.
 4. Provide all required accessories (fasteners, clips, brackets, supports, etc.) required for adjustment and installation as required by field conditions.
- E. Anchors: 3-way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.
- F. Concealed Flashing: Dead-soft, 0.018-inch- (0.457-mm-) thick stainless steel, complying with ASTM A 666, of type selected by manufacturer for compatibility with system..
- G. Insulating Materials: Provide fiberglass batts for stuffing in openings and cracks.

2.5 PROJECTED WINDOWS

- A. Refer to Section 085113.

2.6 HARDWARE

- A. General: Provide hardware units indicated below in sizes, number, and type recommended by manufacturer for entrances indicated. Finish exposed parts to match door finish, unless otherwise indicated. All hardware shall be ADA compliant.
- B. Thresholds: At exterior doors, provide manufacturer's standard thermally broken threshold with cutouts coordinated for operating hardware, with anchors and jamb clips, and not more than 1/2-inch- (12.7-mm-) high, with beveled edges providing a floor level change with a slope of not more than 1:2, and in the following material:
 1. Material: Aluminum, bronze or clear finish to match doors and frames.
- C. Weather Stripping: Provide manufacturer's standard replaceable components.
 1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
 2. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
- D. Weather Sweeps: Provide manufacturer's standard weather sweep for application to exterior door bottoms and with concealed fasteners on mounting strips.
- E. Remainder of hardware is specified in Section 087100.

2.7 CURTAINWALL FABRICATION

- A. General: Fabricate glazed aluminum curtain wall system according to Shop Drawings. Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.
- B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.
- C. Prepare components to receive concealed fasteners and anchor and connection devices.

- D. Fabricate components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.
- E. Glazing Pockets: Provide minimum clearances for thickness and type of glass indicated according to GANA's "Glazing Manual."
- F. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- G. Frame Units: Factory assemble frame units according to Shop Drawings to greatest extent possible. Rigidly secure nonmovement joints. Seal joints watertight, unless otherwise indicated.
- H. Entrances: Fabricate door framing in profiles indicated. Reinforce as required to support imposed loads. Factory assemble door and frame units and factory install hardware to greatest extent possible. Reinforce door and frame units as required for installing hardware indicated. Cut, drill, and tap for factory-installed hardware before finishing components.
 - 1. Provide compression weather stripping at fixed stops. At other locations, provide sliding weather stripping retained in adjustable strip mortised into door edge.
 - 2. At exterior door bottom rail, provide an EPDM blade gasket sweep strip applied with concealed fasteners.
- I. Prefabrication: Complete fabrication, assembly, finishing, hardware application, and other work to the greatest extent possible before shipment to the Project site. Disassemble components only as necessary for shipment and installation.
 - 1. Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work to prevent damage to exposed finish surfaces. Complete these operations for hardware prior to application of finishes.
 - 2. Do not preglaze framing system. Refer to Division 08 Section "Glazing" for specifications.
- J. Reinforcing: Install reinforcing as required for hardware and as necessary for performance requirements, sag resistance and rigidity.

2.8 ALUMINUM FINISHES

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

components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

- C. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- D. Superior-Performance Organic Finish, Three-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat.
 - 1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Color and Gloss: As selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of glazed aluminum curtain wall system. Do not proceed with installation until unsatisfactory conditions have been corrected or accommodations acceptable to Architect have been made.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions for protecting, handling, and installing glazed aluminum curtain wall system. Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight, unless otherwise indicated. Provide means to drain water to the exterior to produce a permanently weatherproof system.
- B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.
- D. Install factory-assembled frame units plumb and true in alignment with established lines and grades.
- E. Install entrances plumb and true in alignment with established lines and grades without warp or rack. Lubricate operating hardware and other moving parts according to hardware manufacturers' written instructions.

1. Install surface-mounted hardware according to manufacturer's written instructions using concealed fasteners to greatest extent possible
- F. Anchorage: After system components are positioned, fix connections to building structure as indicated on Shop Drawings.
 1. Provide separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- G. Install windows in curtainwall framing in compliance with manufacturer's directions and approved shop drawings. Comply with requirements of Division 08 Section "Aluminum Windows," unless otherwise indicated.
- H. Install glazing according to Shop Drawings. Comply with requirements of Division 08 Section "Glazing," unless otherwise indicated.
- I. Install sealant according to Shop Drawings. Comply with requirements of Division 07 Section "Joint Sealants," unless otherwise indicated.
- J. Install insulation materials in locations indicated, and at perimeter of curtainwall system stuffed into openings. Comply with requirements of Division 07 Section "Building Insulation," unless otherwise indicated.
- K. Install firestop in locations indicated. Comply with requirements of Division 07 Section "Firestop Joint Systems," unless otherwise indicated.
- L. Erection Tolerances: Install glazed aluminum curtain wall system to comply with the following maximum tolerances:
 1. Plumb: 1/8 inch in 10 feet (3 mm in 3 m); 1/4 inch in 40 feet (6 mm in 12 m).
 2. Level: 1/8 inch in 20 feet (3 mm in 6 m); 1/4 inch in 40 feet (6 mm in 12 m).
 3. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm); where a reveal or protruding element separates aligned surfaces by less than 2 inches (50.8 mm), limit offset to 1/2 inch (12.7 mm).
 4. Location: Limit variation from plane or location shown on Shop Drawings to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/2 inch (12.7 mm) over total length.

3.3 ADJUSTING AND CLEANING

- A. Adjust windows, doors and hardware to provide tight fit at contact points and weather stripping, smooth operation, and weathertight closure
- B. Clean exposed surfaces of systems that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not allow soil to accumulate until final cleaning.
- C. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

- D. Restore system units damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

- 1. Touch-up minor abrasions with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

3.4 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure glazed aluminum curtain wall system is without damage or deterioration at the time of Substantial Completion.

3.5 HARDWARE SCHEDULE - Refer to Section 087100

END OF SECTION 084413

SECTION 085113 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes aluminum windows of the performance class and grade indicated. Window types required include the following:
 - 1. Single-hung (at Courtyard).
 - 2. Casement (swing out)
 - 3. Awning (swing out)
 - 4. Fixed.
 - 5. Rescue windows
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 08 Section "Glazed Aluminum Curtain Walls" for curtain wall framing system into which aluminum windows are inserted.
 - 2. Division 08 Section "Glazing."

1.2 DEFINITIONS

- A. Rescue (emergency-access/egress) windows are side-hinged, single hung or sliding units that provide emergency exit.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum windows engineered, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading without failure, as demonstrated by testing manufacturer's standard window assemblies representing types, grades, classes, and sizes required for Project according to test methods indicated.
- B. Test Criteria: Testing shall be performed by a qualified independent testing agency based on the following criteria:
 - 1. Wind Loads: Provide aluminum windows capable of withstanding wind-load design pressures indicated on the Drawings.
 - 2. Test Procedures: Test window units according to ASTM E 283 for air infiltration, ASTM E 331 for water penetration, and ASTM E 330 for uniform load deflection and structural performance.
- C. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 - 1. Performance Class and Grade: As indicated in the window type in Part - 2 below.

- D. Performance Requirements: Testing shall demonstrate compliance with requirements indicated in AAMA/WDMA/CSA 101/I.S.2/A440 for air infiltration, water penetration, and structural performance for type, grade, and performance class of window units required.
1. Air-Infiltration Rate: Not more than quantity of cfm/ft. (cu. m/h per m) of operable sash joint for an inward test pressure of as indicated in lbf/sq. ft. (Pa) for the window type in Part - 2 below.
 2. Water Penetration: No water penetration as defined in the test method at an inward test pressure indicated in the window type in Part - 2 below.
 3. Uniform Load Deflection: No deflection in excess of 1/175 of any member's span during the imposed load, for a positive (inward) and negative (outward) test pressure indicated in lbf/sq. ft. (Pa) for the window type in Part - 2 below.
 4. Structural Performance: No failure or permanent deflection in excess of 0.4 percent of any member's span after removing the imposed load, for a positive (inward) and negative (outward) test pressure indicated in lbf/sq. ft. (Pa) for the window type in Part - 2 below.
 5. Condensation Resistance: Where window units are indicated to be "thermally improved," provide units tested for thermal performance according to AAMA 1503.1 showing a minimum condensation resistance factor (CRF) as indicated for the window type in Part - 2 below.
 6. Thermal Transmittance: Provide window units with a U-value maximum as indicated in Btu/sq. ft. x h x deg F (W/sq. m x K) at 15-mi./h (24-km/h) exterior wind velocity, when tested according to AAMA 1503.1, for the window type in Part - 2 below.
 7. Forced-Entry Resistance: Comply with performance grade 10 requirements when tested according to ASTM F 588.
 8. Thermal Movements: Provide window units that allow thermal movement resulting from the following maximum change (range) in ambient temperature when engineering, fabricating, and installing aluminum windows to prevent buckling, opening of joints, and overstressing of components, connections, and other detrimental effects. Base engineering calculation on actual surface temperatures of materials due to solar heat gain and nighttime sky heat loss.
 - a. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.4 SUBMITTALS

- A. Product Data for each type of window required, including the following:
1. Construction details and fabrication methods.
 2. Profiles and dimensions of individual components.
 3. Data on hardware, accessories, and finishes.
 4. Recommendations for maintaining and cleaning exterior surfaces.
- B. Shop Drawings showing fabrication and installation of each type of window required including information not fully detailed in manufacturer's standard Product Data and the following:

1. Layout and installation details, including anchors.
 2. Elevations at 1/4 inch = 1 foot (1:50) scale and typical window unit elevations at 3/4 inch = 1 foot (1:20) scale.
 3. Full-size section details of typical composite members, including reinforcement and stiffeners.
 4. Location of weep holes.
 5. Panning details.
 6. Hardware, including operators.
 7. Window cleaning provisions.
 8. Glazing details.
 9. Accessories.
- C. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.
- D. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for units with factory-applied color finishes.
- E. Samples for Verification: 12-inch- (300-mm-) long sections of window members with applied finish. The Architect reserves the right to require additional samples that show fabrication techniques, workmanship, and design of hardware and accessories.
- F. Test reports from a qualified independent testing agency indicating that each type, grade, and size of window unit complies with performance requirements indicated based on comprehensive testing of current window units within the last 5 years. Test results based on use of down-sized test units will not be accepted.
- G. Qualification Data:
1. For Installer to demonstrate their capabilities and experience. Provide evidence of acceptability from manufacturer for installation.
 2. For manufacturer.
- 1.5 QUALITY ASSURANCE
- A. Installer Qualifications: Engage an experienced Installer acceptable to aluminum window manufacturer for installation of units required for this Project, who has completed installation of aluminum windows similar in material, design, and extent to those required for this Project and with a record of successful in-service performance.
- B. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by test reports, and calculations.
- C. Source Limitations:
1. Obtain all aluminum windows for the entire project through one source and from a single manufacturer.

2. Obtain glazed aluminum curtain wall system, aluminum windows inserted in curtainwall framing, and aluminum-framed entrance doors and framing from one source and by a single manufacturer for the Project.
- D. Product Options: The Drawings indicate sizes, profiles, dimensional requirements, and aesthetic effects of aluminum windows and are based on the specific window types and models indicated. Other aluminum window manufacturers whose products have equal performance characteristics may be considered provided deviations in size, profile, and dimensions are minor and do not alter the aesthetic effect. Refer to Division 01 Section regarding substitutions.
- E. Mock-ups: Provide operable vents in curtainwall mock-up specified in Division 08 Section "Glazed aluminum Curtain Wall."

1.6 PROJECT CONDITIONS

- A. Field Measurements: Check window openings by field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty: Submit a written warranty signed by aluminum window manufacturer agreeing to repair or replace window components that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
 1. Structural failures including excessive deflection, water leakage, air infiltration, or condensation.
 2. Faulty operation of sash and hardware.
 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- C. Warranty Period: 2 years after date of Substantial Completion.
- D. Warranty Period for Glass: 10 years after date of Substantial Completion.
- E. Warranty Period for Metal Finishes: 20 years after date of Substantial Completion for painted finishes, 10 years for anodized finishes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: The drawings are based on windows by Kawneer, an Arconic Company. Provide specified products or equivalent products by one of the following:

1. Wausau
2. EFCO Corporation.

2.2 MATERIALS

- A. Aluminum Extrusions: Provide alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish, not less than 0.070 inch thick at any location for main frame and sash members.
- B. Fasteners: Provide aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum window members, trim, hardware, anchors, and other components of window units.
1. Reinforcement: Where fasteners screw anchor into aluminum less than 0.125 inch (3.2 mm) thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads or provide standard, noncorrosive, pressed-in, splined grommet nuts.
 2. Exposed Fasteners: Except where unavoidable for application of hardware, do not use exposed fasteners. For application of hardware, use fasteners that match finish of member or hardware being fastened, as appropriate. Where exposed fasteners are unavoidable, provide tamper-resistant fasteners.
- C. Anchors, Clips, and Window Accessories: Fabricate anchors, clips, and window accessories of aluminum, nonmagnetic stainless steel, or hot-dip zinc-coated steel or iron complying with requirements of ASTM B 633; provide sufficient strength to withstand design pressure indicated.
1. Provide anchor clips or strap anchors for fastening windows in place.
- D. Compression-Type Weather Stripping: Provide compressible weather stripping designed for permanently resilient sealing under bumper or wiper action and for complete concealment when aluminum window is closed.
1. Weather-Stripping Material: Manufacturer's standard system and materials.
- E. Sealant: For sealants required within fabricated window units, provide type recommended by manufacturer for joint size and movement. Sealant shall remain permanently elastic, nonshrinking, and nonmigrating. Comply with Division 07 Section "Joint Sealants" of these Specifications for installation of sealants.
- F. Wire-Fabric Insect Screen: 18-by-16 mesh of 0.011-inch-diameter, coated aluminum wire.
1. Color: Charcoal Grey.

- G. Emergency Rescue Labels: 3 inch tall by 5 inch wide decal with bright yellow background, and black letters (Helvetica Medium type), with the following words: RESCUE WINDOW, centered on decal.

- 1. Provide all designated rescue windows with a permanent decal located on the sash (centered at bottom of lower sash or window) readable from both sides.

- H. Insulating Materials: Provide minimal-expanding, single-component polyurethane foam sealant packaged in a spray can and intended to be used to fill smaller cracks and gaps as perimeter seal.

- 1. Basis of Design Product: Great Stuff Window and Door by DuPont, or equal

2.3 GLAZING

- A. Provide insulating glass unit of material and thickness as specified in Section 088000.
- B. For single hung windows only, provide between the glass muntins and interior and exterior tape applied muntins on glazing; finish to match windows.

2.4 HARDWARE

- A. General: Where not indicated, provide manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum and of sufficient strength to perform the function for which it is intended.

2.5 ACCESSORIES

- A. General: Provide manufacturer's standard accessories that comply with indicated standards.
- B. Insect Screens: Provide insect screens for each operable exterior sash or ventilator as scheduled. Locate screens on inside or outside of window sash or ventilator, depending on window type. Design windows and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches.

- 1. Screen Frames: Fabricate frames of tubular-shaped, extruded- or formed-aluminum members of 0.050-inch- minimum wall thickness, with mitered or coped joints and concealed mechanical fasteners. Finish frames to match window units. Provide removable PVC spline-anchor concealing edge of screen frame.
 - 2. Insect screens for rescue windows shall be side hinged type.

- C. Sills: Finished to match window. Provide where indicated.

- 1. Extruded: .125 inch thick extruded aluminum.

2.6 FABRICATION, GENERAL

- A. General: Fabricate aluminum window units to comply with indicated standards. Include a complete system for assembly of components and anchorage of window units.
 - 1. Provide units that are reglazable without dismantling sash or ventilator framing.
- B. Thermally Improved Construction: Fabricate window units with an integral, concealed, low-conductance, thermal barrier, located between exterior materials and window members exposed on interior, in a manner that eliminates direct metal-to-metal contact.
 - 1. Structural thermal break made with glass-reinforced nylon strips, (closed cell PVC foam strips) installed by the window manufacturer in the frame and vent members
 - 2. Provide hardware with low conductivity or nonmetallic material for hardware bridging thermal breaks at frame or vent sash.
- C. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- D. Preglazed Fabrication: Preglaze window units at the factory. Comply with glass and glazing requirements of Division 08 Section "Glazing" of these Specifications and AAMA 101.
- E. Fabrication:
 - 1. Single Hung
 - a. Frame: 0.070 inch thick extrusions with each corner joined with mechanical fasteners.
 - b. Vent: 0.070 inch thick tubular members with each corner mitered, gusset reinforced, crimped and sealed.
 - 2. Casement and Awning:
 - a. Frame: 0.080 inch thick extrusions with each corner joined with mechanical fasteners.
 - b. Vent: 0.125 inch thick tubular members with each corner mitered, gusset reinforced, crimped and sealed
 - 3. Fixed:
 - a. Frame: 0.080 inch thick extrusions with each corner joined with mechanical fasteners.
 - 4. Provide units incorporating pressure equalization to direct water to the exterior through baffled weep holes and/or compression seals installed in the aluminum extrusion.
 - 5. Glazing Stops: Provide snap-on glazing stops, coordinated with glass selection and glazing system indicated. Finish to match window units.
- F. Weatherstripping: Provide full perimeter weatherstripping for each operable sash complying with AAMA 701/702. Provide sliding-type weatherstripping where sash rails slide horizontally or vertically along unit frame. Provide compression-type weatherstripping at perimeter of each operating sash where sliding type is inappropriate.

1. Provide weatherstripping locked into extruded grooves in sash.
- G. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.
- H. Rescue Windows: Fabricate all window units designated as "Rescue" windows on drawings to comply with local and state codes for emergency egress windows. Provide a minimum clear opening of 6 square feet, with minimum 24" clearance for opening width and height. Rescue window maximum 54" to operating hardware.

2.7 SINGLE-HUNG WINDOWS

- A. Window Performance Class and Grade: Comply with requirements of AAMA Performance Class and Grade AW-PG65-H. Window units shall successfully pass life-cycle test requirements specified in AAMA 910.
- B. Hardware: Provide the following equipment and operating hardware:
 1. Sash Balances: Class 5 adjustable spiral balance with stainless steel or other corrosion-resistant components. Two per sash.
 2. Sash Lock: White bronze sweep lock and keeper on meeting rails. One or two per sash as required by size. Brushed nickel finish.
 3. Handle: Continuous, integral, bottom sash lift handle.
 4. Bottom Rail Sash Lock: Spring-loaded, snap-type lock on bottom rail of lower sash.
 5. Limit Device: Sash stop limit device; for bottom sash located at jamb; two per sash.
 - a. Do not provide on rescue windows.

C. Performance Requirements:

PERFORMANCE REQUIREMENTS							
Window Type(s)	Window Grade and Class	Air-Infil. Rate/ @ test pressure	Water Penetr.	Uniform Load Deflect.	Uniform Load Struct.	CRF frame	Thermal Trans.
Single-hung	AW-PG65	.3 cfm/ ft. of sash @ 6.2	15 psf	65 psf	97.5 psf	75	.34

- D. Frame Depth: 4-5/8"
- E. Basis of Design Product: Kawneer AA5450 Ultra Thermal Window (Standard Face) or equal.

2.8 FIXED WINDOWS

- A. Window Performance Class and Grade: Comply with requirements of AAMA Performance Class and Grade AW-PG80-FW. Window units shall successfully pass life-cycle test requirements specified in AAMA 910.
- B. Performance Requirements:

PERFORMANCE REQUIREMENTS							
Window Type(s)	Window Grade and Class	Air-Infil. Rate/ @ test pressure	Water Penetr.	Uniform Load Deflect.	Uniform Load Struct.	CRF frame	Thermal Trans.
Fixed	AW-PG80	.01 cfm/ ft. of sash @ 6.24	15 psf	80 psf	120 psf	78	.31

- C. Frame Depth: 3-1/4"
- D. Basis of Design Product: Kawneer AA4325 Ultra Thermal Window or equal

2.9 CASEMENT (PROJECT-OUT) WINDOWS

- A. Window Performance Class and Grade: Comply with requirements of AAMA Performance Class and Grade AW-PG 80-C. Window units shall successfully pass life-cycle test requirements specified in AAMA 910.
- B. Hardware: Provide the following equipment and operating hardware:
1. Hinges: 4-bar stainless steel.
 2. Lock: Cast white bronze cam locks.
 3. Limit Devices: Limit to 4" opening
 4. Operator: Omni Drive (5 lb.) operating force handle.
- C. Performance Requirements:

PERFORMANCE REQUIREMENTS							
Window Type(s)	Window Grade and Class	Air-Infil. Rate/ @ test pressure	Water Penetr.	Uniform Load Deflect.	Uniform Load Struct.	CRF frame	Thermal Trans.
Casement	AW-PG80	.1 cfm/ ft. of sash @ 6.24	15 psf	80 psf	120 psf	70	0.31

D. Frame Depth: 3-1/4"

E. Basis of Design Product: Kawneer AA4325 Ultra Thermal Window or equal.

2.10 AWNING (PROJECT-OUT) WINDOWS

A. Window Performance Class and Grade: Comply with requirements of AAMA Performance Class and Grade AW-PG 80-AP. Window units shall successfully pass life-cycle test requirements specified in AAMA 910.

B. Hardware: Provide the following equipment and operating hardware:

1. Hinges: 4-bar stainless steel.
2. Lock: Cast white bronze cam locks.
3. Limit Devices: Limit to 4" opening
4. Operator: Omni Drive (5 lb.) operating force handle.

C. Performance Requirements:

PERFORMANCE REQUIREMENTS							
Window Type(s)	Window Grade and Class	Air-Infil. Rate/ @ test pressure	Water Penetr.	Uniform Load Deflect.	Uniform Load Struct.	CRF frame	Thermal Trans.
Project Out (Awning)	AW-PG80	.1 cfm/ ft. of sash @ 6.24	15 psf	80 psf	120 psf	70	0.31

D. Frame Depth: 3-1/4"

E. Basis of Design Product: Kawneer AA4325 Ultra Thermal Window or equal.

2.11 FINISHES

- A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designating finishes.
- B. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- C. Provide one of the following as selected by Architect:
 - 1. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.
 - 2. Two or Three-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat(s) and clear top coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Color: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect openings before installation. Verify that rough or masonry opening is correct and sill plate is level.
 - 1. Masonry surfaces shall be visibly dry and free of excess mortar, sand, and other construction debris.
 - 2. Metal surfaces shall be dry; clean; free of grease, oil, dirt, rust and corrosion, and welding slag; without sharp edges or offsets at joints.

3.2 INSTALLATION

- A. Comply with manufacturer's specifications and recommendations for installing window units, hardware, operators, and other components of the Work.
- B. Set window units plumb, level, and true to line, without warp or rack of frames or sash. Provide proper support and anchor securely in place.
 - 1. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified under "Dissimilar Materials" Paragraph in appendix to AAMA 101.
- C. Set sill members and other members in a bed of sealant or with joint fillers or gaskets, as shown on Shop Drawings, to provide weathertight construction. Refer to Division 07 Section "Joint Sealants" for compounds, fillers, and gaskets to be installed concurrently with window units. Coordinate installation with wall flashings and other components of the Work.

1. Sealants, joint fillers, and gaskets to be installed after installation of window units are specified in another Division 07 Section.

- D. Install spray foam insulation at voids, openings and cracks between window frames and adjacent construction.

3.3 CLEANING

- A. Clean aluminum surfaces promptly after installing windows. Exercise care to avoid damage to protective coatings and finishes. Remove excess glazing and sealant compounds, dirt, and other substances. Lubricate hardware and other moving parts.
- B. Clean glass of preglazed units promptly after installing windows. Comply with requirements of Division 08 Section "Glazing" for cleaning and maintenance.

3.4 PROTECTION

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

END OF SECTION 085113

SECTION 085656 - TRANSACTION WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sliding transaction windows.

1.2 COORDINATION

- A. Coordinate installation of anchorages for transaction windows. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for window units.

B. Shop Drawings: For transaction windows.

1. Include plans, elevations, sections, and attachments to other work.
2. Full-size section details of framing members, including internal armoring, reinforcement, and stiffeners.
3. Glazing details.
4. Keying information

C. Samples for Initial Selection: Of manufacturer's available colors for powder paint finish.

1.4 INFORMATIONAL SUBMITTALS

- A. Operation and Maintenance Data: To include in operation and maintenance manuals.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Pack transaction windows in wood crates for shipment.

- B. Label transaction window packaging with drawing designation.

- C. Store crated transaction windows on raised blocks to prevent moisture damage.

PART 2 - PRODUCTS

2.1 PERFORMANCE CRITERIA

- A. Horizontal sliding steel windows shall conform to the HS-C30 voluntary specifications in AAMA/NWWDA 101/I.S.2-97 and be designed to meet the performance requirements listed herein.

2.2 FABRICATION

- A. General: Fabricate self-closing and self-latching horizontal sliding transaction windows to provide a complete system for assembly of components and anchorage of window units.
 - 1. Provide factory preglazed transaction windows.
- B. Framing: Miter or cope corners the full depth of framing; weld and dress smooth.
- C. Fabricate from 6063-T6 aluminum extrusions with one fixed and one sliding panel (OX or XO); refer to drawings for locations of sliding panels at each opening. Units shall be self-closing and self-latching with a thumbturn deadlock and a locked/unlocked indicator. Removable header access panel shall house heavy-duty anti-lift ball bearing carrier for operable panel. Bottom track for operable panel shall be vinyl.
 - 1. Provide unit with aluminum half bottom track with clear service opening and no track under slider.
 - 2. Dimensions:
 - a. Frame depth 4-1/2"
 - b. Header height 2-7/8"
 - c. Center sightline 1-1/2"
 - d. Center and end stiles, top rail and bottom rail 15/16"
 - e. Width and height of unit shall be as indicated on Drawings for each location.
 - 3. Basis of Design Product: CRL SCDW1801P by CR Laurence, or equal.
- D. Glazing: Factory glaze with SG5 security glazing by School Guard Glass.
- E. Finish: Provide powder coat painted finish, manufacturer's standard system, in RAL color selected by Architect.

2.3 ACCESSORIES

- A. Anchors, Fasteners, Clips, and Window Accessories: Stainless steel; hot-dip, zinc-coated steel or iron, complying with ASTM B 633.
- B. Sealants: For sealants required within fabricated transaction windows, provide type recommended by manufacturer for joint size and movement. Sealant shall remain permanently elastic, nonshrinking, and nonmigrating.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of transaction windows.
- B. Examine in-place construction for compliance with manufacturer's installation requirements before transaction window installation.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of transaction windows.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing transaction windows to in-place construction. Include threaded fasteners for inserts, security fasteners, and other connectors.
- B. Fasteners: Install transaction windows using fasteners recommended by manufacturer with head style appropriate for installation requirements, strength, and finish of adjacent materials. Provide stainless-steel fasteners.
- C. Sealants: Comply with requirements in Section 079200 "Joint Sealants" for installing sealants, fillers, and gaskets.

3.3 ADJUSTING

- A. Remove and replace defective work, including transaction windows that are warped, bowed, or otherwise unacceptable.
- B. Adjust for smooth operation of sliding windows

3.4 CLEANING AND PROTECTION

- A. Clean surfaces promptly after installation of transaction windows. Take care to avoid damaging the finish. Remove excess glazing and sealant compounds, dirt, and other substances.
- B. Clean glass of preglazed transaction windows promptly after installation.
- C. Provide temporary protection to ensure that transaction windows are without damage at time of Substantial Completion.

END OF SECTION 085656

SECTION 086300 - METAL-FRAMED SKYLIGHTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes aluminum-framed skylights with the following characteristics:
 - 1. Glazing is glass.
 - 2. Glazing is retained by field-installed pressure caps on four sides
- B. Related Sections include the following:
 - 1. Division 07 Section "Joint Sealants" for sealants installed at perimeters of metal-framed skylights.
 - 2. Division 08 Section "Glazing" for glass units installed in metal-framed skylights.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality and Code Requirements," to design metal-framed skylights.
- B. Provide metal-framed skylights, including anchorage, capable of withstanding, without failure, the effects of the following:
 - 1. Structural loads.
 - 2. Thermal movements.
 - 3. Movements of supporting structure.
 - 4. Dimensional tolerances of building frame and other adjacent construction.
- C. Failure includes the following:
 - 1. Deflection exceeding specified limits.
 - 2. Water leakage.
 - 3. Thermal stresses transferred to building structure.
 - 4. Noise or vibration created by wind and thermal and structural movements.
 - 5. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
 - 6. Loosening or weakening of fasteners, attachments, and other components.
 - 7. Sealant failure.
- D. Structural Loads:
 - 1. Wind Loads, Snow Loads, Earthquake Loads: As indicated by structural design data on Drawings.
 - 2. Concentrated Live Loads: 300 lbf applied to framing members at locations that will produce greatest stress or deflection.

3. Load Combinations: Calculate according to requirements of applicable code indicated on Drawings.

E. Deflection of Framing Members:

1. Deflection Normal to Glazing Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding $L/175$ of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19.1 mm), whichever is less.
2. Deflection Parallel to Glazing Plane: Limited to $L/360$ of clear span or 1/8 inch (3.2 mm), whichever is smaller.

F. Lateral Bracing of Framing Members: Compression flanges of flexural members are laterally braced by cross members with minimum depth equal to 50 percent of flexural member that is braced. Glazing does not provide lateral support.

G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

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

1.3 PERFORMANCE TESTING

- A. Provide metal-framed skylights that comply with test-performance requirements indicated, as evidenced by reports of tests performed on manufacturer's standard assemblies by a qualified independent testing agency.
- B. Structural-Performance: Provide metal-framed skylights, including anchorage, capable of withstanding pressures indicated without material and deflection failures and permanent deformation of structural members exceeding 0.2 percent of span when tested according to ASTM E 330.
- C. Air-Infiltration: Metal-framed skylights with maximum air leakage through fixed glazing and framing areas of 0.01 cfm/sq. ft. (0.05 L/s per sq. m) of surface when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft. (300 Pa)
- D. Water Penetration under Static Pressure Metal-framed skylights that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft. (718 Pa).
- E. Condensation Resistance: Provide aluminum-framed systems that when tested with fixed glazing, have a frame condensation-resistance factor (CR) of not less than 46 when tested according to NFRC 500 when clear over clear insulated glass is used.

- F. Energy Performance: Provide metal-framed skylights with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below and certified and labeled according to NFRC:

1. Thermal Transmittance (U-Factor): Fixed glazing and framing areas shall have U-factor of not more than 0.40 Btu/sq. ft. x h x deg F as determined according to NFRC 100.

1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for metal-framed skylights.
- B. Shop Drawings: For metal-framed skylights. Include plans, elevations, sections, details, and attachments to other work.
1. Indicate structural loadings and reactions to be transmitted to supporting curbs.
 2. Include details of provisions for assembly expansion and contraction and for draining moisture within the assembly to the exterior..
- C. Delegated-Design Submittal: For metal-framed skylights indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Fabrication Sample: Of each framing intersection of assemblies, made from 12-inch (300-mm) lengths of full-size components and showing details of the following:
1. Joinery.
 2. Anchorage.
 3. Expansion provisions.
 4. Glazing.
 5. Flashing and drainage.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for metal-framed skylights.
- F. Maintenance Data: For metal-framed skylights to include in maintenance manuals.
- G. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of metal-framed skylights required for this Project.
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those

performed for installations of metal skylights that are similar to those indicated for this Project in material, design, and extent

- C. Testing Agency Qualifications: An independent agency qualified according to ASTM E 699 for testing indicated.
- D. Product Options: Information on Drawings and in Specifications establishes requirements for skylights' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including testing conducted by an independent testing agency and in-service performance.
 - 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.

1.6 PROJECT CONDITIONS

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

1.7 WARRANTY

- A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal-framed skylights that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration caused by thermal movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Adhesive or cohesive sealant failures.
 - e. Water leakage.
 - 2. Warranty Period: Five years from date of Substantial Completion.
- B. Finish Special Warranty: Provide written warranty signed by manufacturer agreeing to repair or replace work with finish defects. "Defects" is defined as peeling, chipping, chalking, fading, abnormal aging or deterioration, and failure to perform as required.
 - 1. Warranty Period for Kynar 500 Finish: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: The design for metal-framed skylights is based on Pinnacle 350 Skylight manufactured by Wasco Division, Velux Commercial. Subject to compliance with requirements, provide the named product or a comparable product by one of the following, or equal:
1. Kawneer
 2. Super Sky Products Inc.

2.2 FRAMING MATERIALS

- A. Aluminum: Alloy and temper recommended in writing by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 4. Framing members shall have a minimum effective thickness of 0.125 inches.
- B. Pressure Caps: Manufacturer's standard aluminum components that mechanically retain glazing, with minimum effective thickness of 0.109 inches.
1. Include snap-on aluminum trim that conceals fasteners.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning skylight components.
- D. Anchors, Fasteners, and Accessories: Manufacturer's standard, corrosion-resistant, nonstaining, and nonbleeding; compatible with adjacent materials.
1. Aluminum Retaining Cap Fasteners and Framing Members Fasteners: ASTM A 193/A 193M, Series 300 stainless-steel screws; type as recommended by manufacturer.
 2. Connections to Supporting Structure: Series 300 Stainless Steel or ASTM A 307, hot dipped galvanized steel fasteners by installer.
 3. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
 4. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended in writing by manufacturer.
- E. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- F. Anchor Bolts: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), hot-dip zinc coating, ASTM A 153/A 153M, Class C.

- G. Concealed Flashing: Manufacturer's standard, corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- H. Exposed Flashing and Closures: Manufacturer's standard aluminum components not less than 0.032 inch thick for apron flashing and 0.062 inch for closures..
- I. Framing Gaskets: Manufacturer's standard.
- J. Framing Sealants: As recommended in writing by manufacturer.
 - 1. Sealant shall have a VOC content of 250 g/L or less.

2.3 GLAZING MATERIALS

- A. Glazing: As specified in Division 08 Section "Glazing."
- B. Spacers, Setting Blocks, and Gaskets: Manufacturer's standard elastomeric types.
- C. Glazing Sealants: As recommended in writing by manufacturer.
 - 1. Sealant shall have a VOC content of 250 g/L or less.

2.4 ACCESSORY MATERIALS

- A. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

2.5 FABRICATION

- A. Basis of Design Products: Provide the following products from Wasco Division, Velux Commercial, or equal:
 - 1. Pinnacle 350 CC3DG Double Pitch Skylight (double pitch 7/12 (flat ends) using 5" curb x 18" tall); 8'x16' (inside curb) - (outside curb is 8'-10" x 16'-10").
- B. Fabricate aluminum components before finishing.
- C. Fabricate aluminum components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Internal guttering systems or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within skylight 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.

- D. Attach retainer bars with gasketed stainless steel fasteners spaced at a maximum of 12 inches on center.
- E. Weld components before finishing and in concealed locations to greatest extent practicable to minimize distortion.
- F. Fabricate aluminum sill closures with weep holes and for installation as continuous component.
- G. Reinforce aluminum components as required to receive fastener threads.
- H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.6 ALUMINUM FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. Kynar Fluoropolymer Two-Coat System: (70% PVDF) complying with AAMA 2605. Color as selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General:
 - 1. Comply with manufacturer's written instructions.
 - 2. Do not install damaged components.
 - 3. Fit joints between aluminum components to produce hairline joints free of burrs and distortion.
 - 4. Rigidly secure nonmovement joints.
 - 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
 - 6. Seal joints watertight, unless otherwise indicated.

- B. Metal Protection: Where aluminum will contact dissimilar materials, protect against galvanic action by painting contact surfaces with bituminous paint or by installing nonconductive spacers as recommended in writing by manufacturer for this purpose.
- C. Install continuous aluminum sill closure with weatherproof expansion joints and locked and sealed or welded corners. Locate weep holes at rafters.
- D. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within skylight to exterior.
- E. Install components plumb and true in alignment with established lines and elevations.
- F. Install glazing as specified in Division 08 Section "Glazing."
- G. Erection Tolerances: Install metal-framed skylights to comply with the following maximum tolerances:
 - 1. Alignment: Limit offset from true alignment to 1/32 inch where surfaces abut in line, edge to edge, at corners, or where a reveal or protruding element separates aligned surfaces by less than 3 inches; otherwise, limit offset to 1/8 inch.
 - 2. Location and Plane: Limit variation from true location and plane to 1/8 inch in 10 feet but no greater than 1/4 inch over total length.

END OF SECTION 086300

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 "General Requirements" sections for Allowances, Alternates, Owner Furnished Contractor Installed, Project Management and Coordination.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:
 - a. "Metal Doors and Frames"
 - b. "Flush Wood Doors"
 - c. "Stile and Rail Wood Doors"
 - d. "Interior Aluminum Doors and Frames"
 - e. "Aluminum-Framed Entrances and Storefronts"
 - f. "Stainless Steel Doors and Frames"
 - g. "Special Function Doors"
 - h. "Entrances"
6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies

3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:
 - a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
 - b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - a. Wiring Diagrams: For power, signal, and control wiring and including:
 - 1) Details of interface of electrified door hardware and building safety and security systems.
 - 2) Schematic diagram of systems that interface with electrified door hardware.

- 3) Point-to-point wiring.
 - 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
 - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule:
 - a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
 - b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
 - c. Indicate complete designations of each item required for each opening, include:
 - 1) Door Index: door number, heading number, and Architect's hardware set number.
 - 2) Quantity, type, style, function, size, and finish of each hardware item.
 - 3) Name and manufacturer of each item.
 - 4) Fastenings and other pertinent information.
 - 5) Location of each hardware set cross-referenced to indications on Drawings.
 - 6) Explanation of all abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for hardware.
 - 8) Door and frame sizes and materials.
 - 9) Degree of door swing and handing.
 - 10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.
5. Key Schedule:
 - a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
 - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
 - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
 - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
 - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
 - f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

C. Informational Submittals:

1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
2. Provide Product Data:
 - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
 - b. Include warranties for specified door hardware.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Final approved hardware schedule edited to reflect conditions as installed.
 - d. Final keying schedule
 - e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
 - f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
 - a. Fire door assemblies, in compliance with NFPA 80.
 - b. Required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
 - a. For door hardware: DHI certified AHC or DHC.
 - b. Can provide installation and technical data to Architect and other related subcontractors.

- c. Can inspect and verify components are in working order upon completion of installation.
 - d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.
- 4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

- 1. Fire-Rated Door Openings:
 - a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
 - b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
- 2. Smoke and Draft Control Door Assemblies:
 - a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
 - b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
- 3. Electrified Door Hardware
 - a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
- 4. Accessibility Requirements:
 - a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

- 1. Keying Conference
 - a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - 1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2) Preliminary key system schematic diagram.
 - 3) Requirements for key control system.
 - 4) Requirements for access control.
 - 5) Address for delivery of keys.
- 2. Pre-installation Conference
 - a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

- b. Inspect and discuss preparatory work performed by other trades.
 - c. Inspect and discuss electrical roughing-in for electrified door hardware.
 - d. Review sequence of operation for each type of electrified door hardware.
 - e. Review required testing, inspecting, and certifying procedures.
 - f. Review questions or concerns related to proper installation and adjustment of door hardware.
3. Electrified Hardware Coordination Conference:
- a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
- C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
- D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.07 WARRANTY

- A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.
 - 1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
 - 2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
 - a. Mechanical Warranty
 - 1) Locks
 - a) Schlage ND Series: 10 years
 - b) Schlage L Series: 3 years
 - 2) Exit Devices
 - a) Von Duprin: 3 years
 - 3) Closers
 - a) LCN 4000 Series: 30 years
 - b) LCN 1460 Series: 30 years
 - b. Electrical Warranty
 - 1) Locks
 - a) Schlage: 1 year
 - 2) Exit Devices
 - a) Von Duprin: 1 year
 - 3) Closers
 - a) LCN: 2 years

1.08 MAINTENANCE

- A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
- B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. The Owner requires use of certain products for their unique characteristics and project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."
 - 1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.

- B. Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request in accordance with section 01 25 00.
- C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fabrication

- 1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer's recognized installation standards for application intended.
- 2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
- 3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with "Metal Doors and Frames", "Flush Wood Doors", "Stile and Rail Wood Doors" to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.

B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

- 1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

C. Cable and Connectors:

- 1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
- 2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.
- 3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Ives 5BB series
2. Acceptable Manufacturers and Products:
 - a. Hager BB1191/1279 series
 - b. Best FBB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins
9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Select
 - b. Hager

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 ELECTRIC POWER TRANSFER

A. Manufacturers:

1. Scheduled Manufacturer and Product:
 - a. Von Duprin EPT-10
2. Acceptable Manufacturers and Products:
 - a. Security Door Controls PTM
 - b. Precision EPT-12C

B. Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
2. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.06 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. DCI
 - c. Trimco

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.07 COORDINATORS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco
 - c. DCI

B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes, or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.08 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage L9000 series
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.
2. Indicators: Where specified, provide indicator window measuring a minimum 2-3/5-inch x 3/5 inch with 180-degree visibility. Provide messages color-coded using ANSI Z535 Safety Red with full text and/or symbols, as scheduled, for easy visibility. When applicable allows for lock status indication on both sides of the door.

3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches.
7. Provide motor based electrified locksets that comply with the following requirements:
 - a. Universal input voltage – single chassis accepts 12 or 24VDC to allow for changes in the field without changing lock chassis.
 - b. Fail Safe/Fail Secure – changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case.
 - c. Low maximum current draw – maximum 0.4 amps to allow for multiple locks on a single power supply.
 - d. Low holding current – maximum 0.01 amps to produce minimal heat, eliminate "hot levers" in electrically locked applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
 - e. Connections – provide quick-connect Molex system standard.
8. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
 - a. Lever Design: 06A

2.09 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage ND series
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.

- a. Lever Design: Rhodes

2.10 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Von Duprin 98/35A series
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide smooth touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.11 ELECTRONIC ACCESS CONTROL LOCKSETS AND EXIT DEVICE TRIM

A. Manufacturers:

1. Scheduled Manufacturer and Product:
 - a. Schlage AD Series
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide adaptable electronic access control products that comply with the following requirements:
 - a. Listed, UL 294 - The Standard of Safety for Access Control System Units.
 - b. Compliant with ANSI/BHMA A156.25 Grade 1 Operation and Security.
 - c. Certified to UL10C, FCC Part15, Florida Building Code Standards TAS 201 large missile impact, TAS 202 and TAS 203.
 - d. Compliant with ASTM E330 for door assemblies.
 - e. Compliant with ICC / ANSI A117.1, NFPA 101, NFPA 80, and Industry Canada IC.
2. Functions: Provide functions as scheduled that are field configurable without taking the adaptable electronic product off the door.
3. Emergency Override: Provide mechanical key override; cylinders: Refer to "KEYING" article, herein.
4. Levers:
 - a. Vandal Resistance: Exterior (secure side) lever rotates freely while door remains locked, preventing damage to internal lock components from vandalism by excessive force.
 - b. Provide non-handed lever trim that operates independently of non-locking levers.
 - c. Style: Rhodes (RHO)
 - d. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.
5. Features:
 - a. Audible feedback that can be enabled or disabled.
 - b. Tamper-Resistant Screws: Tamper torx screws on inside escutcheon for increased security.
 - c. Visual tri-colored LED indicators that indicate activation, additional PIN code credential required, operational systems status, system error conditions and low power conditions.
 - d. Door Position Switch
 - e. Interior Cover Tamper Guard
 - f. Mechanical Key Override
 - g. Request to Exit
 - h. Request to Enter
 - i. Lock/Unlock Status
6. Credential Reader
 - a. Credential Reader Configuration: Provide credential reader modules in the following configurations as indicated in door hardware sets.
 - b. Credential Reader Capabilities: Provide credential readers capable of operating with the following integrated software partners.
 - 1) 13.56 MHz Smart card credentials:

- a) Secure section (Multi-Technology and Smartcard): Schlage MIFARE Classic, Schlage MIFARE DESFire EV1/EV3, PIV and PIV-I Compatible
 - b) 13.56 MHz Serial number only (Multi-Technology and Smartcard): MIFARE, DESFire, HID iClass, MIFARE DESFire EV1/EV3
 - c) 125 kHz Proximity card credentials: Schlage, XceedID, HID, GE/CASI ProxLite and AWID.
 - 2) Multi-Technology readers that read both 13.56 MHz Smart Cards and 125 kHz Prox cards.
 - 3) Dual credential reading capabilities credential card or fob and PIN.
 - 4) 12 button keypad with backlit buttons.
 - 5) Magnetic Card Reader:
 - a) Full insertion or swipe reader capable of reading information along full length of magnetic stripe.
 - b) Magnetic card triple track reader capable of reading tracks 1, 2 or 3 per configuration in field.
7. Operation:
- a. Offline – access control rights stored on device
 - 1) Provide adaptable electronic access control products with the ability to be configured at door by handheld programming device the length of time device is unlocked upon access grant.
 - 2) Provide adaptable electronic access control products with the ability to communicate identifying information such as firmware versions, hardware versions, serial numbers, and manufacturing dates by handheld programming device.
 - b. Networked – wireless
 - 1) Adaptable electronic access control product system interface:
 - 2) Adaptable electronic access control products to have real-time bidirectional communication between access control system and lock.
 - 3) Remote Commanding By Partner Integrated Access Control Network Software: Battery-powered lockset shall have "Wake on Radio" feature causing activation of remote, wireless access control devices, enabling activated devices to be configured, locked or unlocked from a centralized location within 10 seconds or less without user interface at the device.
 - 4) Local Commanding: Provide adaptable electronic access control product with the ability to be configured, locked or unlocked locally by handheld programming device, in real-time.
 - 5) When Utilized with Access Control Network Software with Remote Commanding Capability: Provide adaptable electronic access control product with the ability to be remotely locked down or unlocked within 10 seconds or less while battery powered without user interface at the device.
 - 6) Real-time response of battery powered device capable of being configured at door by handheld programming device and remotely by Partner integrated software.
 - 7) Upon Loss of Power to Device: Provide adaptable electronic access control product with the ability to manage access control offline in one of three methods below that can be configured in the field at device by handheld programming device and remotely by Partner integrated software:
 - a) Fail locked (secured)
 - b) Fail unlocked (unsecured)

- c) Fail As-Is
- 8) Upon Loss of Communication Between Device and Network: Provide adaptable electronic access control product with the ability to manage access control offline in one of four methods below that can be configured in the field at lockset by handheld programming device and remotely by Partner integrated software:
 - a) Fail locked (secured)
 - b) Fail unlocked (unsecured)
 - c) Fail As-Is
 - d) Fail to Degraded/cache mode utilizing cache memory with following selectable options:
 - i. Grant access up to the last 1,000 unique previously accepted User IDs.
 - ii. Grant access up to the last 1,000 unique previously accepted facility/site codes
 - iii. Remove from cache previously stored User IDs or facility/site codes that have not been presented to lock within the last 5 days.
- 9) Provide adaptable electronic access control product with the ability to be configured at door by handheld programming device and remotely by Partner integrated software the length of time device is unlocked upon access grant.
- 10) Provide adaptable electronic access control product with the ability to communicate identifying information such as firmware versions, hardware versions, serial numbers, and manufacturing dates by handheld programming device and remotely by Partner integrated software.
- 11) Wireless Transmission:
 - a) Modulation: 900 MHz spread spectrum, direct sequence, 10 channels.
 - b) Encryption: AES-128-bit Key minimum.

C. Components

- 1. Product: Schlage HHD series with Utility Software. (OFFLINE)
 - a. Provide Handheld Programming Device for adaptable electronic access control products capable of the following minimum requirements.
 - 1) Capable of initializing lock and accessories using preloaded software.
 - 2) Utilized to field configure electronic access control devices, to download firmware updates and door files to device, and to download audit files from device.
- 2. Provide Panel Interface for adaptable electronic access control products.
 - a. Product: Schlage PIM400-485 or PIM400-TD2 Panel Interface Module as required. (AD-400)

2.12 POWER SUPPLIES

A. Manufacturers and Products:

- 1. Scheduled Manufacturer and Product:
 - a. Schlage/Von Duprin PS900 Series
- 2. Acceptable Manufacturers and Products:
 - a. Precision ELR series
 - b. Dynalock 5000 series
 - c. Security Door Controls 600 series

B. Requirements:

1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:
 - a. 12/24 VDC Output, field selectable.
 - b. Class 2 Rated power limited output.
 - c. Universal 120-240 VAC input.
 - d. Low voltage DC, regulated and filtered.
 - e. Polarized connector for distribution boards.
 - f. Fused primary input.
 - g. AC input and DC output monitoring circuit w/LED indicators.
 - h. Cover mounted AC Input indication.
 - i. Tested and certified to meet UL294.
 - j. NEMA 1 enclosure.
 - k. Hinged cover w/lock down screws.
 - l. High voltage protective cover.

2.13 CYLINDERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage Everest 29 S ** CONFIRM EXISTING KEYWAY IN PLACE
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset; manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
 - a. Patented Open: cylinder with interchangeable core with open keyway.
3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent protected.
4. Nickel silver bottom pins.

2.14 KEYING

A. Scheduled System:

1. Existing factory registered system:
 - a. Provide cylinders/cores keyed into Owner's existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

1. Construction Keying:
 - a. Replaceable Construction Cores.
 - 1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
 - a) 3 construction control keys
 - b) 12 construction change (day) keys.
 - 2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.
2. Permanent Keying:
 - a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - 1) Master Keying system as directed by the Owner.
 - b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
 - c. Provide keys with the following features:
 - 1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
 - 2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
 - 3) Geographically Exclusive: Where High Security or Security cylinders/cores are indicated, provide nationwide, geographically exclusive key system complying with the following restrictions.
 - d. Identification:
 - 1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
 - 2) Identification stamping provisions must be approved by the Architect and Owner.
 - 3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
 - 4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
 - 5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
 - e. Quantity: Furnish in the following quantities.
 - 1) Permanent Control Keys: 3.
 - 2) Master Keys: 6.
 - 3) Change (Day) Keys: 3 per cylinder/core that is keyed differently
 - 4) Key Blanks: Quantity as determined in the keying meeting.

2.15 KEY CONTROL SYSTEM

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Telkee
2. Acceptable Manufacturers:
 - a. HPC
 - b. Lund

B. Requirements:

1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.
 - a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
 - b. Provide hinged-panel type cabinet for wall mounting.

2.16 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. LCN 4040XP series
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2-inch (38 mm) diameter piston with 5/8-inch (16 mm) diameter double heat-treated pinion journal. QR code with a direct link to maintenance instructions.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards. Provide snap-on cover clip, with plastic covers, that secures cover to spring tube.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck. Provide graphically labelled instructions on the closer body adjacent to each adjustment valve. Provide positive stop on reg valve that prevents reg screw from being backed out.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.

8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.17 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. LCN 1460 series
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory.
2. Provide door closers with fully hydraulic, full rack and pinion action cast iron cylinder.
3. Closer Body: 1-1/4-inch (32 mm) diameter, with 5/8-inch (16 mm) diameter heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.18 ELECTRO-MECHANICAL CLOSER/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. LCN
2. Acceptable Manufacturers:
 - a. No Substitute

B. Requirements:

1. Provide single-point or multi-point hold-open electro-mechanical closer/holders as specified. Coordinate voltage requirements and provide transformer if necessary.
2. Provide closer/holders that function as full rack and pinion door closer when current is interrupted or continuous hold-open is not engaged.
3. Provide door closers with fully hydraulic, full rack and pinion action with high strength cylinder and full complement bearings at shaft.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.19 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Elmes
 - b. Burns
 - c. Trimco

B. Requirements:

1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.20 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.

2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.21 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:
 - a. Glynn-Johnson
2. Acceptable Manufacturers:
 - a. No Substitute

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.

2.22 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button or thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.23 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Zero International
2. Acceptable Manufacturers:

- a. National Guard
- b. Reese
- c. Legacy

B. Requirements:

- 1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
- 2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
- 3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
- 4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.24 SILENCERS

A. Manufacturers:

- 1. Scheduled Manufacturer:
 - a. Ives
- 2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

B. Requirements:

- 1. Provide "push-in" type silencers for hollow metal or wood frames.
- 2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
- 3. Omit where gasketing is specified.

2.25 MAGNETIC HOLDERS

A. Manufacturers:

- 1. Scheduled Manufacturer:
 - a. LCN
- 2. Acceptable Manufacturers:
 - a. No Substitute

B. Requirements:

1. Provide wall or floor mounted electromagnetic door release as specified with minimum of 25 pounds of holding force. Coordinate projection of holder and armature with other hardware and wall conditions to ensure that door sits parallel to wall when fully open. Connect magnetic holders on fire-rated doors into the fire control panel for fail-safe operation.

2.26 COAT HOOKS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Rockwood

B. Provide coat hooks as specified.

2.27 FINISHES

A. FINISH: BHMA 630 (US32D); EXCEPT:

1. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
2. Door Closers: Powder Coat to Match
3. Weatherstripping: Clear Anodized Aluminum
4. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
 - 4. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.
- C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- I. Lock Cylinders:
 - 1. Install construction cores to secure building and areas during construction period.
 - 2. Replace construction cores with permanent cores as indicated in keying section.
 - 3. Furnish permanent cores to Owner for installation.
- J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:
 - 1. Conduit, junction boxes and wire pulls.
 - 2. Connections to and from power supplies to electrified hardware.
 - 3. Connections to fire/smoke alarm system and smoke evacuation system.
 - 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
 - 5. Connections to panel interface modules, controllers, and gateways.
 - 6. Testing and labeling wires with Architect's opening number.
- K. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

- L. Continuous Hinges: Re-locate the door and frame fire rating labels where they will remain visible so that the hinge does not cover the label once installed.
- M. Door Closers & Auto Operators: Mount closers/operators on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers/operators so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- N. Overhead Stops/Holders: Mount overhead stops/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- O. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
- P. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- Q. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- R. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- S. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- T. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
 - 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 - 3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items per manufacturer's instructions to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
- D. Hardware Sets:

Abbreviation	Name
ABH	ABH Manufacturing
GLY	Glynn-Johnson Corp
IVE	H.B. Ives
LCN	LCN Commercial Division
SCE	Schlage Electronic Security
SCH	Schlage Lock Company
TBD	Manufacturer To Be Determined
VON	Von Duprin
ZER	Zero International Inc

88843 OPT0245534 Version 2

Legend:







⚡ **Electrified Opening**

Hardware Group No. 01

For use on Door #(s):

102G

Provide each SGL door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-L-BE-F-06		630	VON
1	EA	SURFACE CLOSER	4040XP CUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 01.1

For use on Door #(s):

115.3 115.4

Provide each SGL door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP CUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 02.1

For use on Door #(s):

101C	105A	106	108	108A	109A
117	119B.1	119B	121A.1	130A	144C
154	166	201	205	207	214A
215	216	217	218	219A	220
223	231	246	247	248	305A
305B	307	309	311	316	319
320	321	331	346	348	348A
G40	G42	G60G	G60H		

Provide each SGL door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY		626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 02.2

For use on Door #(s):

101B	105	105E	107	109	109G
110	112	113B	113C	116	116A
117A	119	119A	121A	121D	131
133	135	137	138A	138	142
166B	172E	172F	174E	174F	175A
175B	175C	203	204A	208	209
210	211	213	214	217B	219
225	230A	233	235	237	238
240	242	244	246A	248A	308
310	317	318	323	330A	333
335	337	338	340	342	344
346B	C308	G01	G30A	G33	G35
G37	G40D	G51	G51A	G53	G53A
G55A	G55B	G70C			

Provide each SGL door(s) with the following:










QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA		626	SCE
			BATTERY			
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 02.3STC

For use on Door #(s):

151B 155 157 163

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY		✂ 626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	SOUND HEAD/JAMB/MTG STILE SEAL	770AA-S		AA	ZER
1	EA	SOUND DOOR BOTTOM	369AA		AA	ZER
1	EA	THRESHOLD	164A-223		A	ZER
1	EA	MOUNTING BRACKET	770SPB			ZER











STC 45 DOOR

Hardware Group No. 02.4STC

For use on Door #(s):

146 148 159 161

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	CONT. HINGE	224HD		628	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY		✂ 626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	SOUND HEAD/JAMB/MTG STILE SEAL	770AA-S		AA	ZER
1	EA	SOUND DOOR BOTTOM	369AA		AA	ZER
1	EA	THRESHOLD	164A-223		A	ZER
1	EA	MOUNTING BRACKET	770SPB			ZER







STC 45 DOOR

Hardware Group No. 02.5

For use on Door #(s):

105D	105H	105K	219B	219D	219E
219F	318A	318B	318C	318E	

Provide each SGL door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	COAT AND HAT HOOK	543		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 02.6

For use on Door #(s):

118	121	247B	317A	319A	G33B
G36					

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS441		626	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 02.7

For use on Door #(s):

105B	118A	118B	120B	120C	120D
120E	G40A	G40B	G42A	G42B	

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
4	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY	⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	COAT AND HAT HOOK	543		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 02.8

For use on Door #(s):

107A

Provide each SGL door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY	⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 02.9

For use on Door #(s):

134 136 140 144A 219C

Provide each SGL door(s) with the following:







QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
4	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY		626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	1461 RW/PA STD		689	LCN
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	COAT AND HAT HOOK	543		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 03

For use on Door #(s):

103J 117C G38A G38B G46

Provide each SGL door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	1460T STD		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 03.1

For use on Door #(s):

107B C112 G74






Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 03.2

For use on Door #(s):
161A

Provide each SGL door(s) with the following:






QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 03.3

For use on Door #(s):

102B	102C	109D	111A	111K	113D
113E	123	144B	144D	202A	204
207A.1	207A.2	304	307A.1	307A.2	314A
322A	347	G32	G70A		

Provide each SGL door(s) with the following:







QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	1460T STD		689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 03.4

For use on Door #(s):

104	114	165	173A	233A	235A
237A	304A	314	337A	G22	G33A
G35A	G37A	G54	G56	G58	











Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	1461 RW/PA STD		689	LCN
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 03.5

For use on Door #(s):
G70B










Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	SET	GASKETING	139A-S		A	ZER
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR BOTTOM	355AA		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER

Hardware Group No. 04

For use on Door #(s):
171 G42C G42D

Provide each PR door(s) with the following:







QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE RATED REMOVABLE MULLION	KR9954 STAB		689	VON
2	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R- LRX 4AA BATTERY	 ✎	626	SCE
1	EA	MORTISE CYLINDER	20-061 ICA X K510-730 36-083		626	SCH
2	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	✎	TBD	TBD

Hardware Group No. 05

For use on Door #(s):

105J	109F	117B	119C	121B	121C
316A					

Provide each SGL door(s) with the following:









QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	PRIVACY LOCK	L9040 06A 09-544 L283-722		630	SCH
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	COAT AND HAT HOOK	543		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 05.1

For use on Door #(s):

103A	103B	103C	103D	103E	103F
103G	103H	111C	111D	111E	111F
111G	111H	122A	122B	122C	122D
162	164	172A	172B	172C	172D
175D	206A	206B	206C	206D	206E
212A	212B	212C	212D	212E	212F
222E	222F	222G	222H	222J	306A
306B	306C	306D	306E	312A	312B
312C	312D	312E	312F	322E	322F
322G	322H	322J	G52A	G52B	G70D
G70E					

Provide each SGL door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	PRIVACY LOCK	L9040 06A 09-544 L283-722		630	SCH
1	EA	SURFACE CLOSER	1461 RW/PA STD		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MOP PLATE	8400 4" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	COAT AND HAT HOOK	543		630	IVE

Hardware Group No. 05.2

For use on Door #(s):

G38C G38D

Provide each SGL door(s) with the following:










QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	PRIVACY LOCK	L9040 06A 09-544 L283-722		630	SCH
1	EA	SURFACE CLOSER	1460T STD		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MOP PLATE	8400 4" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	COAT AND HAT HOOK	543		630	IVE

Hardware Group No. 06

For use on Door #(s):

G60A GSK

Provide each SGL door(s) with the following:









QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	PANIC HARDWARE	98-L-NL-06		630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	GASKETING	139A-S		A	ZER
1	EA	DOOR BOTTOM	355AA		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER

Hardware Group No. 06.1

For use on Door #(s):

C203.2 C203.1 C303.2 C303.1

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-L-F-06		630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER

OPERATIONS:

SINGLE HELD OPEN ON MAGNETIC HOLD OPEN













FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 06.2

For use on Door #(s):

156 156A

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
1	SET	SOUND HEAD/JAMB/MTG STILE SEAL	770AA-S		AA	ZER
1	EA	SOUND DOOR BOTTOM	369AA		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER
1	EA	MOUNTING BRACKET	770SPB			ZER

STC OPENING

OPERATIONS:










SINGLE HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 06.3

For use on Door #(s):

G38

Provide each SGL door(s) with the following:







QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-L-F-06		630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	GASKETING	139A-S		A	ZER
1	EA	DOOR BOTTOM	360AA36" (914MM)		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER

Hardware Group No. 07

For use on Door #(s):

218A 247A G70H G70K G70M G70N
G70Q

Provide each SGL door(s) with the following:






QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	PASSAGE SET	ND10S RHO		626	SCH
1	EA	SURFACE CLOSER	1461 RW/PA STD		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 07.1

For use on Door #(s):

109B 109C 109E 318D G70F

Provide each SGL door(s) with the following:







QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	PASSAGE SET	ND10S RHO		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	COAT AND HAT HOOK	543		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 07.2

For use on Door #(s):

220A 346A 348B G37B

Provide each SGL door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	PASSAGE SET	ND10S RHO		626	SCH
1	EA	SURFACE CLOSER	1460T STD		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 09

For use on Door #(s):

114A 125 130 230 330 G30
G50 G73 G75

Provide each SGL door(s) with the following:









QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	⚡	TBD	TBD

Hardware Group No. 09.1

For use on Door #(s):

120.1 144F.1 144G.1

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	⚡	TBD	TBD

OPERATIONS:








SINGLE HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 09.2

For use on Door #(s):

120.2 144F.2 144G.2

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX 4AA BATTERY	 ⚡	626	SCE
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	⚡	TBD	TBD

OPERATIONS:







SINGLE HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 10

For use on Door #(s):

1SL SAGA SC1 SCG SH2 SK1









Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-L-BE-F-06		630	VON
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 10.1

For use on Door #(s):
SD1 SR

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-SPA-J-LRX 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 10.2

For use on Door #(s):

102N	125B	153B	C106A	C107	C110A
G72	G76	SA	SB	SD1A	SE1
SF	SG				

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD EPT		628	IVE
2	EA	POWER TRANSFER	EPT10 CON	⚡	689	VON
1	EA	REMOVABLE MULLION	KR4954		689	VON
1	EA	ELEC PANIC HARDWARE	RX-98-EO	⚡	630	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-NL-OP-110MD-CON 24 VDC	⚡	630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	MORTISE CYLINDER	20-061 ICA X K510-730 36-083 36-082-037		626	SCH
2	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	DOOR PULL, 1" ROUND	8103EZHD 12" STD		630- 316	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	SET	GASKETING	139A-S		A	ZER
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	DOOR BOTTOM	355AA		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER
1	EA	WIRE HARNESS TO POWER SUPPLY	CON-192P			VON
2	EA	LOCK TO POWER TRANSFER CONNECTOR	CON-32			VON
1	EA	POWER SUPPLY	PS902 120/240 VAC	⚡	LGR	SCE
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	⚡	TBD	TBD

DOOR OPERATION:

DOOR NORMALLY CLOSED AND LOCKED.

ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.

REQUEST TO EXIT SWITCH / SENSOR SHUNTS DOOR FORCED OPEN IN ACCESS CONTROL SYSTEM.













KEY OVER-RIDE WILL CAUSE DOOR FORCED ALARM IN ACCESS CONTROL SYSTEM
FREE EGRESS AT ALL TIMES.

Hardware Group No. 10.3

For use on Door #(s):

101.2 101.3 113.3 113.1 144J 144K
144M

Provide each SGL door(s) with the following:














QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	PANIC HARDWARE	CD-98-NL-OP-110MD		630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	MORTISE CYLINDER	20-061 ICA X K510-730 36-083		626	SCH
2	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	DOOR PULL, 1" ROUND	8103EZHD 12" STD		630- 316	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	SET	GASKETING	139A-S		A	ZER
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR BOTTOM	355AA		AA	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER

Hardware Group No. 10.4

For use on Door #(s):

101.4	101.1	113.2	113.4	121V	173B
C008A	C113A	C114A	SH1		

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD EPT		628	IVE
1	EA	POWER TRANSFER	EPT10 CON	 ⚡	689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-NL-OP-110MD-CON 24 VDC	 ⚡	630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	DOOR PULL, 1" ROUND	8103EZHD 12" STD		630- 316	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	SET	GASKETING	139A-S		A	ZER
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR BOTTOM	355AA		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER
1	EA	WIRE HARNESS TO POWER SUPPLY	CON-192P			VON
1	EA	LOCK TO POWER TRANSFER CONNECTOR	CON-32			VON
1	EA	POWER SUPPLY	PS902 120/240 VAC	 ⚡	LGR	SCE
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	 ⚡	TBD	TBD

DOOR OPERATION:

DOOR NORMALLY CLOSED AND LOCKED.

ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.







REQUEST TO EXIT SWITCH / SENSOR SHUNTS DOOR FORCED OPEN IN ACCESS CONTROL SYSTEM.

KEY OVER-RIDE WILL CAUSE DOOR FORCED ALARM IN ACCESS CONTROL SYSTEM
FREE EGRESS AT ALL TIMES.

Hardware Group No. 10.5

For use on Door #(s):
SAR SC









Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	PANIC HARDWARE	98-EO		630	VON
1	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER

Hardware Group No. 11.0

For use on Door #(s):
C007 C008 C108 C113 C114

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBR-06-499F		630	VON
2	EA	SURFACE CLOSER	4040XP HW/PA		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	WALL STOP	WS406/407CVX		626	IVE
2	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	MEETING STILE	8195AA		AA	ZER
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	⚡	TBD	TBD








PAIR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 11.1

For use on Door #(s):

144E.2	144E.1	C001.2	C001.1	C003.2	C003.1
C101.2	C103.2	C101.1	C102.2	C102.1	C103.1
C207.2	C207.1	C307.2	C307.1	SA1.2	SA1.1
SA2.2	SA2.1	SA3.2	SA3.1	SAG	SB1.2
SB1.1	SB2.2	SB2.1	SB3.2	SB3.1	SBG.2
SBG.1	SJ2.2	SJ2.1	SJ3.2	SJ3.1	SJG.2
SJG.1					

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-L-BE-F-06		630	VON
1	EA	SURFACE CLOSER	4040XP HW/PA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		626	IVE
1	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER










DOOR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 11.2

For use on Door #(s):

174A	174C	174D	C111A	C111B	C204
C206	C304	C306			

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	9827-EO-F-LBR-499F		630	VON
1	EA	FIRE EXIT HARDWARE	9827-L-F-LBR-06-499F		630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	FIRE/LIFE CLOSER	4314ME B80 SF WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
2	SET	GASKETING	326AA-S		AA	ZER








PAIR HELD OPEN ON SENTRONIC CLOSERS
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 11.2 DE

For use on Door #(s):

C004 C105

Provide each DE door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBR-06-499F		630	VON
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	MEETING STILE	8195AA		AA	ZER







DOUBLE EGRESS PAIR, HELD OPEN ON WALL MAGNET
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 11.5

For use on Door #(s):

170C C005 G73B G75A SDG

Provide each PR door(s) with the following:









QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBR-06-499F		630	VON
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	MEETING STILE	8195AA		AA	ZER

Hardware Group No. 11.6

For use on Door #(s):

C006 C006A C009A C009B C104A C104B

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBR-06-499F		630	VON
2	EA	SURFACE CLOSER	4040XP HW/PA		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	WALL STOP	WS406/407CVX		626	IVE
2	EA	LOW PROFILE ELECTROMAGNETIC DOOR HOLDER	2400L	 ⚡	630	ABH
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	MEETING STILE	8195AA		AA	ZER









PAIR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 11.7

For use on Door #(s):

202 202B

Provide each PR door(s) with the following:











QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-EO-F-LBR-499F		630	VON
2	EA	ELEC EXIT DEVICE TRIM	AD-400-993S-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	MEETING STILE	8195AA		AA	ZER

Hardware Group No. 11.8

For use on Door #(s):

170A 170B 174B C105A C105B

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-EO-F-LBR-499F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993S-50-MT-RHO-R		626	SCE
			4AA BATTERY			
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP HW/PA		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	WALL STOP	WS406/407CVX		626	IVE
2	EA	MAGNETIC DOOR	SEM7850 12V/24V/120V		689	LCN
		HOLDER				
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	MEETING STILE	8195AA		AA	ZER
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR		TBD	TBD











PAIR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 12

For use on Door #(s):

115A 150 152 G40C G44 G71

Provide each PR door(s) with the following:










QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	CONST LATCHING BOLT	FB61P		630	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY		✂ 626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	COORDINATOR	COR X FL		628	IVE
2	EA	SURFACE CLOSER	1460T STD		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	MEETING STILE	8195AA		AA	ZER
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR		✂ TBD	TBD

Hardware Group No. 12.1

For use on Door #(s):

154A







Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
2	EA	MANUAL FLUSH BOLT WD	FB457		626	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	OH STOP & HOLDER	100HP		630	GLY
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 12.2

For use on Door #(s):
105C

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
2	EA	MANUAL FLUSH BOLT WD	FB457		626	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	PASSAGE SET	ND10S RHO		626	SCH
1	EA	SINGLE DUMMY TRIM	ND170 RHO		626	SCH
2	EA	OH STOP	100S		630	GLY












Hardware Group No. 14

** GASKETING BY ALUM DOOR MFG

For use on Door #(s):

170D 170E G34

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD EPT		628	IVE
2	EA	POWER TRANSFER	EPT10 CON		✂ 689	VON
1	EA	ELEC PANIC HARDWARE	RX-9847-EO-CON		✂ 630	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-9847-NL-OP-110MD-CON 24 VDC		✂ 630	VON
1	EA	MORTISE CYLINDER	20-061 ICA X K510-730 36-083		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	45 DEGREE OFFSET PULL	8145EZHD 12" A		630-316	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER
2	EA	WIRE HARNESS TO POWER SUPPLY	CON-192P			VON
2	EA	LOCK TO POWER TRANSFER CONNECTOR	CON-32			VON
1	EA	POWER SUPPLY	PS902 BBK 120/240 VAC		✂ LGR	SCE
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR		✂ TBD	TBD
1	EA	PERIMETER GASKETING BY DOOR MFG	PROVIDED BY ALUM DOOR MFG		AA	TBD

GASKETING BY ALUM DOOR MFG

OPERATIONS:

DOOR NORMALLY CLOSED AND LOCKED.

ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.

REQUEST TO EXIT SWITCH / SENSOR SHUNTS DOOR FORCED OPEN IN ACCESS CONTROL SYSTEM.

KEY OVER-RIDE WILL CAUSE DOOR FORCED ALARM IN ACCESS CONTROL SYSTEM







FREE EGRESS AT ALL TIMES.

Hardware Group No. 16

For use on Door #(s):

C002 SE2 SF1 SG1

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBR-06-499F		630	VON
2	EA	FIRE/LIFE CLOSER	4314ME B140 SF WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
2	SET	GASKETING	326AA-S		AA	ZER

OPERATIONS:








PAIR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 16.1

For use on Door #(s):

SF2 SF3 SG2 SG3

Provide each PR door(s) with the following:





QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBR-06-499F		630	VON
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ✎	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
2	SET	GASKETING	326AA-S		AA	ZER

1 - DOOR @ WALL, MAGNET TO RELEASE UPON FIRE ALARM

Hardware Group No. 17 AL

For use on Door #(s):
G34A

Provide each PR door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	PUSH/PULL BAR	9145EZHD-12"-NS		630	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER
1	EA	PERIMETER GASKETING BY DOOR MFG	PROVIDED BY ALUM DOOR MFG		AA	TBD

PERIMETER GASKETING BY DOOR MFG

Hardware Group No. 17 WD

For use on Door #(s):
C106 C110 SF1A SG1A

Provide each PR door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	PUSH/PULL BAR	9145EZHD-12"-NS		630	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	GASKETING	139A-S		A	ZER
2	EA	DOOR BOTTOM	360AA36" (914MM)		AA	ZER
2	EA	MEETING STILE	8195AA		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER

Hardware Group No. 17 WD.1

For use on Door #(s):

101A.2	101A.4	101A.3	101A.1	113A.2	113A.3
113A.4	113A.1				

Provide each SGL door(s) with the following:










QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	PUSH/PULL BAR	9145EZHD-12"-NS		630	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	GASKETING	139A-S		A	ZER
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR BOTTOM	360AA36" (914MM)		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER

Hardware Group No. 18

For use on Door #(s):

102H	102K	102M	115.1	115.2	175
G70	G72A	SE1A			

Provide each PR door(s) with the following:











QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE RATED REMOVABLE MULLION	KR9954 STAB		689	VON
2	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX 4AA BATTERY	 ✎	626	SCE
1	EA	MORTISE CYLINDER	20-061 ICA X K510-730 36-083		626	SCH
2	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

AD TRIM @ RHR DOOR

Hardware Group No. 18.1

For use on Door #(s):
173













Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
1	EA	REMOVABLE MULLION	KR4954		689	VON
2	EA	PANIC HARDWARE	98-EO		630	VON
2	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX 4AA BATTERY	 ✎	626	SCE
1	EA	MORTISE CYLINDER	20-061 ICA X K510-730 36-083		626	SCH
2	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 18.2

For use on Door #(s):
G72B

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE RATED REMOVABLE MULLION	KR9954 STAB		689	VON
2	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX 4AA BATTERY	 ✎	626	SCE
1	EA	MORTISE CYLINDER	20-061 ICA X K510-730 36-083		626	SCH
2	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	GASKETING	139A-S		A	ZER
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	DOOR BOTTOM	355AA		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER



AD TRIM @ RHR DOOR

Hardware Group No. 19 - ** ALL OTHER HARDWARE BY DOOR MANUFACTURE.

For use on Door #(s):

G70X G70Y

Provide each RU door(s) with the following:











QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	MORTISE CYLINDER	20-061 ICA X K510-730 36-083		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH

Hardware Group No. 20

For use on Door #(s):

103 111

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	FIRE EXIT HARDWARE	9827-EO-F-LBR-499F		630	VON
1	EA	FIRE EXIT HARDWARE	9827-L-F-LBR-06-499F		630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	MEETING STILE	8195AA		AA	ZER

OPERATIONS:

PAIR HELD OPEN ON MAGNETIC HOLD OPEN












FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 21

For use on Door #(s):

151 153

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-EO-F-LBR-499F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
5	SET	SOUND HEAD/JAMB/MTG STILE SEAL	770AA-S		AA	ZER
2	EA	SOUND DOOR BOTTOM	369AA		AA	ZER
1	EA	THRESHOLD	164A-223		A	ZER
1	EA	MOUNTING BRACKET	770SPB			ZER

STC OPENING

OPERATIONS:

PAIR HELD OPEN ON MAGNETIC HOLD OPEN










FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 21.1

For use on Door #(s):

151A 153A

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBR-06-499F		630	VON
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
5	SET	SOUND HEAD/JAMB/MTG STILE SEAL	770AA-S		AA	ZER
2	EA	SOUND DOOR BOTTOM	369AA		AA	ZER
1	EA	THRESHOLD	164A-223		A	ZER
1	EA	MOUNTING BRACKET	770SPB			ZER

STC OPENING

OPERATIONS:










PAIR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 21.2

For use on Door #(s):

C115

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-EO-F-LBR-499F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993S-50-MT-RHO-R	 ⚡	626	SCE
		4AA BATTERY				
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	MEETING STILE	8195AA		AA	ZER









OPERATIONS:

PAIR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 21.3

For use on Door #(s):
G73A

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-EO-F-LBR-499F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993S-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	MEETING STILE	8195AA		AA	ZER














OPERATIONS:

PAIR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 22

For use on Door #(s):
G60

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD EPT		628	IVE
2	EA	POWER TRANSFER	EPT10 CON		✂ 689	VON
1	EA	ELEC PANIC HARDWARE	RX-9847-EO-CON		✂ 630	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-9847-NL-OP-110MD-CON 24 VDC		✂ 630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	DOOR PULL, 1" ROUND	8103EZHD 12" STD		630-316	IVE
2	EA	SURFACE CLOSER	4040XP HCUSH WMS		689	LCN
2	EA	ARMOR PLATE	8400 48" X 2" LDW B-CS		630	IVE
1	SET	GASKETING	139A-S		A	ZER
2	EA	DOOR BOTTOM	355AA		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER
2	EA	WIRE HARNESS TO POWER SUPPLY	CON-192P			VON
2	EA	LOCK TO POWER TRANSFER CONNECTOR	CON-32			VON
1	EA	POWER SUPPLY	PS902 BBK 120/240 VAC		✂ LGR	SCE
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR		✂ TBD	TBD

OPERATIONS:

DOOR NORMALLY CLOSED AND LOCKED.

ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.


REQUEST TO EXIT SWITCH / SENSOR SHUNTS DOOR FORCED OPEN IN ACCESS CONTROL SYSTEM.

KEY OVER-RIDE WILL CAUSE DOOR FORCED ALARM IN ACCESS CONTROL SYSTEM
FREE EGRESS AT ALL TIMES.

Hardware Group No. PIMS 1ST - PIMS (GWE) FOR ALL 1ST FLOOR AREAS

For use on Door #(s):
1ST FL PIMS

Provide each SGL door(s) with the following:


QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
16	EA	PIM	PIM400-485-RSI	 ⚡		SCE
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	⚡	TBD	TBD

OPERATIONS:
PIMS (GWE) FOR ALL 1ST FLOOR AREAS

Hardware Group No. PIMS 2ND - PIMS (GWE) FOR ALL 2ND FLOOR AREAS

For use on Door #(s):
2ND FL PIMS

Provide each SGL door(s) with the following:


QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
9	EA	PIM	PIM400-485-RSI	 ⚡		SCE
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	⚡	TBD	TBD

OPERATIONS:
PIMS (GWE) FOR ALL 2ND FLOOR AREAS

Hardware Group No. PIMS 3RD - PIMS (GWE) FOR ALL 3RD FLOOR AREAS

For use on Door #(s):
3RD FL PIMS

Provide each SGL door(s) with the following:


QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
8	EA	PIM	PIM400-485-RSI	 ⚡		SCE
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	⚡	TBD	TBD

OPERATIONS:
PIMS (GWE) FOR ALL 3RD FLOOR AREAS

Hardware Group No. PIMS GROUND - PIMS (GWE) FOR ALL GROUND FLOOR AREAS

For use on Door #(s):
GROUND FLR
PIMS

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	PIM	PIM400-485-RSI	 ⚡		SCE
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	⚡	TBD	TBD

OPERATIONS:
PIMS (GWE) FOR ALL 1ST FLOOR AREAS

END OF SECTION

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 "General Requirements" sections for Allowances, Alternates, Owner Furnished Contractor Installed, Project Management and Coordination.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:
 - a. "Metal Doors and Frames"
 - b. "Flush Wood Doors"
 - c. "Stile and Rail Wood Doors"
 - d. "Interior Aluminum Doors and Frames"
 - e. "Aluminum-Framed Entrances and Storefronts"
 - f. "Stainless Steel Doors and Frames"
 - g. "Special Function Doors"
 - h. "Entrances"
6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:
 - a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
 - b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - a. Wiring Diagrams: For power, signal, and control wiring and including:
 - 1) Details of interface of electrified door hardware and building safety and security systems.
 - 2) Schematic diagram of systems that interface with electrified door hardware.
 - 3) Point-to-point wiring.
 - 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
 - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

4. Door Hardware Schedule:
 - a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
 - b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
 - c. Indicate complete designations of each item required for each opening, include:
 - 1) Door Index: door number, heading number, and Architect's hardware set number.
 - 2) Quantity, type, style, function, size, and finish of each hardware item.
 - 3) Name and manufacturer of each item.
 - 4) Fastenings and other pertinent information.
 - 5) Location of each hardware set cross-referenced to indications on Drawings.
 - 6) Explanation of all abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for hardware.
 - 8) Door and frame sizes and materials.
 - 9) Degree of door swing and handing.
 - 10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.
5. Key Schedule:
 - a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
 - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
 - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
 - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
 - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
 - f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

C. Informational Submittals:

1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
2. Provide Product Data:
 - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
 - b. Include warranties for specified door hardware.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Final approved hardware schedule edited to reflect conditions as installed.
 - d. Final keying schedule
 - e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

- f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

- 1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
 - a. Fire door assemblies, in compliance with NFPA 80.
 - b. Required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

- 1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
- 2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
- 3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
 - a. For door hardware: DHI certified AHC or DHC.
 - b. Can provide installation and technical data to Architect and other related subcontractors.
 - c. Can inspect and verify components are in working order upon completion of installation.
 - d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.
- 4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

- 1. Fire-Rated Door Openings:
 - a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
 - b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
- 2. Smoke and Draft Control Door Assemblies:
 - a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
 - b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
- 3. Electrified Door Hardware

- a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
- 4. Accessibility Requirements:
 - a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.
- C. Pre-Installation Meetings
 - 1. Keying Conference
 - a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - 1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2) Preliminary key system schematic diagram.
 - 3) Requirements for key control system.
 - 4) Requirements for access control.
 - 5) Address for delivery of keys.
 - 2. Pre-installation Conference
 - a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Inspect and discuss preparatory work performed by other trades.
 - c. Inspect and discuss electrical roughing-in for electrified door hardware.
 - d. Review sequence of operation for each type of electrified door hardware.
 - e. Review required testing, inspecting, and certifying procedures.
 - f. Review questions or concerns related to proper installation and adjustment of door hardware.
 - 3. Electrified Hardware Coordination Conference:
 - a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
- C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
- D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

- F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.07 WARRANTY

- A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.
 - 1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
 - 2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
 - a. Mechanical Warranty
 - 1) Locks
 - a) Schlage ND Series: 10 years
 - b) Schlage L Series: 3 years
 - 2) Exit Devices
 - a) Von Duprin: 3 years
 - 3) Closers
 - a) LCN 4000 Series: 30 years
 - b) LCN 1460 Series: 30 years
 - b. Electrical Warranty
 - 1) Locks
 - a) Schlage: 1 year
 - 2) Exit Devices
 - a) Von Duprin: 1 year
 - 3) Closers
 - a) LCN: 2 years

1.08 MAINTENANCE

- A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
- B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. The Owner requires use of certain products for their unique characteristics and project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."
 - 1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.
- B. Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request in accordance with section 01 25 00.
- C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

- A. Fabrication
 - 1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer's recognized installation standards for application intended.
 - 2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
 - 3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with "Metal Doors and Frames", "Flush Wood Doors", "Stile and Rail Wood Doors" to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.
- B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
 - 1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.
- C. Cable and Connectors:
 - 1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
 - 2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.

3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Ives 5BB series
2. Acceptable Manufacturers and Products:
 - a. Hager BB1191/1279 series
 - b. Best FBB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins
9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Select
 - b. Hager

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 ELECTRIC POWER TRANSFER

A. Manufacturers:

1. Scheduled Manufacturer and Product:
 - a. Von Duprin EPT-10
2. Acceptable Manufacturers and Products:
 - a. Security Door Controls PTM
 - b. Precision EPT-12C

B. Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
2. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.06 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. DCI
 - c. Trimco

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.07 COORDINATORS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco
 - c. DCI

B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes, or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.08 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage L9000 series
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.
2. Indicators: Where specified, provide indicator window measuring a minimum 2-3/5-inch x 3/5 inch with 180-degree visibility. Provide messages color-coded using ANSI Z535 Safety Red with full text and/or symbols, as scheduled, for easy visibility. When applicable allows for lock status indication on both sides of the door.
3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.

5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches.
7. Provide motor based electrified locksets that comply with the following requirements:
 - a. Universal input voltage – single chassis accepts 12 or 24VDC to allow for changes in the field without changing lock chassis.
 - b. Fail Safe/Fail Secure – changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case.
 - c. Low maximum current draw – maximum 0.4 amps to allow for multiple locks on a single power supply.
 - d. Low holding current – maximum 0.01 amps to produce minimal heat, eliminate “hot levers” in electrically locked applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
 - e. Connections – provide quick-connect Molex system standard.
8. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
 - a. Lever Design: 06A

2.09 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage ND series
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
 - a. Lever Design: Rhodes

2.10 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

- a. Von Duprin 98/35A series
- 2. Acceptable Manufacturers and Products:
 - a. No Substitute
- B. Requirements:
 - 1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
 - 2. Cylinders: Refer to "KEYING" article, herein.
 - 3. Provide smooth touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
 - 4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
 - 5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
 - 6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
 - 7. Provide flush end caps for exit devices.
 - 8. Provide exit devices with manufacturer's approved strikes.
 - 9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
 - 10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
 - 11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
 - 12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
 - 13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
 - 14. Provide electrified options as scheduled.
 - 15. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
 - 16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.11 ELECTRONIC ACCESS CONTROL LOCKSETS AND EXIT DEVICE TRIM

- A. Manufacturers:
 - 1. Scheduled Manufacturer and Product:
 - a. Schlage AD Series
 - 2. Acceptable Manufacturers and Products:
 - a. No Substitute
- B. Requirements:
 - 1. Provide adaptable electronic access control products that comply with the following requirements:
 - a. Listed, UL 294 - The Standard of Safety for Access Control System Units.
 - b. Compliant with ANSI/BHMA A156.25 Grade 1 Operation and Security.
 - c. Certified to UL10C, FCC Part15, Florida Building Code Standards TAS 201 large missile impact, TAS 202 and TAS 203.
 - d. Compliant with ASTM E330 for door assemblies.

- e. Compliant with ICC / ANSI A117.1, NFPA 101, NFPA 80, and Industry Canada IC.
- 2. Functions: Provide functions as scheduled that are field configurable without taking the adaptable electronic product off the door.
- 3. Emergency Override: Provide mechanical key override; cylinders: Refer to "KEYING" article, herein.
- 4. Levers:
 - a. Vandal Resistance: Exterior (secure side) lever rotates freely while door remains locked, preventing damage to internal lock components from vandalism by excessive force.
 - b. Provide non-handed lever trim that operates independently of non-locking levers.
 - c. Style: Rhodes (RHO)
 - d. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.
- 5. Features:
 - a. Audible feedback that can be enabled or disabled.
 - b. Tamper-Resistant Screws: Tamper torx screws on inside escutcheon for increased security.
 - c. Visual tri-colored LED indicators that indicate activation, additional PIN code credential required, operational systems status, system error conditions and low power conditions.
 - d. Door Position Switch
 - e. Interior Cover Tamper Guard
 - f. Mechanical Key Override
 - g. Request to Exit
 - h. Request to Enter
 - i. Lock/Unlock Status
- 6. Credential Reader
 - a. Credential Reader Configuration: Provide credential reader modules in the following configurations as indicated in door hardware sets.
 - b. Credential Reader Capabilities: Provide credential readers capable of operating with the following integrated software partners.
 - 1) 13.56 MHz Smart card credentials:
 - a) Secure section (Multi-Technology and Smartcard): Schlage MIFARE Classic, Schlage MIFARE DESFire EV1/EV3, PIV and PIV-I Compatible
 - b) 13.56 MHz Serial number only (Multi-Technology and Smartcard): MIFARE, DESFire, HID iClass, MIFARE DESFire EV1/EV3
 - c) 125 kHz Proximity card credentials: Schlage, XceedID, HID, GE/CASI ProxLite and AWID.
 - 2) Multi-Technology readers that read both 13.56 MHz Smart Cards and 125 kHz Prox cards.
 - 3) Dual credential reading capabilities credential card or fob and PIN.
 - 4) 12 button keypad with backlit buttons.
 - 5) Magnetic Card Reader:
 - a) Full insertion or swipe reader capable of reading information along full length of magnetic stripe.
 - b) Magnetic card triple track reader capable of reading tracks 1, 2 or 3 per configuration in field.
- 7. Operation:
 - a. Offline – access control rights stored on device
 - 1) Provide adaptable electronic access control products with the ability to be configured at door by handheld programming device the length of time device is unlocked upon access grant.

- 2) Provide adaptable electronic access control products with the ability to communicate identifying information such as firmware versions, hardware versions, serial numbers, and manufacturing dates by handheld programming device.
- b. Networked – wireless
 - 1) Adaptable electronic access control product system interface:
 - 2) Adaptable electronic access control products to have real-time bidirectional communication between access control system and lock.
 - 3) Remote Commanding By Partner Integrated Access Control Network Software: Battery-powered lockset shall have "Wake on Radio" feature causing activation of remote, wireless access control devices, enabling activated devices to be configured, locked or unlocked from a centralized location within 10 seconds or less without user interface at the device.
 - 4) Local Commanding: Provide adaptable electronic access control product with the ability to be configured, locked or unlocked locally by handheld programming device, in real-time.
 - 5) When Utilized with Access Control Network Software with Remote Commanding Capability: Provide adaptable electronic access control product with the ability to be remotely locked down or unlocked within 10 seconds or less while battery powered without user interface at the device.
 - 6) Real-time response of battery powered device capable of being configured at door by handheld programming device and remotely by Partner integrated software.
 - 7) Upon Loss of Power to Device: Provide adaptable electronic access control product with the ability to manage access control offline in one of three methods below that can be configured in the field at device by handheld programming device and remotely by Partner integrated software:
 - a) Fail locked (secured)
 - b) Fail unlocked (unsecured)
 - c) Fail As-Is
 - 8) Upon Loss of Communication Between Device and Network: Provide adaptable electronic access control product with the ability to manage access control offline in one of four methods below that can be configured in the field at lockset by handheld programming device and remotely by Partner integrated software:
 - a) Fail locked (secured)
 - b) Fail unlocked (unsecured)
 - c) Fail As-Is
 - d) Fail to Degraded/cache mode utilizing cache memory with following selectable options:
 - i. Grant access up to the last 1,000 unique previously accepted User IDs.
 - ii. Grant access up to the last 1,000 unique previously accepted facility/site codes
 - iii. Remove from cache previously stored User IDs or facility/site codes that have not been presented to lock within the last 5 days.
 - 9) Provide adaptable electronic access control product with the ability to be configured at door by handheld programming device and remotely by Partner integrated software the length of time device is unlocked upon access grant.
 - 10) Provide adaptable electronic access control product with the ability to communicate identifying information such as firmware versions, hardware versions, serial numbers, and manufacturing dates by handheld programming device and remotely by Partner integrated software.
 - 11) Wireless Transmission:
 - a) Modulation: 900 MHz spread spectrum, direct sequence, 10 channels.
 - b) Encryption: AES-128-bit Key minimum.

C. Components

1. Product: Schlage HHD series with Utility Software. (OFFLINE)

- a. Provide Handheld Programming Device for adaptable electronic access control products capable of the following minimum requirements.
 - 1) Capable of initializing lock and accessories using preloaded software.
 - 2) Utilized to field configure electronic access control devices, to download firmware updates and door files to device, and to download audit files from device.
2. Provide Panel Interface for adaptable electronic access control products.
 - a. Product: Schlage PIM400-485 or PIM400-TD2 Panel Interface Module as required. (AD-400)

2.12 POWER SUPPLIES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage/Von Duprin PS900 Series
2. Acceptable Manufacturers and Products:
 - a. Precision ELR series
 - b. Dynalock 5000 series
 - c. Security Door Controls 600 series

B. Requirements:

1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:
 - a. 12/24 VDC Output, field selectable.
 - b. Class 2 Rated power limited output.
 - c. Universal 120-240 VAC input.
 - d. Low voltage DC, regulated and filtered.
 - e. Polarized connector for distribution boards.
 - f. Fused primary input.
 - g. AC input and DC output monitoring circuit w/LED indicators.
 - h. Cover mounted AC Input indication.
 - i. Tested and certified to meet UL294.
 - j. NEMA 1 enclosure.
 - k. Hinged cover w/lock down screws.
 - l. High voltage protective cover.

2.13 CYLINDERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage Everest 29 S ** CONFIRM EXISTING KEYWAY IN PLACE
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset; manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
 - a. Patented Open: cylinder with interchangeable core with open keyway.
3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent protected.
4. Nickel silver bottom pins.

2.14 KEYING

A. Scheduled System:

1. Existing factory registered system:
 - a. Provide cylinders/cores keyed into Owner's existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

1. Construction Keying:
 - a. Replaceable Construction Cores.
 - 1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
 - a) 3 construction control keys
 - b) 12 construction change (day) keys.
 - 2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.
2. Permanent Keying:
 - a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - 1) Master Keying system as directed by the Owner.
 - b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
 - c. Provide keys with the following features:
 - 1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
 - 2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
 - 3) Geographically Exclusive: Where High Security or Security cylinders/cores are indicated, provide nationwide, geographically exclusive key system complying with the following restrictions.
 - d. Identification:
 - 1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
 - 2) Identification stamping provisions must be approved by the Architect and Owner.
 - 3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
 - 4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.

- 5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
- e. Quantity: Furnish in the following quantities.
 - 1) Permanent Control Keys: 3.
 - 2) Master Keys: 6.
 - 3) Change (Day) Keys: 3 per cylinder/core that is keyed differently
 - 4) Key Blanks: Quantity as determined in the keying meeting.

2.15 KEY CONTROL SYSTEM

A. Manufacturers:

- 1. Scheduled Manufacturer:
 - a. Telkee
- 2. Acceptable Manufacturers:
 - a. HPC
 - b. Lund

B. Requirements:

- 1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.
 - a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
 - b. Provide hinged-panel type cabinet for wall mounting.

2.16 DOOR CLOSERS

A. Manufacturers and Products:

- 1. Scheduled Manufacturer and Product:
 - a. LCN 4040XP series
- 2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

- 1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
- 2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
- 3. Cylinder Body: 1-1/2-inch (38 mm) diameter piston with 5/8-inch (16 mm) diameter double heat-treated pinion journal. QR code with a direct link to maintenance instructions.
- 4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
- 5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards. Provide snap-on cover clip, with plastic covers, that secures cover to spring tube.

6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck. Provide graphically labelled instructions on the closer body adjacent to each adjustment valve. Provide positive stop on reg valve that prevents reg screw from being backed out.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.17 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. LCN 1460 series
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory.
2. Provide door closers with fully hydraulic, full rack and pinion action cast iron cylinder.
3. Closer Body: 1-1/4-inch (32 mm) diameter, with 5/8-inch (16 mm) diameter heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.18 ELECTRO-MECHANICAL CLOSER/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. LCN
2. Acceptable Manufacturers:
 - a. No Substitute

B. Requirements:

1. Provide single-point or multi-point hold-open electro-mechanical closer/holders as specified. Coordinate voltage requirements and provide transformer if necessary.
2. Provide closer/holders that function as full rack and pinion door closer when current is interrupted or continuous hold-open is not engaged.
3. Provide door closers with fully hydraulic, full rack and pinion action with high strength cylinder and full complement bearings at shaft.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.19 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Elmes
 - b. Burns
 - c. Trimco

B. Requirements:

1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.20 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.21 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:
 - a. Glynn-Johnson
2. Acceptable Manufacturers:
 - a. No Substitute

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.

2.22 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.23 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Zero International
2. Acceptable Manufacturers:
 - a. National Guard
 - b. Reese
 - c. Legacy

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.24 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.25 MAGNETIC HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. LCN
2. Acceptable Manufacturers:
 - a. No Substitute

B. Requirements:

1. Provide wall or floor mounted electromagnetic door release as specified with minimum of 25 pounds of holding force. Coordinate projection of holder and armature with other hardware and wall conditions to ensure that door sits parallel to wall when fully open. Connect magnetic holders on fire-rated doors into the fire control panel for fail-safe operation.

2.26 COAT HOOKS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns
 - b. Rockwood

B. Provide coat hooks as specified.

2.27 FINISHES

A. FINISH: BHMA 630 (US32D); EXCEPT:

1. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
2. Door Closers: Powder Coat to Match
3. Weatherstripping: Clear Anodized Aluminum
4. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 2. Custom Steel Doors and Frames: HMMA 831.
 3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
 4. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.
- C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

- H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- I. Lock Cylinders:
 - 1. Install construction cores to secure building and areas during construction period.
 - 2. Replace construction cores with permanent cores as indicated in keying section.
 - 3. Furnish permanent cores to Owner for installation.
- J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:
 - 1. Conduit, junction boxes and wire pulls.
 - 2. Connections to and from power supplies to electrified hardware.
 - 3. Connections to fire/smoke alarm system and smoke evacuation system.
 - 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
 - 5. Connections to panel interface modules, controllers, and gateways.
 - 6. Testing and labeling wires with Architect's opening number.
- K. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- L. Continuous Hinges: Re-locate the door and frame fire rating labels where they will remain visible so that the hinge does not cover the label once installed.
- M. Door Closers & Auto Operators: Mount closers/operators on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers/operators so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- N. Overhead Stops/Holders: Mount overhead stops/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- O. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
- P. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- Q. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- R. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- S. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- T. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
 - 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 - 3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items per manufacturer's instructions to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
- D. Hardware Sets:

Abbreviation	Name
ABH	ABH Manufacturing
GLY	Glynn-Johnson Corp
IVE	H.B. Ives
LCN	LCN Commercial Division
SCE	Schlage Electronic Security
SCH	Schlage Lock Company
TBD	Manufacturer To Be Determined
VON	Von Duprin
ZER	Zero International Inc

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Legend:

 [Link to catalog cut sheet.](#)







 **Electrified Opening**

Hardware Group No. 01

For use on Door #(s):

102G

Provide each SGL door(s) with the following:









QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-L-BE-F-06		630	VON
1	EA	SURFACE CLOSER	4040XP CUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 01.1

For use on Door #(s):

115.3 115.4

Provide each SGL door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX		 626	SCE
		4AA BATTERY				
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP CUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 02.1

For use on Door #(s):

101C	105A	106	108	108A	109A
117	119B.1	119B	121A.1	130A	144C
154	166	201	205	207	214A
215	216	217	218	219A	220
223	231	246	247	248	305A
305B	307	309	311	316	319
320	321	331	346	348	348A
G40	G42	G60G	G60H		

Provide each SGL door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 02.2

For use on Door #(s):

101B	105	105E	107	109	109G
110	112	113B	113C	116	116A
117A	119	119A	121A	121D	131
133	135	137	138A	138	142
166B	172E	172F	174E	174F	175A
175B	175C	203	204A	208	209
210	211	213	214	217B	219
225	230A	233	235	237	238
240	242	244	246A	248A	308
310	317	318	323	330A	333
335	337	338	340	342	344
346B	C308	G01	G30A	G33	G35
G37	G40D	G51	G51A	G53	G53A
G55A	G55B	G70C			

Provide each SGL door(s) with the following:










QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA		626	SCE
			BATTERY			
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 02.3STC

For use on Door #(s):

151B 155 157 163

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	SOUND HEAD/JAMB/MTG STILE SEAL	770AA-S		AA	ZER
1	EA	SOUND DOOR BOTTOM	369AA		AA	ZER
1	EA	THRESHOLD	164A-223		A	ZER
1	EA	MOUNTING BRACKET	770SPB			ZER











STC 45 DOOR

Hardware Group No. 02.4STC

For use on Door #(s):

146 148 159 161

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	CONT. HINGE	224HD		628	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	SOUND HEAD/JAMB/MTG STILE SEAL	770AA-S		AA	ZER
1	EA	SOUND DOOR BOTTOM	369AA		AA	ZER
1	EA	THRESHOLD	164A-223		A	ZER
1	EA	MOUNTING BRACKET	770SPB			ZER







STC 45 DOOR

Hardware Group No. 02.5

For use on Door #(s):

105D	105H	105K	219B	219D	219E
219F	318A	318B	318C	318E	

Provide each SGL door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	COAT AND HAT HOOK	543		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 02.6

For use on Door #(s):

118	121	247B	317A	319A	G33B
G36					

Provide each SGL door(s) with the following:







QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS441		626	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 02.7

For use on Door #(s):

105B	118A	118B	120B	120C	120D
120E	G40A	G40B	G42A	G42B	









Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
4	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	COAT AND HAT HOOK	543		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 02.8

For use on Door #(s):
107A








Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 02.9

For use on Door #(s):
134 136 140 144A 219C







Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
4	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	1461 RW/PA STD		689	LCN
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	COAT AND HAT HOOK	543		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 03

For use on Door #(s):
103J 117C G38A G38B G46

Provide each SGL door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	1460T STD		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 03.1

For use on Door #(s):

107B C112 G74

Provide each SGL door(s) with the following:






QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 03.2

For use on Door #(s):

161A

Provide each SGL door(s) with the following:






QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 03.3

For use on Door #(s):

102B	102C	109D	111A	111K	113D
113E	123	144B	144D	202A	204
207A.1	207A.2	304	307A.1	307A.2	314A
322A	347	G32	G70A		

Provide each SGL door(s) with the following:







QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	1460T STD		689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 03.4

For use on Door #(s):

104	114	165	173A	233A	235A
237A	304A	314	337A	G22	G33A
G35A	G37A	G54	G56	G58	

Provide each SGL door(s) with the following:











QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY		626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	1461 RW/PA STD		689	LCN
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 03.5

For use on Door #(s):

G70B

Provide each SGL door(s) with the following:










QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	SET	GASKETING	139A-S		A	ZER
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR BOTTOM	355AA		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER

Hardware Group No. 04

For use on Door #(s):

171 G42C G42D

Provide each PR door(s) with the following:







QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE RATED REMOVABLE MULLION	KR9954 STAB		689	VON
2	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX 4AA BATTERY	 ✎	626	SCE
1	EA	MORTISE CYLINDER	20-061 ICA X K510-730 36-083		626	SCH
2	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	✎	TBD	TBD

Hardware Group No. 05

For use on Door #(s):

105J 109F 117B 119C 121B 121C
316A

Provide each SGL door(s) with the following:









QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	PRIVACY LOCK	L9040 06A 09-544 L283-722		630	SCH
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	COAT AND HAT HOOK	543		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 05.1

For use on Door #(s):

103A	103B	103C	103D	103E	103F
103G	103H	111C	111D	111E	111F
111G	111H	122A	122B	122C	122D
162	164	172A	172B	172C	172D
175D	206A	206B	206C	206D	206E
212A	212B	212C	212D	212E	212F
222E	222F	222G	222H	222J	306A
306B	306C	306D	306E	312A	312B
312C	312D	312E	312F	322E	322F
322G	322H	322J	G52A	G52B	G70D
G70E					

Provide each SGL door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	PRIVACY LOCK	L9040 06A 09-544 L283-722		630	SCH
1	EA	SURFACE CLOSER	1461 RW/PA STD		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MOP PLATE	8400 4" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	COAT AND HAT HOOK	543		630	IVE

Hardware Group No. 05.2

For use on Door #(s):

G38C G38D

Provide each SGL door(s) with the following:










QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	PRIVACY LOCK	L9040 06A 09-544 L283-722		630	SCH
1	EA	SURFACE CLOSER	1460T STD		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MOP PLATE	8400 4" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	COAT AND HAT HOOK	543		630	IVE

Hardware Group No. 06

For use on Door #(s):

G60A GSK

Provide each SGL door(s) with the following:









QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	PANIC HARDWARE	98-L-NL-06		630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	GASKETING	139A-S		A	ZER
1	EA	DOOR BOTTOM	355AA		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER

Hardware Group No. 06.1

For use on Door #(s):

C203.2 C203.1 C303.2 C303.1

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-L-F-06		630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V		689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER

OPERATIONS:













SINGLE HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 06.2

For use on Door #(s):

156 156A

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX		626	SCE
		4AA BATTERY				
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V		689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
1	SET	SOUND HEAD/JAMB/MTG	770AA-S		AA	ZER
		STILE SEAL				
1	EA	SOUND DOOR BOTTOM	369AA		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER
1	EA	MOUNTING BRACKET	770SPB			ZER

STC OPENING

OPERATIONS:










SINGLE HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 06.3

For use on Door #(s):

G38

Provide each SGL door(s) with the following:







QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-L-F-06		630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	GASKETING	139A-S		A	ZER
1	EA	DOOR BOTTOM	360AA36" (914MM)		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER

Hardware Group No. 07

For use on Door #(s):

218A 247A G70H G70K G70M G70N
G70Q

Provide each SGL door(s) with the following:






QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	PASSAGE SET	ND10S RHO		626	SCH
1	EA	SURFACE CLOSER	1461 RW/PA STD		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 07.1

For use on Door #(s):

109B 109C 109E 318D G70F

Provide each SGL door(s) with the following:







QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	PASSAGE SET	ND10S RHO		626	SCH
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	COAT AND HAT HOOK	543		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 07.2

For use on Door #(s):

220A 346A 348B G37B

Provide each SGL door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	PASSAGE SET	ND10S RHO		626	SCH
1	EA	SURFACE CLOSER	1460T STD		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 09

For use on Door #(s):

114A	125	130	230	330	G30
G50	G73	G75			

Provide each SGL door(s) with the following:









QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	⚡	TBD	TBD

Hardware Group No. 09.1

For use on Door #(s):

120.1	144F.1	144G.1
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Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	⚡	TBD	TBD

OPERATIONS:








SINGLE HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 09.2

For use on Door #(s):

120.2 144F.2 144G.2

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX		✂ 626	SCE
		4AA BATTERY				
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V		✂ 689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	WIRING DIAGRAMS, CARD	BY SECURITY INTEGRATOR		✂ TBD	TBD
		READERS, DR CONTACTS				
		BY DIV 28				

OPERATIONS:







SINGLE HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 10

For use on Door #(s):

1SL SAGA SC1 SCG SH2 SK1

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-L-BE-F-06		630	VON
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER









Hardware Group No. 10.1

For use on Door #(s):

SD1

SR

Provide each SGL door(s) with the following:

















QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-SPA-J-LRX		✂ 626	SCE
		4AA BATTERY				
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 10.2

For use on Door #(s):

102N	125B	153B	C106A	C107	C110A
G72	G76	SA	SB	SD1A	SE1
SF	SG				

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD EPT		628	IVE
2	EA	POWER TRANSFER	EPT10 CON	 ⚡	689	VON
1	EA	REMOVABLE MULLION	KR4954		689	VON
1	EA	ELEC PANIC HARDWARE	RX-98-EO	 ⚡	630	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-NL-OP-110MD-CON 24 VDC	 ⚡	630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	MORTISE CYLINDER	20-061 ICA X K510-730 36-083 36-082-037		626	SCH
2	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	DOOR PULL, 1" ROUND	8103EZHD 12" STD		630-316	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	SET	GASKETING	139A-S		A	ZER
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	DOOR BOTTOM	355AA		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER
1	EA	WIRE HARNESS TO POWER SUPPLY	CON-192P			VON
2	EA	LOCK TO POWER TRANSFER CONNECTOR	CON-32			VON
1	EA	POWER SUPPLY	PS902 120/240 VAC	 ⚡	LGR	SCE
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	 ⚡	TBD	TBD

DOOR OPERATION:

DOOR NORMALLY CLOSED AND LOCKED.

ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.

REQUEST TO EXIT SWITCH / SENSOR SHUNTS DOOR FORCED OPEN IN ACCESS CONTROL SYSTEM.

KEY OVER-RIDE WILL CAUSE DOOR FORCED ALARM IN ACCESS CONTROL SYSTEM













FREE EGRESS AT ALL TIMES.

Hardware Group No. 10.3

For use on Door #(s):

101.2	101.3	113.3	113.1	144J	144K
144M					

Provide each SGL door(s) with the following:













QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	PANIC HARDWARE	CD-98-NL-OP-110MD		630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	MORTISE CYLINDER	20-061 ICA X K510-730 36-083		626	SCH
2	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	DOOR PULL, 1" ROUND	8103EZHD 12" STD		630-316	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	SET	GASKETING	139A-S		A	ZER
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR BOTTOM	355AA		AA	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER

Hardware Group No. 10.4

For use on Door #(s):

101.4	101.1	113.2	113.4	121V	173B
C008A	C113A	C114A	SH1		

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD EPT		628	IVE
1	EA	POWER TRANSFER	EPT10 CON		⚡ 689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-NL-OP-110MD-CON 24 VDC		⚡ 630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	DOOR PULL, 1" ROUND	8103EZHD 12" STD		630-316	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	SET	GASKETING	139A-S		A	ZER
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR BOTTOM	355AA		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER
1	EA	WIRE HARNESS TO POWER SUPPLY	CON-192P			VON
1	EA	LOCK TO POWER TRANSFER CONNECTOR	CON-32			VON
1	EA	POWER SUPPLY	PS902 120/240 VAC		⚡ LGR	SCE
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR		⚡ TBD	TBD

DOOR OPERATION:

DOOR NORMALLY CLOSED AND LOCKED.

ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.

REQUEST TO EXIT SWITCH / SENSOR SHUNTS DOOR FORCED OPEN IN ACCESS CONTROL SYSTEM.

KEY OVER-RIDE WILL CAUSE DOOR FORCED ALARM IN ACCESS CONTROL SYSTEM







FREE EGRESS AT ALL TIMES.

Hardware Group No. 10.5

For use on Door #(s):

SAR	SC
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Provide each SGL door(s) with the following:









QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	PANIC HARDWARE	98-EO		630	VON
1	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER

Hardware Group No. 11.0

For use on Door #(s):

C007 C008 C108 C113 C114

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBR-06-499F		630	VON
2	EA	SURFACE CLOSER	4040XP HW/PA		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	WALL STOP	WS406/407CVX		626	IVE
2	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	MEETING STILE	8195AA		AA	ZER
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	⚡	TBD	TBD








PAIR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 11.1

For use on Door #(s):

144E.2	144E.1	C001.2	C001.1	C003.2	C003.1
C101.2	C103.2	C101.1	C102.2	C102.1	C103.1
C207.2	C207.1	C307.2	C307.1	SA1.2	SA1.1
SA2.2	SA2.1	SA3.2	SA3.1	SAG	SB1.2
SB1.1	SB2.2	SB2.1	SB3.2	SB3.1	SBG.2
SBG.1	SJ2.2	SJ2.1	SJ3.2	SJ3.1	SJG.2
SJG.1					

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	98-L-BE-F-06		630	VON
1	EA	SURFACE CLOSER	4040XP HW/PA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		626	IVE
1	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER










DOOR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 11.2

For use on Door #(s):

174A	174C	174D	C111A	C111B	C204
C206	C304	C306			

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE EXIT HARDWARE	9827-EO-F-LBR-499F		630	VON
1	EA	FIRE EXIT HARDWARE	9827-L-F-LBR-06-499F		630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	FIRE/LIFE CLOSER	4314ME B80 SF WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
2	SET	GASKETING	326AA-S		AA	ZER








PAIR HELD OPEN ON SENTRONIC CLOSERS
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 11.2 DE

For use on Door #(s):

C004	C105
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Provide each DE door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBR-06-499F		630	VON
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	MEETING STILE	8195AA		AA	ZER







DOUBLE EGRESS PAIR, HELD OPEN ON WALL MAGNET
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 11.5

For use on Door #(s):

170C C005 G73B G75A SDG

Provide each PR door(s) with the following:









QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBR-06-499F		630	VON
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	MEETING STILE	8195AA		AA	ZER

Hardware Group No. 11.6

For use on Door #(s):

C006 C006A C009A C009B C104A C104B

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBR-06-499F		630	VON
2	EA	SURFACE CLOSER	4040XP HW/PA		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	WALL STOP	WS406/407CVX		626	IVE
2	EA	LOW PROFILE ELECTROMAGNETIC DOOR HOLDER	2400L	 ✎	630	ABH
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	MEETING STILE	8195AA		AA	ZER









PAIR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 11.7

For use on Door #(s):

202 202B

Provide each PR door(s) with the following:











QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-EO-F-LBR-499F		630	VON
2	EA	ELEC EXIT DEVICE TRIM	AD-400-993S-50-MT-RHO-R 4AA BATTERY	 ✎	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	MEETING STILE	8195AA		AA	ZER

Hardware Group No. 11.8

For use on Door #(s):

170A 170B 174B C105A C105B

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-EO-F-LBR-499F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993S-50-MT-RHO-R 4AA BATTERY	 ✎	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP HW/PA		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	WALL STOP	WS406/407CVX		626	IVE
2	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ✎	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	MEETING STILE	8195AA		AA	ZER
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	✎	TBD	TBD











PAIR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 12

For use on Door #(s):

115A 150 152 G40C G44 G71

Provide each PR door(s) with the following:










QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	CONST LATCHING BOLT	FB61P		630	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	COORDINATOR	COR X FL		628	IVE
2	EA	SURFACE CLOSER	1460T STD		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	MEETING STILE	8195AA		AA	ZER
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR	⚡	TBD	TBD

Hardware Group No. 12.1

For use on Door #(s):

154A







Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
2	EA	MANUAL FLUSH BOLT WD	FB457		626	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
1	EA	OH STOP & HOLDER	100HP		630	GLY
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 12.2

For use on Door #(s):
105C

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
2	EA	MANUAL FLUSH BOLT WD	FB457		626	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	PASSAGE SET	ND10S RHO		626	SCH
1	EA	SINGLE DUMMY TRIM	ND170 RHO		626	SCH
2	EA	OH STOP	100S		630	GLY












Hardware Group No. 14

** GASKETING BY ALUM DOOR MFG

For use on Door #(s):

170D 170E G34

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD EPT		628	IVE
2	EA	POWER TRANSFER	EPT10 CON	 ⚡	689	VON
1	EA	ELEC PANIC HARDWARE	RX-9847-EO-CON	 ⚡	630	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-9847-NL-OP-110MD-CON 24 VDC	 ⚡	630	VON
1	EA	MORTISE CYLINDER	20-061 ICA X K510-730 36-083		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	45 DEGREE OFFSET PULL	8145EZHD 12" A		630-316	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER
2	EA	WIRE HARNESS TO POWER SUPPLY	CON-192P			VON
2	EA	LOCK TO POWER TRANSFER CONNECTOR	CON-32			VON
1	EA	POWER SUPPLY	PS902 BBK 120/240 VAC	 ⚡	LGR	SCE
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR		⚡ TBD	TBD
1	EA	PERIMETER GASKETING BY DOOR MFG	PROVIDED BY ALUM DOOR MFG		AA	TBD

GASKETING BY ALUM DOOR MFG

OPERATIONS:

DOOR NORMALLY CLOSED AND LOCKED.

ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.

REQUEST TO EXIT SWITCH / SENSOR SHUNTS DOOR FORCED OPEN IN ACCESS CONTROL SYSTEM.

KEY OVER-RIDE WILL CAUSE DOOR FORCED ALARM IN ACCESS CONTROL SYSTEM







FREE EGRESS AT ALL TIMES.

Hardware Group No. 16

For use on Door #(s):

C002 SE2 SF1 SG1

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBR-06-499F		630	VON
2	EA	FIRE/LIFE CLOSER	4314ME B140 SF WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
2	SET	GASKETING	326AA-S		AA	ZER

OPERATIONS:








PAIR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 16.1

For use on Door #(s):

SF2 SF3 SG2 SG3

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBR-06-499F		630	VON
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
2	SET	GASKETING	326AA-S		AA	ZER





1 - DOOR @ WALL, MAGNET TO RELEASE UPON FIRE ALARM

Hardware Group No. 17 AL

For use on Door #(s):

G34A

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	PUSH/PULL BAR	9145EZHD-12"-NS		630	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER
1	EA	PERIMETER GASKETING BY DOOR MFG	PROVIDED BY ALUM DOOR MFG		AA	TBD








PERIMETER GASKETING BY DOOR MFG

Hardware Group No. 17 WD

For use on Door #(s):

C106 C110 SF1A SG1A

Provide each PR door(s) with the following:








QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	PUSH/PULL BAR	9145EZHD-12"-NS		630	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	GASKETING	139A-S		A	ZER
2	EA	DOOR BOTTOM	360AA36" (914MM)		AA	ZER
2	EA	MEETING STILE	8195AA		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER

Hardware Group No. 17 WD.1

For use on Door #(s):

101A.2 101A.4 101A.3 101A.1 113A.2 113A.3
113A.4 113A.1

Provide each SGL door(s) with the following:










QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	PUSH/PULL BAR	9145EZHD-12"-NS		630	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	GASKETING	139A-S		A	ZER
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR BOTTOM	360AA36" (914MM)		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER

Hardware Group No. 18

For use on Door #(s):

102H	102K	102M	115.1	115.2	175
G70	G72A	SE1A			

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE RATED REMOVABLE MULLION	KR9954 STAB		689	VON
2	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX 4AA BATTERY	 ⚡	626	SCE
1	EA	MORTISE CYLINDER	20-061 ICA X K510-730 36-083		626	SCH
2	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER











AD TRIM @ RHR DOOR

Hardware Group No. 18.1

For use on Door #(s):

173













Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
1	EA	REMOVABLE MULLION	KR4954		689	VON
2	EA	PANIC HARDWARE	98-EO		630	VON
2	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX 4AA BATTERY	 ⚡	626	SCE
1	EA	MORTISE CYLINDER	20-061 ICA X K510-730 36-083		626	SCH
2	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	WALL STOP	WS401/402CCV		626	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER

Hardware Group No. 18.2

For use on Door #(s):
G72B

Provide each PR door(s) with the following:



QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
1	EA	FIRE RATED REMOVABLE MULLION	KR9954 STAB		689	VON
2	EA	FIRE EXIT HARDWARE	98-EO-F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX 4AA BATTERY	 ✎	626	SCE
1	EA	MORTISE CYLINDER	20-061 ICA X K510-730 36-083		626	SCH
2	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	GASKETING	139A-S		A	ZER
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	DOOR BOTTOM	355AA		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER

AD TRIM @ RHR DOOR

Hardware Group No. 19 - ** ALL OTHER HARDWARE BY DOOR MANUFACTURE.

For use on Door #(s):
G70X G70Y

Provide each RU door(s) with the following:











QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	MORTISE CYLINDER	20-061 ICA X K510-730 36-083		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH

Hardware Group No. 20

For use on Door #(s):

103 111

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	FIRE EXIT HARDWARE	9827-EO-F-LBR-499F		630	VON
1	EA	FIRE EXIT HARDWARE	9827-L-F-LBR-06-499F		630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ✎	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	MEETING STILE	8195AA		AA	ZER

OPERATIONS:












PAIR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 21

For use on Door #(s):

151 153

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-EO-F-LBR-499F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-R-LRX	 ✎	626	SCE
		4AA BATTERY				
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ✎	689	LCN
5	SET	SOUND HEAD/JAMB/MTG	770AA-S		AA	ZER
		STILE SEAL				
2	EA	SOUND DOOR BOTTOM	369AA		AA	ZER
1	EA	THRESHOLD	164A-223		A	ZER
1	EA	MOUNTING BRACKET	770SPB			ZER

STC OPENING

OPERATIONS:










PAIR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 21.1

For use on Door #(s):

151A 153A

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-L-BE-F-LBR-06-499F		630	VON
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
5	SET	SOUND HEAD/JAMB/MTG STILE SEAL	770AA-S		AA	ZER
2	EA	SOUND DOOR BOTTOM	369AA		AA	ZER
1	EA	THRESHOLD	164A-223		A	ZER
1	EA	MOUNTING BRACKET	770SPB			ZER

STC OPENING

OPERATIONS:










PAIR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 21.2

For use on Door #(s):

C115

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-EO-F-LBR-499F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993S-50-MT-RHO-R 4AA BATTERY	 ⚡	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
2	EA	MAGNETIC DOOR HOLDER	SEM7850 12V/24V/120V	 ⚡	689	LCN
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	MEETING STILE	8195AA		AA	ZER









OPERATIONS:

PAIR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 21.3

For use on Door #(s):
G73A

Provide each PR door(s) with the following:














QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	FIRE EXIT HARDWARE	9827-EO-F-LBR-499F		630	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993S-50-MT-RHO-R 4AA BATTERY	 ✎	626	SCE
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH WMS		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	188SBK PSA		BK	ZER
2	EA	MEETING STILE	8195AA		AA	ZER

OPERATIONS:
PAIR HELD OPEN ON MAGNETIC HOLD OPEN
FIRE ALARM TO RELEASE IN CASE OF FIRE

Hardware Group No. 22

For use on Door #(s):
G60

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD EPT		628	IVE
2	EA	POWER TRANSFER	EPT10 CON		⚡ 689	VON
1	EA	ELEC PANIC HARDWARE	RX-9847-EO-CON		⚡ 630	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-9847-NL-OP-110MD-CON 24 VDC		⚡ 630	VON
1	EA	RIM CYLINDER	20-057 ICA		626	SCH
1	EA	FSIC PERM CORE	23-030		626	SCH
2	EA	DOOR PULL, 1" ROUND	8103EZHD 12" STD		630-316	IVE
2	EA	SURFACE CLOSER	4040XP HCUSH WMS		689	LCN
2	EA	ARMOR PLATE	8400 48" X 2" LDW B-CS		630	IVE
1	SET	GASKETING	139A-S		A	ZER
2	EA	DOOR BOTTOM	355AA		AA	ZER
1	EA	H/C SADDLE THRESHOLD	545A-223		A	ZER
2	EA	WIRE HARNESS TO POWER SUPPLY	CON-192P			VON
2	EA	LOCK TO POWER TRANSFER CONNECTOR	CON-32			VON
1	EA	POWER SUPPLY	PS902 BBK 120/240 VAC		⚡ LGR	SCE
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR		⚡ TBD	TBD

OPERATIONS:

DOOR NORMALLY CLOSED AND LOCKED.

ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.

REQUEST TO EXIT SWITCH / SENSOR SHUNTS DOOR FORCED OPEN IN ACCESS CONTROL SYSTEM.


KEY OVER-RIDE WILL CAUSE DOOR FORCED ALARM IN ACCESS CONTROL SYSTEM

FREE EGRESS AT ALL TIMES.

Hardware Group No. PIMS 1ST - PIMS (GWE) FOR ALL 1ST FLOOR AREAS

For use on Door #(s):
1ST FL PIMS

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
16	EA	PIM	PIM400-485-RSI		⚡	SCE
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR		⚡ TBD	TBD


OPERATIONS:

PIMS (GWE) FOR ALL 1ST FLOOR AREAS

Hardware Group No. PIMS 2ND - PIMS (GWE) FOR ALL 2ND FLOOR AREAS

For use on Door #(s):
2ND FL PIMS

Provide each SGL door(s) with the following:


QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
9	EA	PIM	PIM400-485-RSI		⚡	SCE
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR		⚡ TBD	TBD

OPERATIONS:
PIMS (GWE) FOR ALL 2ND FLOOR AREAS

Hardware Group No. PIMS 3RD - PIMS (GWE) FOR ALL 3RD FLOOR AREAS

For use on Door #(s):
3RD FL PIMS

Provide each SGL door(s) with the following:


QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
8	EA	PIM	PIM400-485-RSI		⚡	SCE
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR		⚡ TBD	TBD

OPERATIONS:
PIMS (GWE) FOR ALL 3RD FLOOR AREAS

Hardware Group No. PIMS GROUND - PIMS (GWE) FOR ALL GROUND FLOOR AREAS

For use on Door #(s):
GROUND FLR
PIMS

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	PIM	PIM400-485-RSI		⚡	SCE
1	EA	WIRING DIAGRAMS, CARD READERS, DR CONTACTS BY DIV 28	BY SECURITY INTEGRATOR		⚡ TBD	TBD

OPERATIONS:
PIMS (GWE) FOR ALL 1ST FLOOR AREAS

END OF SECTION

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
1. Windows.
 2. Doors.
 3. Interior borrowed lites, sidelights and transoms.
 4. Glazed entrances.
 5. Curtainwall framing.
 6. Storefront framing.
 7. Metal-framed skylights.
 8. Transaction windows.
 9. Glazing film, decorative.
 10. Safety and security window film
 11. Security glazing.

1.2 DEFINITIONS

- A. Manufacturer: A firm that produces primary glass or fabricated glass as defined in referenced glazing publications.
- B. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.
- C. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.
- D. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
- E. Deterioration of Insulating Glass: Failure of the hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's

written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Glass Design: Where glass thicknesses are indicated these are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Where glass thickness is not indicated design glass thickness and types of glass required by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
 - 1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
 - a. Wind Loads: Provide glazing capable of resisting wind positive and negative pressures calculated according to the New York Building Code Section 1609.6 and the following criteria:
 - 1) Basic Wind Speed (3 second gust) = as indicated on Structural Drawings
 - 2) Wind Load Importance Factor I_w = as indicated on Structural Drawings
 - 3) Wind Speed Category = as indicated on Structural Drawings
 - 4) Other applicable criteria indicated on Structural Drawings.
 - b. Specified Design Snow Loads: As indicated on Structural Drawings
 - c. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
 - 1) Load Duration: 60 seconds or less.
 - d. Probability of Breakage for Sloped Glazing: 1 lite per 1000 for lites set more than 15 degrees off vertical and under wind and snow action.
 - 1) Load Duration: 30 days
 - e. Maximum Lateral Deflection: For the following types of glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch (25 mm), whichever is less.
 - 1) For insulating glass.
 - 2) For laminated glass
 - 3) For monolithic-glass lites heat treated to resist wind loads.
 - f. Minimum Glass Thickness for Exterior Lites: Not less than 1/4" (6 mm).

- g. Thickness of Tinted and Heat-Absorbing Glass: Provide the same thickness for each tint color indicated throughout Project.
 - C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
 - D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
 - 1. For monolithic-glass lites, properties are based on units with lites 6 mm thick, unless otherwise indicated.
 - 2. For laminated-glass lites, properties are based on products of construction indicated.
 - 3. For insulating-glass units, properties are based on units with lites 6 mm thick and a nominal 1/2-inch- (13-mm-) wide interspace, unless otherwise indicated.
 - 4. Center-of-Glass U-Values: NFRC 100 methodology using LBL-35298 WINDOW 4.1 computer program, expressed as Btu/ sq. ft. x h x deg F (W/sq. m x K).
 - 5. Center-of-Glass Solar Heat Gain Coefficient: NFRC 200 methodology using LBL-35298 WINDOW 4.1 computer program.
 - 6. Solar Optical Properties: NFRC 300.
- 1.4 SUBMITTALS
- A. Product Data: For each glass product and glazing material indicated.
 - B. Samples: For the following products, in the form of 12-inch- (300-mm-) square Samples for glass and of 12-inch- (300-mm-) long Samples for sealants. Install sealant Samples between two strips of material representative in color of the adjoining framing system.
 - 1. Insulating glass for each designation indicated.
 - 2. Each type of laminated glass specified.
 - 3. Each type of fire-rated glass specified.
 - 4. For each color (except black) of exposed glazing sealant indicated.
 - 5. Spandrel glass
 - 6. Silk screened ceramic fritted glass, for each pattern indicated
 - 7. Each type of glazing film specified
 - 8. Each type of security glazing.

- C. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.
 - 1. For glass indicated to receive glazing film, indicate location and extent of glazing film on each piece of glass
- D. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
 - 1. For solar-control low-e-coated glass, provide documentation demonstrating that manufacturer of coated glass is certified by coating manufacturer
- E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- F. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.
- G. Product Test Reports: From a qualified testing agency indicating the following products comply with requirements, based on comprehensive testing of current products:
 - 1. Insulating glass.
 - 2. Coated float glass.
 - 3. Glazing sealants.
 - 4. Fire resistive glazing
 - 5. Security glazing
 - 6. Safety and security window film
- H. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of glass from one primary-glass manufacturer.
- C. Source Limitations for Glass Sputter-Coated with Solar-Control Low-E Coatings: Where solar-control low-e coatings of a primary glass manufacturer that has established a certified fabricator program is specified, obtain sputter-coated solar-control low-e-coated glass in fabricated units from a manufacturer that is certified by coated-glass manufacturer

- D. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified testing agency based on testing glass products.
 - 1. Glass Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- E. Elastomeric Glazing Sealant Product Testing: Obtain sealant test results for product test reports in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.
 - 1. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
 - 2. Test elastomeric glazing sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.
- F. Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing indicated below, samples of each glass type, tape sealant, gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants.
 - 1. Use manufacturer's standard test methods to determine whether priming and other specific preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
 - a. Perform tests under normal environmental conditions replicating those that will exist during installation.
 - 2. Submit not fewer than nine pieces of each type and finish of glass-framing members and each type, class, kind, condition, and form of glass (monolithic, laminated, and insulating units) as well as one sample of each glazing accessory (gaskets, tape sealants, setting blocks, and spacers).
 - 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 4. For materials failing tests, obtain sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.
 - 5. Testing will not be required if elastomeric glazing sealant manufacturers submit data based on previous testing of current sealant products for adhesion to, and compatibility with, glazing materials matching those submitted.
- G. Glazing for Fire-Rated Door Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by UL, for fire ratings indicated, based on testing according to NFPA 252.
- H. Glazing for Fire-Rated Window Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by UL, for fire ratings indicated, based on testing according to NFPA 257.

- I. Glazing for Fire-Rated Wall Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by UL, for fire ratings indicated, based on testing according to NFPA 257, ASTM E119.
 - J. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1.
 - 1. Subject to compliance with requirements, permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
 - 2. Safety glass includes fully tempered glass, laminated glass and fire-resistant glass.
 - K. Fire-Rated Glass: Permanently mark fire-rated glass with certification label of certification agency acceptable to authorities having jurisdiction indicating manufacturer name, test standard and fire-rating.
 - L. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. SIGMA Publications: SIGMA TM-3000, "Vertical Glazing Guidelines."
 - 2. GANA Publications: GANA'S "Glazing Manual" and "Laminated Glass Design Guide."
 - 3. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."
 - M. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following inspecting and testing agency:
 - 1. Insulating Glass Certification Council.
 - 2. Associated Laboratories, Inc.
 - 3. National Accreditation and Management Institute.
 - N. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- 1.7 PROJECT CONDITIONS
- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers

and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F (4.4 deg C).

1.8 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Manufacturer's Special Warranty on Coated-Glass Products: Written warranty, made out to Owner and signed by coated-glass manufacturer agreeing to furnish replacements for those coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 1. Warranty Period: 10 years from date of Substantial Completion.
- C. Manufacturer's Special Warranty on Insulating Glass: Written warranty, made out to Owner and signed by insulating-glass manufacturer agreeing to furnish replacements for insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 1. Warranty Period: 10 years from date of Substantial Completion.
- D. Manufacturer's Special Warranty on Laminated Glass: Written warranty, made out to Owner and signed by laminated-glass manufacturer agreeing to furnish replacements for laminated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 1. Warranty Period: Five years from date of Substantial Completion.
 2. Warranty Period for Security Glass: Ten years from date of Substantial Completion.
- E. Manufacturer's Special Warranty on Fire Rated Glass: Written warranty, made out to Owner and signed by insulating-glass manufacturer agreeing to furnish replacements for insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 1. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PRIMARY FLOAT GLASS

- A. Float Glass: ASTM C 1036, Type I (transparent glass, flat), Quality q3 (glazing select); Class 1 unless otherwise indicated in schedules at the end of Part 3.

2.2 HEAT-TREATED FLOAT GLASS

- A. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
- A. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent glass, flat); Quality q3 (glazing select); class, kind, and condition as indicated in schedules at the end of Part 3.

2.3 COATED FLOAT GLASS

- A. General: Provide coated glass complying with requirements indicated in this Article and in schedules at the end of Part 3.
 - 1. Provide Kind HS (heat-strengthened) coated float glass in place of coated annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in "Performance Requirements" Article. Provide Kind FT (fully tempered) where safety glass is indicated.
- B. Sputter-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide or -nitride coating deposited by vacuum deposition process after manufacture and heat treatment (if any), and complying with other requirements specified in schedules at the end of Part 3.
 - 1. Basis of Design Product:
 - a. Standard Glazing: Solarban 70 by Vitro Architectural Glass (formerly PPG Industries, Inc.) or equal.
 - b. Insulated Reflective Glazing: Solarban R100 by Vitro Architectural Glass (formerly PPG Industries, Inc.) or equal.
- C. Silicone-Coated Spandrel Glass: ASTM C 1048, Condition C, Type I, Quality-Q3, and complying with other requirements specified.
 - 1. Basis of Design Product: Opacicoat-300 by ICD Coatings or equal
 - 2. Color(s): As selected by Architect from manufacturer's full range.
 - 3. Thickness of Coating: 6.50 mils dry, for fallout protection
- D. Ceramic-Coated Silk Screened Fritted Glass: ASTM C 1048, Type I, Condition B, Quality-Q3, and complying with other requirements specified.
 - 1. Basis of Design Product: Viraspan by Viracon or equal
 - 2. Color(s): As scheduled.
 - 3. Pattern: As scheduled.

2.4 FIRE RATED GLAZING

- A. Fire-Rated Glazing Product (Laminated Ceramic Glazing Material): Proprietary Category I and II safety glazing product in the form of 2 lites of clear ceramic glazing material laminated together to produce a laminated lite of 5/16-inch nominal thickness; polished on both surfaces, weighing 4 lb/sq. ft.; and as follows:
1. Fire-Protection Rating: As indicated for the assembly in which glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
 2. Polished on both surfaces, transparent.
 3. Product: "FireLite Plus Premium" by Nippon Electric Glass Co., Ltd., and distributed by Technical Glass Products.
- B. Fire-Rated Glazing Product (Laminated Ceramic Glazing Material): Proprietary Category I and II safety glazing product in the form of multiple sheets of Pilkington Optiwhite high visible light transmission glass laminated with an intumescent interlayer.
1. Fire-Protection Rating: As indicated for the assembly in which glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
 2. Interior Glazing Thickness for 120 Minute Openings: IG unit, 2-1/8" thick (Product Designation 120-104 with minimum 74% daylight transmission).
 3. Interior Glazing Thickness for 90 Minute Openings: Single lite, 1-7/16" thick (Product Designation 90-102 with minimum 84% daylight transmission).
 4. Interior Glazing Thickness for 60 Minute Openings: Single lite, 7/8" thick (Product Designation 60-101 with minimum 87% daylight transmission).
 5. Polished on both surfaces
 6. Product: "Pilkington Pyrostop" by Nippon Sheet Glass Co., Ltd., and distributed by Technical Glass Products.

2.5 LAMINATED GLASS

- A. Laminated Glass: Comply with ASTM C 1172 for kinds of laminated glass indicated and other requirements specified, including those in the Laminated-Glass Schedule at the end of Part 3.
- B. Interlayer: Interlayer material as indicated below, clear or in colors, and of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
1. Interlayer Material: Polyvinyl butyral sheets
 2. Interlayer Thickness: .030" except provide .060" thickness for laminating two lites of heat strengthened glass together, for acoustical rating required and where scheduled.
 3. Interlayer Color: Clear, except provide a patterned/colored interlayer in design selected by Architect for part height frosted glazing on H11 and H12 storefront types.

- C. Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets as follows:
 - 1. Lamine lites with polyvinyl butyral interlayer in autoclave with heat plus pressure.
- D. Security Glazing: Laminated glass product consisting of outer layers of glass with a custom security, heat strengthened, chemically bonded core. The patent pending core reacts to physical abuse like metal and will bend, but will not tear or rip like other security products. Security glazing shall be designed to replace glass used in openings that would normally be glazed with 1/4" or 5/16" glass.
 - 1. Basis of Design Product: SG5 by School Guard glass, or equal.
 - a. Thickness: 7/16"
 - b. Ratings:
 - 1) UL972
 - 2) 5-aa1 rated for 12 minutes
 - 3) ASTM F1233 Class 1.4 (tested to 5 minutes of class 1.5 until failure)

2.6 INSULATING GLASS

- A. Insulating-Glass Units: Preassembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in the Insulating-Glass Schedule at the end of Part 3.
 - 1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in "Performance Requirements" Article. Provide Kind FT (fully tempered) where safety glass is indicated.
- B. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated in the Insulating-Glass Schedule at the end of Part 3 are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
- C. Sealing System: Dual seal, with primary and secondary sealants as follows:
 - 1. Manufacturer's standard sealants.
- D. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:
 - 1. Aluminum with mill or clear-anodized finish.
 - 2. Desiccant: Molecular sieve or silica gel, or blend of both.
 - 3. Corner Construction: Manufacturer's standard corner construction.

2.7 ELASTOMERIC GLAZING SEALANTS

- A. General: Provide products of type indicated, complying with the following requirements:
1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range for this characteristic.
 4. Field-applied sealants shall have a VOC content of not more than 250 g/L.
- B. Single-Component Neutral-Curing Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 50; Uses NT, M, G, A, and, as applicable to joint substrates indicated, O.
1. Products:
 - a. Dow Corning Corporation; 791.
 - b. Dow Corning Corporation; 795.
 - c. GE Silicones; SilPruf NB SCS9000.
 - d. GE Silicones; UltraPruf II SCS2900.
 - e. Pecora Corporation; 865.
 - f. Pecora Corporation; 895.
 - g. Pecora Corporation; 898
- C. Glazing Sealants for Fire-Resistive and Fire Protective Glazing Products: Identical to products used in test assemblies to obtain fire-protection rating.

2.8 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
- B. Expanded Cellular Glazing Tape: Closed-cell, PVC foam tape; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:
1. Type 1, for glazing applications in which tape acts as the primary sealant.
 2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.
- C. Glazing Tapes for Fire-Resistive and Fire Protective Glazing Products: Identical to products used in test assemblies to obtain fire-protection rating.

2.9 GLAZING GASKETS

- A. Glazing gaskets for storefront and entrance systems are specified in Division 08 Section "Aluminum-Framed Storefronts and Entrances".
- B. Glazing gaskets for glazed aluminum curtain wall systems are specified in Division 08 Section "Glazed Aluminum Curtain Walls."
- C. Glazing gaskets for all other sliding and swinging glazed doors and panels systems and glazed walls are specified in their respective Division 08 Sections.
- D. Glazing gaskets for metal-framed skylights are specified in Division 08 Section "Metal-Framed Skylights."

2.10 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Silicone elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- G. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating
- H. Decorative Window Film: Provide 3M Window Film, in patterns and designs as selected by Architect for each different location, by 3M Company, or equal.
- I. Safety and Security Window Film: Provide 3M Scotchshield Safety and Security Window Film, Ultra S800, by 3M Company, or equal.

2.11 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.
- B. Grind smooth and polish exposed glass edges.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing glazing, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep system.
 - 3. Minimum required face or edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where the length plus width is larger than 50 inches (1270 mm) as follows:
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.

- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

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

3.7 PROTECTION AND CLEANING

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.
- E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

3.8 GLASS SCHEDULE

A. Exterior Glazing:

- 1. Exterior Doors: Provide 1 inch insulated tempered glass as follows:
 - a. Outboard Lite: 1/4-inch thick clear, fully tempered (Kind FT) glass, low-E coated on the second surface.
 - 1) Low-Emissivity Sputter Coating: Solarban 70; by Vitro Architectural Glass
 - b. Air Space: 1/2 inch, argon filled.
 - c. Inboard Lite: 1/4-inch thick clear, fully tempered (Kind FT) glass
 - d. Performance Characteristics:
 - 1) Visible Light Transmittance: Min 64%.
 - 2) Winter Nighttime U-Value: Max. 0.24
 - 3) Solar Heat Gain Coefficient (SHGC): Max. 0.27
 - 4) Light to Solar Gain: 2.37
 - 5) Outdoor Visible Light Reflectance: 12%
- 2. Bottom Panels of Entrance Framing and Bottom Panels of Curtainwall Framing (including sidelites and transoms): Provide 1 inch insulated tempered glass as follows:
 - a. Outboard Lite: 1/4-inch thick clear, fully tempered (Kind FT) glass, low-E coated on the second surface.
 - 1) Low-Emissivity Sputter Coating: Solarban 70; by Vitro Architectural Glass
 - b. Air Space: 1/2 inch, argon filled.
 - c. Inboard Lite: 1/4-inch thick clear, fully tempered (Kind FT) glass
 - d. Performance Characteristics:
 - 1) Visible Light Transmittance: Min 64%.
 - 2) Winter Nighttime U-Value: Max. 0.24
 - 3) Solar Heat Gain Coefficient (SHGC): Max. 0.27
 - 4) Light to Solar Gain: 2.37

- 5) Outdoor Visible Light Reflectance: 12%
3. Fixed Windows, Operable Vents and Upper Panels of Curtainwall Framing: Provide 1 inch insulated glass as follows:
- a. Outboard Lite: 1/4-inch thick clear, annealed glass, low-E coated on the second surface.
 - 1) Low-Emissivity Sputter Coating: Solarban 70; by Vitro Architectural Glass
 - b. Air Space: 1/2 inch, argon filled.
 - c. Inboard Lite: 1/4-inch thick clear, annealed glass
 - d. Performance Characteristics:
 - 1) Visible Light Transmittance: Min 64%.
 - 2) Winter Nighttime U-Value: Max. 0.24
 - 3) Solar Heat Gain Coefficient (SHGC): Max. 0.27
 - 4) Light to Solar Gain: 2.37
 - 5) Outdoor Visible Light Reflectance: 12%
 - e. At single hung windows, provide between the glass muntins and interior and exterior tape applied muntins on glazing; finish to match windows.
4. Curtainwall Spandrel Glazing: Provide 1 inch insulated glass, as follows:
- a. Outboard Lite: 1/4-inch thick clear, heat strengthened (Kind HS) float glass, low-E coated on the second surface.
 - 1) Low-Emissivity Sputter Coating: Solarban 70; by Vitro Architectural Glass
 - b. Air Space: 1/2 inch, argon filled.
 - c. Inboard Lite: 1/4-inch thick clear, heat strengthened (Kind HS) float glass, with silicone coating on the #4 surface
 - 1) Silicone Coating: Opacicoat-300 by ICD Coatings
 - 2) Color: As selected by Architect.
5. Curtainwall and Entrance Framing and Glazed Doors where Security Glazing is Scheduled: Provide 1-1/16 inch insulated laminated glass as follows:
- a. Outboard Lite: 1/4" thick clear, fully tempered glass (Kind FT), low-E coated on the second surface.
 - 1) Low-Emissivity Sputter Coating: Solarban 70; by Vitro Architectural Glass (formerly PPG Industries, Inc.)
 - b. Air Space: 3/8 inch, argon filled.
 - c. Inboard Lite: 7/16-inch thick clear, security glazing School Guard SG5.
 - d. Performance Characteristics:
 - 1) Visible Light Transmittance: Min 60%.
 - 2) Winter Nighttime U-Value: Max. 0.23
 - 3) Solar Heat Gain Coefficient (SHGC): Max. 0.27

6. Safety and security window film shall be applied to interior glass surfaces at windows and storefront and curtainwall framing in locations as indicated on Drawings.
 7. Curtainwall Framing and Operable Vents at Cafeteria where Insulated Reflective Glazing is Indicated: Provide 1 inch insulated tempered glass as follows:
 - a. Outboard Lite: 1/4-inch thick clear, fully tempered (Kind FT) glass, low-E coated on the second surface.
 - 1) Low-Emissivity Sputter Coating: Solarban R100; by Vitro Architectural Glass
 - b. Air Space: 1/2 inch, argon filled.
 - c. Inboard Lite: 1/4-inch thick clear, fully tempered (Kind FT) glass
 - d. Performance Characteristics:
 - 1) Visible Light Transmittance: Min 42%.
 - 2) Winter Nighttime U-Value (with argon): Max. 0.22
 - 3) Solar Heat Gain Coefficient (SHGC): Max. 0.23
 - 4) Light to Solar Gain: 1.83
 - 5) Outdoor Visible Light Reflectance: 32%
 8. Metal-Framed Skylights: Provide 1-3/8 inch insulated glass, as follows:
 - a. Outboard Lite: 3/8-inch thick clear, heat strengthened (Kind HS) float glass, low-E coated on the second surface and ceramic-coated silk screen fritted pattern on second surface.
 - 1) Low-Emissivity Sputter Coating: Solarban 70; by Vitro Architectural Glass (formerly PPG Industries, Inc.).
 - 2) Ceramic-Coated Silk Screened Pattern: Viraspan 30% or 40% coverage (as selected by Architect), 1/8" dot pattern
 - a) Pattern: Screen 5006
 - b) Color: White opaque frit V175
 - b. Air Space: 1/2 inch, argon filled.
 - c. Inboard Lite: 1/2-inch thick clear, laminated glass.
 - 1) Provide two lites of annealed glass laminated together unless two lites of heat strengthened glass are required for strength.
 - 2) Interlayer Thickness: 0.060"
- B. Interior Glazing, as Scheduled:
1. Non-Fire Rated Doors, Transoms, Sidelights and Borrowed Lights: 1/4 inch clear tempered glass.
 - a. Provide SG5 laminated security glass product by School Guard Glass where indicated on Drawings.
 - b. Provide minimum 3/8" laminated decorative glazing where indicated on Drawings.

2. Fire Rated Doors, Transoms, Sidelights and Borrowed Lights: Laminated ceramic glazing material 5/16 inches thick; "FireLite Plus Premium" by Nippon Electric Glass Co., Ltd., and distributed by Technical Glass Products.
3. Fire Rated Doors and Frames Where Specifically Scheduled: 120 minute, 90 minute or 60 minute Pilkington Pyrostop glazing material, as scheduled, by Nippon Electric Glass Co., Ltd., and distributed by Technical Glass Products.
4. Acoustic Rated Wood Doors and Acoustic Rated Windows: Dual glazed acoustic laminated glazing in thicknesses and make-up as scheduled for each location; adjust as required to match tested door/window assembly used on project.
5. Security Glazing for Transaction Windows: SG5 laminated glass product by School Guard Glass, or approved equal.
6. Glazing Film: Provide decorative glazing film where indicated on Drawings.

END OF SECTION 088000

SECTION 088300 - MIRRORS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes unframed mirrors attached to walls in Room 173 Fitness.
- B. Related work specified elsewhere:
 - 1. Framed mirrors are specified in Division 10 Section "Toilet and Bath Accessories."

1.2 ACTION SUBMITTALS

- A. Product Data: For each material.
- B. Shop Drawings: Provide shop drawings of layout of mirrors on walls, indicating seam locations and seam details and methods of attachment to substrate.
- C. Samples for Verification: For each type of mirror materials, in the form of 12-inch-square samples.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed mirror installations similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of mirror from one source.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect mirrors according to manufacturer's written instructions and as needed to prevent damage to mirror materials.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of mirrors on walls by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

- B. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

- 1. Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MIRROR GLASS

- A. Mirror Units: Provide 1/4 inch float "silvering" quality glass with electrolytic application of copper to provide first quality distortion free mirrors. Products shall conform to ASTM C 1503-01. Apply water-resistant paint to rear side of units prior to setting.
 - 1. Safety Backing: Provide a Category II Tape Backing which conforms to CPSC 16CFR1201 for safety glazing requirements, 48 inches wide; CRL Shatterproof Safety Tape for Mirrors, Product #2MT48 by CR Laurence, or equal.
 - 2. Mirror Size: 4'w x 6'h for Fitness Room
- B. Mirror Hardware: Provide J-channel supports and mirror clips to properly support mirrors, in addition to mastic. All hardware and fasteners shall be fabricated from stainless steel.
- C. Mirror Mastic - Palmer Products Corp. ("Mirro-Mastic Bond" and "Mirro-Mastic Adhesive"); C. Gunther Company ("Ultra/Bond" and "Extra/Bond") or approved equal. Primer systems shall be type recommended by mirror mastic manufacturer for intended substrates.
- D. Fabricate mirrors in the shop. Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine wall surfaces to ensure a Level 5 finish has been applied to gypsum board surfaces and substrates are suitable for mirror installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION OF MIRRORS

- A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced National Glass Association (NGA) publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
 - 1. NGA Publications: "Glazing Manual" and "Installation Techniques Designed to Prolong the Life of Flat Glass Mirrors."
- B. Provide a minimum airspace of 1/8 inch between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.
- C. Install mirrors with mastic and mirror hardware to properly support mirrors.
 - 1. Install mastic as follows:
 - a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
 - b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
 - c. After mastic is applied, align mirrors and press into place while maintaining a minimum airspace of 1/8 inch between back of mirrors and mounting surface.

3.4 CLEANING AND PROTECTION

- A. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- B. Do not permit edges of mirrors to be exposed to standing water.
- C. Maintain environmental conditions that prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- D. Clean exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer and NGA's publication "Proper Procedures for Cleaning Flat Glass Mirrors."

END OF SECTION 088300

SECTION 089000 - LOUVERS AND VENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section Includes the Following:

1. Fixed, extruded-aluminum louvers.

B. Related Sections Include the Following:

1. Division 07 Section "Joint Sealants" for sealants installed in perimeter joints between louver frames and adjoining construction.
2. Division 23 Sections for louvers that are a part of mechanical equipment.

1.2 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
- B. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide louvers capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers.
1. Wind Loads: Uniform pressure (velocity pressure) of 18 lbf per sq. ft. acting inwards.
- B. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- C. Air-Performance, Water-Penetration, Air-Leakage, and Wind-Driven Rain Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by

testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
- B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other Work. Show blade profiles, angles, and spacing.
- C. Samples for Verification: For each type of metal finish required.
- D. Product Certificates: Signed by manufacturers stating the location of the material manufacturer and the distance from the manufacturer to the Project site.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.
- B. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
 - 1. Basis-of-Design Product: The design for each louver is based on the product named. Subject to compliance with requirements, provide either the named product or approved equivalent by one of the other manufacturers specified.
 - a. Construction Specialties.
 - b. Airolite Co.
 - c. Reliable Metal Products.
 - d. Industrial Acoustics Company.

2.2 MATERIALS

- A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy 6063-T5 or T-52.T-52.

- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Aluminum Castings: ASTM B 26/B 26M, alloy 319.
- D. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.
 - 1. Use types and sizes to suit unit installation conditions.
 - 2. Use Phillips flat-head screws for exposed fasteners, unless otherwise indicated.
- E. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
- F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.3 FABRICATION, GENERAL

- A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Maintain equal louver blade spacing to produce uniform appearance.
- C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
- D. Include supports, anchorages, and accessories required for complete assembly.
- E. Where indicated, provide subsills made of same material as louvers or extended sills for recessed louvers.
- F. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer, concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.4 FIXED, EXTRUDED-ALUMINUM LOUVERS

- A. Horizontal, Single Drainable-Blade Louver:
 - 1. Basis-of-Design Product: Ruskin Model ELF375DX Drainable Stationary Louvers.
 - 2. Finish: Fluoropolymer 3-Coat System.
 - 3. Depth: 4-inches.

4. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.081 inch.
5. Mullion Type: Fixed, hidden mullions shall allow for continuous line appearance for up to 120"
6. Performance Requirements:
 - a. Free Area: 54%.
 - b. Point of Beginning Water Penetration: 873 fpm at .01 oz/sf.
7. Sizes: Refer to Contract Drawings for sizes, configurations, and locations.
8. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.5 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
 1. Screen Location for Fixed Louvers: Interior face.
 2. Screening Type: Bird screening. NO Insect screening allowed.
- B. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c.
- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
 1. Metal: Same kind and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
 2. Finish: Same finish as louver frames to which louver screens are attached.
- D. Louver Screening for Aluminum Louvers:
 1. Bird Screening: Aluminum, 1/2-inch- (12.7-mm-) square mesh, 0.063-inch (1.6-mm) wire.

2.6 BLANK-OFF PANELS

- A. Insulated, Blank-Off Panels: Laminated panels consisting of an insulating core surfaced on back and front with metal sheets and attached to back of louver.
 1. Thickness: 1 inch (25 mm).
 2. Metal Facing Sheets: Aluminum sheet, not less than 0.032-inch (0.81-mm) nominal thickness.
 3. Insulating Core: Rigid, glass-fiber-board insulation.
 4. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturer's standard channel frames, with corners mitered and with same finish as panels.
 5. Seal perimeter joints between panel faces and louver frames with gaskets or sealant.
 6. Panel Finish: As selected by Architect.
 7. Attach blank-off panels with clips.

2.7 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish louvers after assembly.

2.8 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
- B. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1. Fluoropolymer 3-Coat System: Manufacturer's standard 3-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.
 - a. Color(s): As selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.

- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
- F. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
- G. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

- A. Clean exposed surfaces of louvers that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
 - 1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 089000

SECTION 092100 - GYPSUM PLASTER

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. New gypsum plaster ceilings.
 - 2. New gypsum plaster finish on walls.
- B. Related Sections include the following:
 - 1. Division 07 Section "Joint Sealants" for acoustical sealants and sealants installed with gypsum plaster
 - 2. Division 09 Section "Gypsum Board Assemblies" for framing and other components of gypsum plaster assemblies.
 - 3. Division 09 Section "Gypsum Plaster Repair and Restoration" for plaster repair work.

1.2 SUBMITTALS

- A. Product Data consisting of manufacturer's product specifications and installation instructions for each product, including data showing compliance with specified requirements.
- B. Samples for verification in units at least 12 inches (300 mm) square of each type of finish indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.
- C. Material Certificates: Submit certificate signed by manufacturer for each kind of plaster aggregate certifying that materials comply with requirements.
- D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.3 QUALITY ASSURANCE

- A. Installer: A firm having not less than five (5) years successful experience in plaster work similar to work of this project.
- B. Workmen: Skilled plasterers who have demonstrated experience in the type of work specified and who are thoroughly familiar with the requirements of the work. In acceptance or rejection of plaster work, no allowance will be made for lack of skill on the part of the workmen.

- C. Single-Source Responsibility: Obtain gypsum plaster from one source and by a single manufacturer.
- D. Fire-Test-Response Characteristics: Where fire-resistance-rated plaster assemblies are indicated, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: As indicated by GA File Numbers in GA-600 "Fire Resistance Design Manual" or design designations in UL "Fire Resistance Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.
- E. Mockups: Prior to installing plaster work, construct panels for each type of finish and application required to verify selections made under Sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.
 - 1. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect.
 - 2. Erect mockups 48 by 48 inches (1200 by 1200 mm) by full thickness in presence of Architect using materials, including lath, support system, and control joints indicated for final Work.
 - 3. Notify Architect 7 days in advance of the dates and times when mockups will be constructed.
 - 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 5. Simulate finished lighting conditions for review of mockups
 - 6. Obtain Architect's approval of mockups before plastering.
 - 7. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed plaster Work.
 - a. When directed, remove mockups from Project site.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original packages, containers, or bundles, labeled with manufacturer's name, product brand name, and lot number.
- B. Store materials inside, under cover, and dry, protected from weather, direct sunlight, surface contamination, aging, corrosion, and damage from construction traffic and other causes. Protect plaster material from dampness and intrusion of foreign material.
- C. Protect metal cornerbeads and trim from being bent or damaged.

1.5 PROJECT CONDITIONS

- A. Environmental Requirements, General: Comply with requirements of referenced plaster application standards and recommendations of plaster manufacturer for environmental conditions before, during, and after plaster application.
- B. Cold-Weather Requirements: When ambient outdoor temperatures are below 40 deg F (4 deg C), maintain continuous uniform temperature of not less than 40 deg F (4 deg C) nor more than 80 deg F (27 deg C) for at least 7 days before beginning plaster application, during its application, and until plaster is dry but for at least 7 days after application is complete. Distribute heat evenly; prevent concentrated or uneven heat from contacting plaster near heat source.
- C. Ventilation: Ventilate building spaces as required to remove water in excess of that required for hydrating plaster. Begin ventilation immediately after plaster is applied and continue until it sets.
- D. Protect contiguous work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Gypsum Plasters:
 - a. National Gypsum Co.
 - b. United States Gypsum Co.

2.2 FRAMING

- A. Metal Supports: Comply with Section 092216 "Non-Structural Metal Framing."

2.3 LATH

- A. Expanded-Metal Lath: Fabricate expanded-metal lath from uncoated or zinc-coated (galvanized) steel sheet to produce lath complying with ASTM C 847 for type, configuration, and other characteristics indicated below, with uncoated steel sheet coated after fabrication into lath.
 - 1. Diamond-Mesh Lath: Weighing 3.4 lb/sq. yd. (1.8 kg/sq. m).
 - a. Provide self-furring type for plastering directly on masonry, concrete, plywood and other flat surfaces.
 - b. Provide rib lath for ceiling locations.
 - c. Provide expanded metal flat diamond mesh lath for all other wall locations.

2.4 ACCESSORIES

- A. General: Comply with material provisions of ASTM C 841 and the requirements indicated below; coordinate depth of accessories with thicknesses and number of plaster coats required.
 - 1. Galvanized Steel Components: Fabricated from zinc-coated (galvanized) steel sheet complying with ASTM A 653, G40 (ASTM A 653M, Z90) minimum coating designation.
- B. Metal Cornerbeads: Type as indicated below, fabricated from zinc-coated (galvanized) steel.
 - 1. Type: Small nose with expanded flanges reinforced by perforated stiffening rib, for use on columns and for finishing masonry corners.
 - 2. Type: Bull nose, radius 3/4 inch (19 mm) minimum, with expanded flanges, at locations indicated.
- C. Strip Reinforcement: Smooth-edge strips of expanded-metal lath fabricated from uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel sheet coated after fabrication; in the following forms:
 - 1. Cornerite: Strips bent lengthwise in center for internal plaster angles not otherwise reinforced by metal lath lapped or carried around.
 - 2. Stripite: Flat strips for reinforcing joints in nonmetallic bases, and between dissimilar plaster bases.
- D. Casing Beads: Square-edged style, with short or expanded flanges to suit kinds of plaster bases indicated; of the following material:
 - 1. Material: Zinc-coated (galvanized) steel.
- E. Control Joints: Prefabricated, zinc-coated (galvanized) steel; one-piece type with Folded pair of nonperforated screeds in M-shaped configuration, with expanded or perforated flanges.
 - 1. Provide removable protective tape on plaster face of control joints.

2.5 MISCELLANEOUS MATERIALS

- A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- B. Bonding Compound: ASTM C 631.
- C. Repair and Reinforcing Tape: Open-mesh, glass fiber.
- D. Sound Attenuation Blankets: Comply with Section 092900 "Gypsum Board."

2.6 PLASTER MATERIALS

- A. Base-Coat Plasters: ASTM C 28, types as indicated below:
 - 1. Standard-strength gypsum neat plaster with a minimum, average, dry compressive strength of 875 psi per ASTM C 472 for a mix of 100 lb of plaster and 2 cu. ft. of sand.
- B. Finish-Coat Plasters: Gypsum Keene's cement, ASTM C 61.
- C. Finishing Hydrated Limes: ASTM C 206, type S, special hydrated lime for finishing purposes.
- D. Aggregates for Base-Coat Plasters: ASTM C 35, type as indicated below:
 - 1. Sand aggregate, unless otherwise indicated.
- E. Aggregates for Finish-Coat Plaster with Floated Finish: ASTM C 35, sand aggregate, graded per ASTM C 842.
- F. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Standard-Strength Gypsum Neat Plaster:
 - a. Red Top Gypsum Plaster; United States Gypsum Co.
 - 2. Gypsum Keene's Cement:
 - a. Red Top Keene's Cement; United States Gypsum Co.
 - 3. Finishing Hydrated Limes, Type S:
 - a. Ivory Finish Lime; United States Gypsum Co.
 - b. Snowdrift Finish Lime; United States Gypsum Co.

2.7 PLASTER MIXES AND COMPOSITIONS

- A. Plaster Base-Coat Compositions: Comply with ASTM C 842 and manufacturer's written instructions for plaster base-coat proportions that correspond to application methods and plaster bases indicated below:
 - 1. Three-Coat Work over Masonry and Metal Lath: Base coats as indicated below:
 - a. Scratch Coat: Standard-strength gypsum plaster with job-mixed sand; 100 lbs plaster to 2 cu. ft. of sand
 - b. Brown Coat: Standard-strength gypsum plaster with job-mixed sand; 100 lbs plaster to 3 cu. ft. of sand.
- B. Finish Coats: Proportion materials in parts by dry weight for finish coats to comply with the following requirements for each type of finish coat and texture indicated:
 - 1. Float Finishes: Finish-coat proportion as indicated below:

- a. Gypsum Keene's Cement: 2 part plaster to 2 parts lime to 6 parts sand.

2.8 MIXING

- A. Mechanically mix cementitious and aggregate materials for plasters to comply with applicable referenced application standard and with recommendations of plaster manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION OF LATH AND FURRING, GENERAL

- A. Interior Lathing and Furring: Install materials indicated for plaster to comply with ASTM C 841.
- B. Isolation: Where lathing and metal support system abuts building structure horizontally and where partition or wall abuts overhead structure, sufficiently isolate from structural movement to prevent transfer of loading from building structure. Install slip- or cushion-type joints to absorb deflections but maintain lateral support.
 1. Frame both sides of control joints independently and do not bridge joints with furring and lathing or accessories.

3.2 METAL LATHING

- A. Install according to ASTM C 841. Provide appropriate type, configuration, and weight of metal lath selected from materials indicated that comply with referenced lathing installation standards, and as specified in Part 2 "Lath" Article of this Section.

3.3 INSTALLATION OF PLASTERING ACCESSORIES

- A. General: Comply with referenced lathing and furring installation standards for provision and location of plaster accessories of type indicated. Miter or cope accessories at corners; install with tight joints and in alignment. Attach accessories securely to plaster bases to hold accessories in place and in alignment during plastering.
- B. Accessories: Provide the following types to comply with requirements indicated for location:
 1. Cornerbeads: Install at external corners.
 2. Casing Beads: Install at terminations of plaster work, except where plaster passes behind and is concealed by other work and where metal screeds, bases, or frames act as casing beads.
 3. Control Joints: Install at locations indicated or, if not indicated, at spacings and locations required by referenced standard, recommended by plaster manufacturer, and approved by Architect. Spacing between joints in either direction shall not exceed the following:

- a. Partitions: 30 feet (9 m).
- b. Ceilings: 50 feet (15 m) where ceilings are isolated from partitions; 30 feet (9 m) where ceilings are not isolated from partitions.

3.4 PLASTER APPLICATION, GENERAL

- A. Prepare monolithic surfaces for bonded base coats and use bonding compound to comply with requirements of referenced plaster application standards for conditioning monolithic surfaces.
- B. Wet unit masonry surfaces to reduce excessive suction.
- C. Tolerances: Do not deviate more than plus or minus 1/8 inch in 10 feet (3 mm in 3 m) from a true plane in finished plaster surfaces, as measured by a 10-foot (3-m) straightedge placed at any location on surface.
- D. Grout hollow-metal frames, bases, and similar work occurring in plastered areas, with base-coat plaster material, before lathing where necessary. Except where full grouting is indicated or required for fire-resistance rating, grout at least 6 inches (152 mm) at each jamb anchor.
- E. Sequence plaster application with installation and protection of other work so that neither will be damaged by installation of other.
- F. Plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground, unless otherwise indicated. Where plaster is not terminated at metal frame by casing beads, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
- G. Apply thicknesses and number of coats of plaster to match existing.
- H. Concealed Plaster: Where plaster application will be concealed by wall paneling, above suspended ceilings and in similar locations, finish coat may be omitted; where concealed behind cabinets, similar furnishings, and equipment, apply finish coat; where used as a base for adhesive application of tile and similar finishes, omit finish coat, coordinate thickness with overall dimension as shown, and comply with tolerances specified.

3.5 PLASTER APPLICATION

- A. Plaster Application Standard: Apply plaster materials, composition, mixes, and finishes indicated to comply with ASTM C 842.
- B. Execute work to provide a finish free from depressions, bulges, slick spots, scratches, brush and tool marks, cracks, visible joints, crazing, and discolorations. Surfaces shall have true planes, with uniform texture to match the adjoining surfaces and with lines and arises that are straight, plumb and level. Work shall be true to grounds and guidelines and free from blemishes and defects of any sort.

1. Ventilation: During the application of each coat of interior plaster, keep the exterior openings closed until the plaster has set, then adjust for proper ventilation to regulate the drying and curing of the plaster.
 2. Thickness of Plaster: Match existing.
 3. Joints: Lap joints in succeeding coats including joints at interior angles; continue past the angle and corner and feather off on adjacent wall.
- C. Scratch (First) Coat on Three Coat Work:
1. Apply plaster with sufficient materials and pressure to force plaster to form good bond with solid base material and cover well.
 2. Thickness of Scratch Coat: Approximately 3/8".
 3. Leave surface level.
 4. Scratch this coat and allow to set and thoroughly dry out before the application of the brown coat.
- D. Brown (Second) Coat on Three Coat Work:
1. Do not apply brown coat until after scratch coat has hardened, not sooner than 48 hours after application of scratch coat. Evenly dampen scratch coat to provide uniform suction before brown coat is applied.
 2. Prior to application of gypsum brown coat place plaster screeds at angles and corners and at intervals of 8' in both walls and ceilings unless grounds occur at smaller intervals.
 3. Thickness of Brown Coat: Approximately 3/8".
 4. Bring brown coat out to ground and required lines, to true, even surfaces. Straighten with rod and darby and leave rough to accept finish coat.
 5. Moist cure brown coat for 48 hours after application and then allow coat to set and partially dry out.
- E. Finish Coat:
1. Thickness of Finish: As thin as possible; preferably 1/16 to no more than 3/32 inch thick and treated and finished as directed.
 2. Before application of finish coat, cut out shrinkage cracks and fill with scratch coat mortar.
 3. Apply finish coats well ground to scratched surfaces, then double back to a true plane, filling all imperfections.
 - a. For sand float finish, float using a shingle, cork, carpet, rubber wood, or sponge float to bring aggregate to the surface to produce a finish of uniform smooth texture free of slick spots, cat faces and other blemishes. Use water sparingly.
 4. Finish surfaces plumb, straight, level, and true throughout, varying from a true plane by not more than 1/8" when tested with a 10' straightedge at any point and finish surface to match adjacent existing texture.
- F. Washdown: When plaster work has been completed, wash down the new plaster with a zinc sulphate solution (2 pounds per gallon of water) and allow to dry.

3.6 CUTTING AND PATCHING

- A. Cut, patch, replace, and repair plaster as necessary to accommodate other work and to restore cracks, dents, and imperfections. Repair or replace work to eliminate blisters, buckles, excessive crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.
- B. Leave plaster ready for painting.

3.7 CLEANING AND PROTECTING

- A. Remove temporary protection and enclosure of other work. Promptly remove plaster from door frames, windows, and other surfaces not to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering. When plastering is completed, remove unused materials, containers, and equipment and clean floors of plaster debris.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure plaster work is without damage or deterioration at the time of Substantial Completion.

3.8 CURING

- A. Allow plaster to cure 30 days prior to application of paint or other finishes.

END OF SECTION 092100

SECTION 092116.23 - GYPSUM BOARD SHAFT WALL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Gypsum board shaft wall assemblies.

1.2 ACTION SUBMITTALS

- A. Product Data: For each component of gypsum board shaft wall assembly.

1.3 DELIVERY, STORAGE, AND HANDLING

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

1.4 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: Provide materials and construction identical to those of assemblies tested according to ASTM E 90 and classified according to ASTM E 413 by a testing and inspecting agency.

2.2 GYPSUM BOARD SHAFT WALL ASSEMBLIES

- A. Fire-Resistance Rating: 1 hour and 2 hours as indicated.
- B. STC Rating: As indicated.
- C. Studs: Manufacturer's standard profile for repetitive members, corner and end members, and fire-resistance-rated assembly indicated.
 - 1. Depth: 2-1/2 inches (64 mm), 4 inches (102 mm) and 6 inches (152 mm) as indicated on the Partition Type Drawing.
 - 2. Minimum Base-Metal Thickness: 0.033 inch (0.84 mm).
- D. Runner Tracks: Manufacturer's standard J-profile track with manufacturer's standard long-leg length, but at least 2 inches (51 mm) long and matching studs in depth.
 - 1. Minimum Base-Metal Thickness: Matching steel studs.
- E. Room-Side Finish: As indicated.
- F. Shaft-Side Finish: Gypsum shaftliner board, moisture- and mold-resistant Type X.
- G. Insulation: Sound attenuation blankets.

2.3 PANEL PRODUCTS

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
- B. Gypsum Shaftliner Board, Type X: ASTM C 1396/C 1396M; manufacturer's proprietary fire-resistive liner panels with paper faces.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Lafarge North America, Inc.; Firecheck Type X Shaftliner.
 - b. National Gypsum Company; Gold Bond Brand Fire-Shield Shaftliner.
 - c. USG Corporation; Sheetrock Brand Gypsum Liner Panel.
 - d. American Gypsum; Shaft Liner.
 - 2. Thickness: 1 inch (25.4 mm).
 - 3. Long Edges: Double bevel.
- C. Gypsum Shaftliner Board, Moisture- and Mold-Resistant Type X: ASTM C 1396/C 1396M; manufacturer's proprietary fire-resistive liner panels with moisture- and mold-resistant core and surfaces.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Lafarge North America, Inc.; Firecheck Moldcheck Type X Shaftliner.
 - b. National Gypsum Company; Gold Bond Brand Fire-Shield Shaftliner XP.
 - c. USG Corporation; Sheetrock Brand Mold Tough Gypsum Liner Panel.
 - 2. Thickness: 1 inch (25.4 mm).
 - 3. Long Edges: Double bevel.
 - 4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

- D. Gypsum Board: As specified in Section 092900 "Gypsum Board."

2.4 NON-LOAD-BEARING STEEL FRAMING

- A. Steel Framing Members: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 1. Protective Coating: ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.

2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with manufacturer's written recommendations.
- B. Trim Accessories: Cornerbead, edge trim, and control joints of material and shapes as specified in Section 092900 "Gypsum Board" that comply with gypsum board shaft wall assembly manufacturer's written recommendations for application indicated.
- C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
- D. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.
 - 1. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing according to ASTM E 488 conducted by a qualified testing agency.
 - 2. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing according to ASTM E 1190 conducted by a qualified testing agency.
- E. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from slag wool, or rock wool; Provide mineral-fiber SAFB.
- F. Acoustical Sealant: As specified in Section 079200 "Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to which gypsum board shaft wall assemblies attach or abut, with Installer present, including hollow-metal frames, elevator hoistway door frames, cast-in anchors, and structural framing. Examine for compliance with requirements for installation tolerances and other conditions affecting performance.

- B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Sprayed Fire-Resistive Materials: Coordinate with gypsum board shaft wall assemblies so both elements of Work remain complete and undamaged. Patch or replace sprayed fire-resistive materials removed or damaged during installation of shaft wall assemblies to comply with requirements specified in Section 078100 "Applied Fireproofing."
- B. After sprayed fire-resistive materials are applied, remove only to extent necessary for installation of gypsum board shaft wall assemblies and without reducing the fire-resistive material thickness below that which is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLATION

- A. General: Install gypsum board shaft wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated, manufacturer's written installation instructions, and ASTM C 754 other than stud-spacing requirements.
- B. Do not bridge building expansion joints with shaft wall assemblies; frame both sides of expansion joints with furring and other support.
- C. Install supplementary framing in gypsum board shaft wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, wall-mounted door stops, and similar items that cannot be supported directly by shaft wall assembly framing.
 - 1. Reinforcing: Where handrails directly attach to gypsum board shaft wall assemblies, provide galvanized steel reinforcing strip with 0.033-inch (0.84-mm) minimum thickness of base metal (uncoated), accurately positioned and secured behind at least one layer of face panel.
- D. Penetrations: At penetrations in shaft wall, maintain fire-resistance rating of shaft wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons, elevator floor indicators, and similar items.
- E. Isolate perimeter of gypsum panels from building structure to prevent cracking of panels, while maintaining continuity of fire-rated construction.
- F. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect while maintaining fire-resistance rating of gypsum board shaft wall assemblies.
 - 1. Install control joints on 30 foot maximum centers, for all partitions, at locations indicated, and as detailed. Align control joints with door frames wherever

possible, with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels.

- G. Sound-Rated Shaft Wall Assemblies: Seal gypsum board shaft walls with acoustical sealant at perimeter of each assembly where it abuts other work and at joints and penetrations within each assembly.
- H. Cant Panels: At projections into shaft exceeding 4 inches (102 mm), install 1/2- or 5/8-inch- (13- or 16-mm-) thick gypsum board cants covering tops of projections.
 - 1. Slope cant panels at least 75 degrees from horizontal. Set base edge of panels in adhesive and secure top edges to shaft walls at 24 inches (610 mm) o.c. with screws fastened to shaft wall framing.
 - 2. Where steel framing is required to support gypsum board cants, install framing at 24 inches (610 mm) o.c. and extend studs from the projection to shaft wall framing.
- I. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.4 IDENTIFICATION

- A. Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling. Such identification shall:
 - 1. Be located in accessible concealed floor, floor-ceiling or attic spaces.
 - 2. Be repeated at intervals not exceeding 30 feet (914 mm) measured horizontally along the wall or partition.
 - 3. Include lettering not less than 0.5 inch (12.7 mm)) in height, incorporating the followings wording: "FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS," or other wording to reflect the wall type as indicated on the Code Summary Drawings.

3.5 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, or mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092116.23

SECTION 092150 - GYPSUM PLASTER REPAIR AND RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Repair of existing plaster on interior walls and ceilings to the extent indicated on drawings.
 - 2. Repair of existing plaster on interior walls and ceilings that requires cutting or removal to accommodate new conduit, piping, or other components of mechanical and electrical systems or other new construction.

1.2 SUBMITTALS

- A. Product Data consisting of manufacturer's product specifications and installation instructions for each product, including data showing compliance with specified requirements.
- B. Samples for verification in units at least 12 inches (300 mm) square of each type of finish indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.
- C. Material Certificates: Submit certificate signed by manufacturer for each kind of plaster aggregate certifying that materials comply with requirements.

1.3 QUALITY ASSURANCE

- A. Installer: A firm having not less than five (5) years successful experience in plaster work similar to work of this project.
- B. Workmen: Skilled plasterers who have demonstrated experience in the type of work specified and who are thoroughly familiar with the requirements of the work. In acceptance or rejection of plaster work, no allowance will be made for lack of skill on the part of the workmen.
- C. Single-Source Responsibility: Obtain gypsum plaster from one source and by a single manufacturer.
- D. Fire-Test-Response Characteristics: Where fire-resistance-rated plaster assemblies are indicated, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: As indicated by GA File Numbers in GA-600 "Fire Resistance Design Manual" or design designations in UL "Fire Resistance

Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.

- E. Mockups: Prior to proceeding with plaster repair and restoration work, prepare mock-up panels for each type of finish and application required to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.
1. Provide in-place 2' x 2' (min. size) sample of each type of repair work at existing plaster wall or ceiling surfaces to demonstrate quality of work expected in finished work in location directed by Architect.
 2. Execute mock-up in presence of Architect using all materials indicated for final Work including lath, support system, and control joints.
 3. Notify Architect 7 days in advance of the dates and times when mockups will be constructed.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Obtain Architect's approval of mockups before proceeding with remainder of plaster repair and restoration work.
 6. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed plasterwork.
 7. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original packages, containers, or bundles, labeled with manufacturer's name, product brand name, and lot number.
- B. Store materials inside, under cover, and dry, protected from weather, direct sunlight, surface contamination, aging, corrosion, and damage from construction traffic and other causes. Protect plaster material from dampness and intrusion of foreign material.

1.5 PROJECT CONDITIONS

- A. Environmental Requirements, General: Comply with requirements of referenced plaster application standards and recommendations of plaster manufacturer for environmental conditions before, during, and after plaster application.
- B. Temperature Requirements: Maintain continuous uniform room temperature of not less than 40 deg F (4 deg C) nor more than 80 deg F (27 deg C) for at least 7 days before beginning plaster application, during its application, and until plaster is dry but for at least 7 days after application is complete. Distribute heat evenly; prevent concentrated or uneven heat from contacting plaster near heat source.
- C. Ventilation Requirements: Ventilate building spaces as required to remove water in excess of that required for hydrating plaster. Begin ventilation immediately after plaster is applied and continue until it sets.

- D. Protect contiguous work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Gypsum Plasters and Accessories:
 - a. National Gypsum Co.
 - b. United States Gypsum Co.

2.2 LATH

- A. Expanded-Metal Lath: Fabricate expanded-metal lath from uncoated or zinc-coated (galvanized) steel sheet to produce lath complying with ASTM C 847 for type, configuration, and other characteristics indicated below, with uncoated steel sheet coated after fabrication into lath.
 - 1. Diamond-Mesh Lath: Weighing 3.4 lb/sq. yd. (1.8 kg/sq. m).
 - a. Provide self-furring type for plastering directly on masonry, concrete, plywood and other flat surfaces.
 - b. Provide rib lath for ceiling locations.
 - c. Provide expanded metal flat diamond mesh lath for all other locations.

2.3 ACCESSORIES

- A. General: Comply with material provisions of ASTM C 841 and the requirements indicated below; coordinate depth of accessories with thicknesses and number of plaster coats required.
 - 1. Galvanized Steel Components: Fabricated from zinc-coated (galvanized) steel sheet complying with ASTM A 653, G40 (ASTM A 653M, Z90) minimum coating designation.
- B. Metal Cornerbeads: Type as indicated below, fabricated from zinc-coated (galvanized) steel.
 - 1. Type: Small nose with perforated flanges, for use on curved corners.
 - 2. Type: Small nose with expanded flanges reinforced by perforated stiffening rib, for use on columns and for finishing masonry corners.
 - 3. Type: Bull nose, radius 3/4 inch (19 mm) minimum, with expanded flanges, at locations indicated.

- C. Strip Reinforcement: Smooth-edge strips of expanded-metal lath fabricated from uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel sheet coated after fabrication; in the following forms:
 - 1. Cornerite: Strips bent lengthwise in center for internal plaster angles not otherwise reinforced by metal lath lapped or carried around.
 - 2. Stripite: Flat strips for reinforcing joints in gypsum lath, nonmetallic bases, and between dissimilar plaster bases.
- D. Casing Beads: Square-edged style, with short or expanded flanges to suit kinds of plaster bases indicated; of the following material:
 - 1. Material: Zinc-coated (galvanized) steel.
- E. Control Joints: Prefabricated, zinc-coated (galvanized) steel; one-piece type with folded pair of nonperforated screeds in M-shaped configuration, with expanded or perforated flanges.
 - 1. Provide removable protective tape on plaster face of control joints.

2.4 MISCELLANEOUS MATERIALS

- A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- B. Bonding Compound: ASTM C 631.
- C. Repair and Reinforcing Tape: Open-mesh, glass fiber.

2.5 PLASTER MATERIALS

- A. Base-Coat Plasters: ASTM C 28, types as indicated below:
 - 1. High-strength gypsum neat plaster with a minimum, average, dry compressive strength of 2800 psi (19 MPa) per ASTM C 472 for a mix of 100 lb (45 kg) of plaster and 2 cu. ft. (0.06 cu. m) of sand.
- B. Finish-Coat Plasters: Gypsum Keene's cement, ASTM C 61.
- C. Finishing Hydrated Limes: ASTM C 206, type S, special hydrated lime for finishing purposes.
- D. Aggregates for Base-Coat Plasters: ASTM C 35, type as indicated below:
 - 1. Sand aggregate, unless otherwise indicated.
- E. Aggregates for Finish-Coat Plaster with Floated Finish: ASTM C 35, sand aggregate, graded per ASTM C 842.

- F. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

1. High-Strength Gypsum Neat Plaster:
 - a. Structo-Base; United States Gypsum Co.
2. Gypsum Keene's Cement:
 - a. Red Top Keene's Cement; United States Gypsum Co.
3. Finishing Hydrated Limes, Type S:
 - a. Ivory Finish Lime; United States Gypsum Co.
 - b. Snowdrift Finish Lime; United States Gypsum Co.

2.6 PLASTER MIXES AND COMPOSITIONS

- A. Plaster Base-Coat Compositions: Comply with ASTM C 842 and manufacturer's written instructions for plaster base-coat proportions that correspond to application methods and plaster bases indicated below:
1. Three-Coat Work over Masonry and Metal Lath: Base coats as indicated below:
 - a. Scratch Coat: High-strength gypsum plaster with job-mixed sand.
 - b. Brown Coat: High-strength gypsum plaster with job-mixed sand.
- B. Finish Coats: Proportion materials in parts by dry weight for finish coats to comply with the following requirements for each type of finish coat and texture indicated:
1. Troweled Finishes: Finish-coat proportion as indicated below:
 - a. Gypsum Keene's Cement: 2 parts plaster to 1 part lime.

2.7 MIXING

- A. Mechanically mix cementitious and aggregate materials for plasters to comply with applicable referenced application standard and with recommendations of plaster manufacturer.
- B. Use materials without admixture of materials other than those specified herein in each instance. No retempering or retarding of partially set plaster mixes will be permitted, trade custom or local practices notwithstanding.
- C. Mix plaster in a batch type mixer at the construction site. Frozen, caked or lumpy material shall not be used. Clean mixer of all set or hardened material before materials for a new batch are loaded.
- D. Mix each batch of plaster separately. Thoroughly mix to obtain uniformity of color and workable consistency of mass and only in such quantities as will be used before it has started to set. Retempering after the plaster has started to set will not be permitted and such plaster shall be discarded.

- E. Machine mix special finishing hydrated lime with amount of water called for in printed directions of the manufacturer to form a putty and allow to stand for at least 15 minutes before using. Treat hydrated lime in a manner to obtain smooth or lump-free putty. Protect the putty from sun and take preventive measures to prevent excessive evaporation while stored.
- F. Batches for base coats shall not be in excess of an amount that can be entirely used within two hours. Batches for finish coats shall not be in excess of an amount that can be entirely used within 30 minutes.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine surfaces to which the work is to be attached or applied and notify Architect of existing conditions that are detrimental to the proper and expeditious installation of the work. Starting of work shall imply acceptance of surfaces to perform work as specified.

3.2 PROTECTION

- A. Exercise care to avoid soiling or spattering plaster onto the work of other trades. Use cover cloths or other suitable means of protection.
- B. Cover and protect furniture, equipment and fixtures to remain from soiling or damage when plaster repair work is performed in areas from which such items have not been removed.
- C. Take precautions to prevent unnecessary staining and smearing of floors by covering the floors with polyethylene.

3.3 PLASTER REMOVAL:

- A. Remove deteriorated plaster and corroded metal lath in areas indicated on drawings. Carefully remove all existing plaster that is loose, friable, bubbled, crumbling or otherwise deteriorated or unsuitable to remain. Make clean, sharp edges beveled inward to insure firm bond of new plaster.

3.4 INSTALLATION OF LATH AND FURRING, GENERAL

- A. Interior Lathing and Furring: Install materials indicated for plaster to comply with ASTM C 841.
- B. Isolation: Where lathing and metal support system abuts building structure horizontally and where partition or wall abuts overhead structure, sufficiently isolate from structural movement to prevent transfer of loading from building structure. Install slip- or cushion-type joints to absorb deflections but maintain lateral support.

1. Frame both sides of control joints independently and do not bridge joints with furring and lathing or accessories.

3.5 METAL LATHING

- A. Install expanded-metal lath for applications where plaster base coats are required. Provide appropriate type, configuration, and weight of metal lath selected from materials indicated that comply with referenced lathing installation standards.

3.6 INSTALLATION OF PLASTERING ACCESSORIES

- A. General: Comply with referenced lathing and furring installation standards for provision and location of plaster accessories of type indicated. Miter or cope accessories at corners; install with tight joints and in alignment. Attach accessories securely to plaster bases to hold accessories in place and in alignment during plastering.
- B. Accessories: Provide the following types to comply with requirements indicated for location:
 1. Cornerbeads: Install at external corners.
 2. Casing Beads: Install at terminations of plaster work, except where plaster passes behind and is concealed by other work and where metal screeds, bases, or frames act as casing beads.
 3. Control Joints: Install at locations indicated or, if not indicated, at spacings and locations required by referenced standard, recommended by plaster manufacturer, and approved by Architect. Spacing between joints in either direction shall not exceed the following:
 - a. Partitions: 30 feet (9 m).

3.7 PLASTER APPLICATION, GENERAL

- A. Prepare monolithic surfaces for bonded base coats and use bonding compound to comply with requirements of referenced plaster application standards for conditioning monolithic surfaces.
- B. Tolerances: Do not deviate more than plus or minus 1/8 inch in 10 feet (3 mm in 3 m) from a true plane in finished plaster surfaces, as measured by a 10-foot (3-m) straightedge placed at any location on surface.
- C. Grout hollow-metal frames, bases, and similar work occurring in plastered areas, with base-coat plaster material, before lathing where necessary. Except where full grouting is indicated or required for fire-resistance rating, grout at least 6 inches (152 mm) at each jamb anchor.
- D. Sequence plaster application with installation and protection of other work so that neither will be damaged by installation of other.
- E. Plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground, unless otherwise indicated. Where plaster is not terminated at metal

frame by casing beads, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.

- F. Apply thicknesses and number of coats of plaster as indicated or as required by referenced standards.
- G. Concealed Plaster: Where plaster application will be concealed by wood paneling, above suspended ceilings and in similar locations, finish coat may be omitted; where concealed behind cabinets, similar furnishings, and equipment, apply finish coat; where used as a base for adhesive application of tile and similar finishes, omit finish coat, coordinate thickness with overall dimension as shown, and comply with tolerances specified.

3.8 PLASTER APPLICATION

- A. Plaster Application Standard: Apply plaster materials, composition, mixes, and finishes indicated to comply with ASTM C 842.
- B. Execute work to provide a finish free from depressions, bulges, slick spots, scratches, brush and tool marks, cracks, visible joints, crazing, and discolorations. Surfaces shall have true planes, with uniform texture to match the adjoining surfaces and with lines and arises that are straight, plumb and level. Work shall be true to grounds and guidelines and free from blemishes and defects of any sort.
 - 1. Ventilation: During the application of each coat of interior plaster, keep the exterior openings closed until the plaster has set, then adjust for proper ventilation to regulate the drying and curing of the plaster.
 - 2. Thickness of Plaster: Match original thickness where patching.
 - a. Where plastering over existing walls in which existing surface is uneven and bumpy, adjust plaster thickness as much as possible to compensate for existing surface irregularities.
 - 3. Joints: Lap joints in succeeding coats including joints at interior angles; continue past the angle and corner and feather off on adjacent wall.
- C. Scratch (First) Coat:
 - 1. Apply plaster with sufficient materials and pressure to force plaster to form good bond with solid base material and cover well.
 - 2. Leave surface level.
 - 3. Scratch this coat and allow to set and thoroughly dry out before the application of the brown coat.
- D. Brown (Second) Coat:
 - 1. Do not apply brown coat until after scratch coat has hardened, not sooner than 48 hours after application of scratch coat. Evenly dampen scratch coat to provide uniform suction before brown coat is applied.

2. Prior to application of gypsum brown coat place plaster screeds at angles and corners and at intervals of 8' in both walls and ceilings unless grounds occur at smaller intervals.
3. Thickness of Brown Coat: Approximately 3/8". Bring brown coat out to ground and required lines, to true, even surfaces. Straighten with rod and darby and leave rough to accept finish coat.
4. Moist cure brown coat for 48 hours after application and then allow coat to set and dry out.

E. Finish Coat:

1. Thickness of Finish: 1/16 to 1/8 inch thick and treated and finished as directed.
2. Before application of finish coat, cut out shrinkage cracks and fill with scratch coat mortar.
3. Apply finish coats well ground to scratched surfaces, then double back and trowel down to a true plane, filling all imperfections. Delay troweling as long as possible and used only to eliminate uneven points and to force aggregate particles into the plaster surface. Avoid excessive troweling.
 - a. For smooth coat finish, trowel surface to a smooth, highly polished surface.
4. Finish surfaces plumb, straight, level, and true throughout, varying from a true plane by not more than 1/8" when tested with a 10' straightedge at any point and finish surface to match adjacent existing texture.

- F. Washdown: When plaster work has been completed, wash down the new plaster with a zinc sulphate solution (2 pounds per gallon of water) and allow to dry.

3.9 CUTTING AND PATCHING

- A. Cut, patch, replace, and repair plaster as necessary to accommodate other work and to restore cracks, dents, and imperfections. Repair or replace work to eliminate blisters, buckles, excessive crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.
- B. Leave plaster ready for painting.

3.10 PATCHING AND REPAIRS TO EXISTING PLASTER

- A. General: Provide patching and repairs to existing plasterwork that is damaged or deteriorated or has been disturbed to accommodate installation of new mechanical or electrical equipment or other construction. Make all such repairs and prepare all surfaces as required to obtain a complete and first class job, as required by job conditions. Comply with plaster manufacturer's recommendations for preparation of surfaces, including installation of lath.
- B. Preparation: Scrape and sand existing plaster surfaces to be repaired, removing all loose and peeling paint.

- C. Bonding Compound on Existing Plaster Surfaces: Apply bonding agent to existing plaster to receive new repair material and allow to dry until no longer tacky before proceeding.
- D. Apply plaster, filling repaired areas in accordance with general plastering provisions described herein. Repair cracks, spalls, gaps and holes, restoring surfaces to a smooth, true, and flush condition.
- E. Reinforce interior angles and flat joints with joint tape and embedding material to comply with ASTM C 843 and manufacturer's written recommendations.
- F. Bumps and Wavy Surfaces: Thoroughly sand bumps and waves as much as possible and apply skim coats of plaster compound filling all depressions to obtain a smooth and true surface. Contractor may use spackling compound that is compatible for use over plaster if approved in advance by the Architect.
- G. Fill hairline cracks with plaster flush and smooth. All other cracks shall have a channel cut along full length of crack of sufficient width to attain tight bond and to receive new plaster. Reverse cut side walls of channel to insure proper bonding of new plaster. Fill channel with successive coats specified herein bringing finish coat out flush for invisible appearance.
- H. Skim coat plaster where base is sound but surface is cracked or crazed or surface was not originally an acceptable finish coat or where for other reasons surface is not hard, smooth, acceptable finish for scheduled surface treatment.
- I. Do not apply plaster coat over any existing painted surfaces.
- J. Execute pointing around fixtures, outlet boxes, switches, plates, piping, registers, and all other elements abutting or extending through plaster.
- K. Repaired and patched areas shall match adjoining work in texture and finish.

3.11 CLEANING AND PROTECTING

- A. Remove temporary protection and enclosure of other work. Promptly remove plaster from door frames, windows, and other surfaces not to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering. When plastering is completed, remove unused materials, containers, and equipment and clean floors of plaster debris.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure plaster work is without damage or deterioration at the time of Substantial Completion.

3.12 CURING

- A. Allow plaster to cure 30 days prior to application of paint or other finishes.

December 14, 2023
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SED No. 44-10-00-01-0-001-041

Enlarged City School District of Middletown
Twin Towers Middle School
Additions and Alterations

END OF SECTION 092150

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 DESCRIPTION

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 2. Protective Coating: ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized, unless otherwise indicated.
- B. Studs and Runners: ASTM C 645. EQ studs not permitted.
1. Steel Studs and Runners:
 - a. Minimum Base-Metal Thickness: 0.0296 inch, 30 mils.
 - b. Depth: As scheduled on Drawings for each location.
- C. Slip-Type Head Joints: Provide one of the following:
1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs, installed with studs

- friction fit into top runner and with continuous cold rolled channel bridging attached to each stud located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
 3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) ClarkDietrich; MaxTrak Slotted Deflection Track
 - 2) Steel Network Inc. (The); VertiClip SLD Series.
 - 3) Telling Industries; True-Action™ Slotted Track.
- D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Minimum Base-Metal Thickness: 0.033 inch, 33 mil.
- E. Cold-Rolled Channel Bridging and Bracing: Steel, 0.053-inch (1.34-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
1. Depth: 1-1/2 inches (38 mm) unless otherwise indicated.
 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.
- F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).
 2. Depth: 7/8 inch (22.2 mm) unless otherwise indicated.
- G. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.
1. Configuration: Asymmetrical.
- H. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
1. Depth: 3/4 inch (19 mm) unless otherwise indicated.
 2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch (0.8 mm).
 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- B. Hanger Attachments to Concrete:
 - 1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
 - a. Type: Postinstalled, chemical anchor or postinstalled, expansion anchor.
 - 2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.
- D. Flat Hangers: Steel sheet, 1 by 3/16 inch (25 by 5 mm) by length indicated.
- E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch (1.34 mm) and minimum 1/2-inch- (13-mm-) wide flanges.
 - 1. Depth: 1-1/2 inches (38 mm) unless otherwise indicated on Drawings.
- F. Furring Channels (Furring Members):
 - 1. Cold-Rolled Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
 - 2. Steel Studs and Runners: ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.018 inch, 18 mil.
 - b. Depth: As indicated on Drawings.
 - 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
 - a. Minimum Base-Metal Thickness: 0.018 inch, 18 mil.
 - 4. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical or hat shaped.
- G. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

- a. Armstrong World Industries, Inc.; Drywall Grid Systems.
- b. Chicago Metallic Corporation; Drywall Grid System.
- c. USG Corporation; Drywall Suspension System.

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 - 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
 - 1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
 - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.
- C. Pre-compressed Spring Hangers for Sound Isolation: Ceiling Hangers shall be fail safe and include a steel frame containing an AASHTO Bridge Bearing Quality LDS Rubber Element at the top and a nominal 1" deflection steel spring at the bottom. Springs shall be seated in an LDS cup with a rubber bushing extending through the box to prevent metal to metal contact between the steel suspension rod and the frame. Dynamic Stiffness of Cup and Element shall not exceed 1.4. The ID of the bushing must allow a 30° swing from side to side before rod contact. Springs shall be factory precompressed to 70% of the assigned deflection.
 - 1. Basis of Design product: Mason Industries 30NCC for 1-1/2 x 1/2 channel.
 - 2. Submittals shall confirm AASHTO Quality and Dynamic Stiffness in addition to deflection.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for

anchorage to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (610 mm) o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.
1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.
- E. Cutting, Notching and Boring Holes in Nonstructural Steel Wall Framing:
1. Flanges and lips of nonstructural steel wall studs shall not be cut or notched.
 2. Holes in webs of nonstructural steel wall studs shall be permitted along the centerline of the web of the framing member, shall not exceed 1-1/2 inches (38 mm) in width or 4 inches (102 mm) in length, and the holes shall not be spaced less than 24 inches (610 mm) center to center from another hole or less than 10 inches (254 mm) from the bearing end.

3.4 INSTALLING FRAMED ASSEMBLIES

- A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- B. Install studs so flanges within framing system point in same direction.

1. Space studs at 16 inches (406 mm) o.c. unless otherwise indicated.
- C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
 - a. Sound Isolation pads shall be installed as a continuous resilient layer separating the base and/or top plate of the stud wall assembly from the non-isolated floor and/or ceiling deck where shown on drawings. Wallboard shall be cut and installed to allow a 1/4" to 3/8" gap at the isolation joint for the installation of resilient non-hardening acoustical caulking.
 6. Curved Partitions:
 - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches (150 mm) o.c.
- D. Install steel studs used as furring with clip angles at midpoint of wall span. Install additional clips to limit deflection to L/240 for walls finished with gypsum wall board and L/360 for walls finished with tile or plaster when subject to 5 psf (239 Pa) lateral load.
- E. Direct Furring: Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

- F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.5 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Isolate suspension systems from building structure to provide sound dampening using spring hangers where indicated on Drawings.
- D. Suspend hangers from building structure as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 - 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 - 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 - 5. Do not attach hangers to steel roof deck.
 - 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 - 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 - 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- E. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

- F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

SECTION 092800 - GLASS-REINFORCED GYPSUM FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following preformed products for interior use, fabricated in glass reinforced gypsum:
 - 1. Column covers.
- B. Related Work include the following:
 - 1. Framing and furring for items requiring anchorage are specified in Division 05 Section "Metal Fabrications."
 - 2. Blocking, nailers, and shims for items requiring anchorage are specified in Division 06 Section "Miscellaneous Carpentry."

1.2 SYSTEM PERFORMANCE REQUIREMENTS

- A. Fabricate and install glass-reinforced gypsum units to withstand, without failure or cracking, loads from gravity and structural movement, including thermally induced movement, and to resist other conditions of in-service use that the building will experience.

1.3 ACTION SUBMITTALS

- A. Product data for each type of product specified.
- B. Shop drawings showing thickness, finish, ornamentation, tolerances, and anchorage details. Indicate attachment methods, imbedded supports, reinforcement, fabrication, joint treatments, and supports.
- C. Samples for verifying glass-reinforced gypsum units. Show the full range of variations in detail expected.
 - 1. Glass-Reinforced Gypsum Units: 2-foot- (0.50-m-) long section with finished joint, typical of the units specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Installer certificates signed by manufacturer certifying that Installers comply with requirements under "Quality Assurance" Article.

- B. Qualification data for firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed glass reinforced gypsum installations similar in material, design, and extent to that indicated for this Project and with a construction record of successful in-service performance.
- B. Manufacturer Qualifications: Manufacturer must be able to show that he has at least 5 years experience in this type of work, has experienced personnel, physical facilities, established quality control procedures and management capacity sufficient to produce the required parts without causing delay of the project.
- C. Single Source Responsibility for Glass-Reinforced Gypsum Materials: Obtain glass reinforced gypsum fabrications from a single manufacturer.
- D. Fire-Test-Response Characteristics: Provide glass-reinforced gypsum units with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Flame Spread: 25 or less.
 - 2. Smoke Developed: 450 or less.
- E. Mockups: Prior to installing glass-reinforced gypsum units, construct mockups for each form of construction and finish required to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.
 - 1. Locate mockups on site in the location and of the size indicated or, if not indicated, as directed by Architect.
 - 2. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 3. Apply specified finish to column covers.
 - 4. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 5. Accepted mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.

- F. Engineering Responsibility: Engineer glass-reinforced gypsum units by qualified professional engineer legally authorized to practice in the jurisdiction where Project is located.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver glass-reinforced gypsum units in factory-wrapped crates, packaged to keep units dry and free of moisture.
- B. Store glass-reinforced gypsum units at Project site to prevent cracking, distortion, warping, staining, or other physical damage.
- C. Comply with manufacturer's recommendations for storing and handling units.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurements before fabricating glass reinforced gypsum units and show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Enclosure and Environmental Limitations: Do not install glass-reinforced gypsum units until space is enclosed and weatherproof, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.
 - 1. Acclimatize glass-reinforced gypsum units by removing packaging and storing in the installation space not less than 48 hours before installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by GC Products or equal products of one of the following:
 - 1. Decoform Corporation
 - 2. Casting Designs, Inc.
 - 3. GRG Technologies
 - 4. Plastrglas.

2.2 MATERIALS

- A. Gypsum Material: Provide alpha-based, calcined gypsum produced from materials complying with ASTM C 22.
- B. Glass Fibers: Comply with ASTM D 578 "E" glass type chopped into 1 inch lengths.
- C. Glass-Reinforced Gypsum Units: Glass fiber shall be 5 to 6 percent by weight of gypsum and glass mixture. Provide units identical to those tested for the following performance characteristics, per test method indicated below, by testing and inspecting organizations acceptable to authorities having jurisdiction.
 - 1. Hardness: 95 RH min Rockwell Scale.
 - 2. Modulus of Rupture 3200 - 3500 psi when tested in accordance with ASTM C 109.
 - 3. Modulus of Elasticity: $2.7 - 3.8 \times 10^6$ psi when tested in accordance with ASTM C 109.
 - 4. Coefficient of Linear Thermal Expansion: 8×10^{-6} inch/inch/deg F when tested in accordance with ASTM D 696.
- D. Material Compatibility: Provide GFRG products with surface characteristics prepared for mortar attachment of ceramic tile.

2.3 MISCELLANEOUS MATERIALS

- A. Embedded or Inserted Hardware: Complying with ASTM A 641, and integrated into the members without visibility on the finish face.
- B. Fasteners: Self-tapping gypsum wallboard screws.
- C. Adhesives: As recommended in manufacturer's printed instructions. and meeting VOC requirements of jurisdiction.
- D. Sealants: Refer to Section 079200 for sealant materials.

2.4 FABRICATION

- A. Basis of Design Product: GFRG Column Covers by GC Products or equal.
 - 1. Shape: Round
 - 2. Diameter: 20" at Band Room and Chorus and 16" at Library.
 - 3. Column Base: Stainless steel. Mounted on concrete base.
 - 4. Column Top: As indicated on Drawings.
 - 5. Shaft: Straight
 - 6. Shell Thickness: Minimum 1/4", and minimum 1/2" at edges.
 - 7. Appearance: Seamless.

- B. Fabricate units as large as possible to minimize joints.
- C. Fabricate units with smooth finished surfaces, prepared to accept application of ceramic tile finish. Repair hollows, voids, scratches, and finish surface imperfections.
- D. Dimensional Tolerances of Units: As follows:
 - 1. Warpage or Bowing: Plus or minus 1/16 inch.
 - 2. Dimensional, all Directions: Plus or minus 1/8 inch.
 - 3. Plane Surface Straightness: Plus or minus 1/8 inch.
 - 4. Overall Assembled Length and Width: Plus or minus 1/8 inch per 10 feet.
 - 5. Out of Round: Plus or minus 1/16 inch..
- E. Construct molds for column cover units of materials resulting in smooth, finished products conforming to profiles and dimensions indicated.
- F. Combine glass fiber and matrix slurry at rates to achieve desired mix proportions and glass content, and sprayed in accordance with manufacturer's instructions.
- G. Embed indicated or required inserts in matrix to develop full strengths. Embed items after required minimum body thickness have been achieved.
- H. Form columns to dimensions indicated. Tolerance as specified. Curved panels accurately formed to radii. Fabricate column covers in two sections with vertical butt joint, suitable for field finishing.
- I. Carefully remove units from molds and repair hollows, voids, scratches and other surface imperfections. Surface shall be primer ready.
- J. Factory fabricate accessories and trim components, hardware, including attachment devices, ready for installation.
- K. Provide base and ceiling joints as indicated, or if not indicated, as per manufacturer's standard detail.

2.5 FINISH

- A. Column cover panels shall be free of scratches and blemishes; column covers to be field finished as specified in Division 09 Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates areas and conditions with Installer present for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of glass-reinforced gypsum units. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install glass-reinforced gypsum units plumb, level, true, and aligned with adjacent materials. Use concealed shims where required for alignment. B. Erection Tolerances: As follows:
 - 1. Plane Alignment (Panel to Panel): 1/16 inch (1.6 mm).
 - 2. Variation from Plumb: Plus or minus 1/8 inch (3.2 mm) per 10 feet (3 m).
 - 3. Variation from Straightness: Plus or minus 1/4 inch (6.3 mm) per 25 feet (7.6 m).
 - 4. Assembly Deflection: Not greater than the length of the assembly divided by 240.
 - 5. Joint Alignment: Not more than 1/8 inch (3.2 mm).
 - 6. Joint Width: Not more than 3/8 inch (9.5 mm).
- C. Predrill fastener holes in ornamentation. Clean fastener holes, removing dirt and oil.
- D. Screw fasteners in place by hand. Do not use pneumatic staple guns. Countersink flathead screws.
- E. Fasteners as required to comply with dimensional tolerances and not less than 5/16 inch (7.9 mm) from edge and end.
- F. Patch fastener holes with bedding compound and fiberglass tape applied flush with finish face. Sand patch smooth and level.
- G. Attach pieces at joints with adhesive, and band or brace together until adhesive is cured. Cure adhesive according to manufacturer's printed instructions.
- H. Joint Finishing: Comply with ASTM C 840. Provide smooth and contiguous surface.

END OF SECTION 092800

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Cement board.
3. Sound-attenuation blankets

B. Related Requirements:

1. Section 092216 "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.
2. Section 092116.23 "Gypsum Board Shaft Wall Assemblies" for metal shaft-wall framing, gypsum shaft liners, and other components of shaft-wall assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

1.3 QUALITY ASSURANCE

A. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE AND HANDLING

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

1.5 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

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

2.3 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CertainTeed Corp.
 - 2. Georgia-Pacific Gypsum LLC.
 - 3. Lafarge North America Inc.
 - 4. National Gypsum Company.
 - 5. USG Corporation.
- B. Gypsum Wallboard: ASTM C 1396/C 1396M.
 - 1. Thickness: 5/8 inch (15.9 mm).
 - 2. Where drawings indicate regular type 5/8 inch (15.9 mm), provide 5/8 inch (15.9 mm) Type X indicated below.
 - 3. Long Edges: Tapered.
- C. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch (15.9 mm).
 2. Long Edges: Tapered.
- D. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces, in 5/8 inch thickness unless otherwise indicated, with tapered edges; panels shall be classified as Type X
1. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
 2. Products: Subject to compliance with requirements, provide one of the following or equal:
 - a. National Gypsum Company; Type XP/PR
 - b. United States Gypsum Co.; Mold Tough
- E. Abuse-Resistant Gypsum Board: ASTM C 1629/C 1629M.
1. Core: 5/8 inch (15.9 mm), Type X.
 2. Long Edges: Tapered.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
 4. Performance Data:
 - a. Surface Abrasion: ASTM C1629. Classification Level 2
 - b. Surface Indentation: ASTM C1629. Classification Level 1
 - c. Soft-body Impact Test: ASTM C1629. Classification Level 1
 5. Products: Subject to compliance with requirements, provide one of the following or equal:
 - a. Protecta AR 100 Type X with Mold Defense; Lafarge North America Inc.
 - b. ProRoc Gypsum Board Panels; CertainTeed, Division of BPB.
- F. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.
1. Thickness: 1/4 inch (6.4 mm).
 - a. Long Edges: Tapered

2.4 SPECIALTY GYPSUM BOARD

- A. Gypsum Board, Type C: ASTM C 1396/C 1396M. Manufactured to have increased fire-resistive capability.
1. Products: Subject to compliance with requirements, provide one of the following or equal:
 - a. CertainTeed Corp.; ProRoc Type C.
 - b. Lafarge North America Inc.; Firecheck Type C.
 - c. National Gypsum Company; Gold Bond Fire-Shield C.
 - d. USG Corporation; Firecode C Core.
 2. Thickness: 5/8 inch (15.9 mm), unless otherwise indicated.
 3. Long Edges: Tapered.
 4. Provide where required by UL Design or NER 258.

2.5 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; FiberCement BackerBoard.
 - b. Custom Building Products; Wonderboard.
 - c. James Hardie Building Products, Inc.; Hardiebacker 500.
 - d. National Gypsum Company, Permabase Cement Board.
 - e. USG Corporation; DUROCK Cement Board.
 - 2. Thickness: 1/2 inch (12.7 mm) or 5/8 inch (15.9 mm) as indicated.
 - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.6 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Material: Galvanized-coated steel sheet or rolled zinc
 - 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. Expansion (control) joint.
 - f. Curved-Edge Cornerbead: With notched or flexible flanges.
- B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Fry Reglet Corp.
 - b. Gordon, Inc.
 - c. Pittcon Industries.
 - 2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
 - 3. Finish:
 - a. Curved Drywall Trim: Corrosion-resistant primer compatible with joint compound and finish materials specified.
 - b. Extruded Aluminum Partition Closures: Clear anodized aluminum.
 - 4. Basis of Design Products:
 - a. Curved Drywall Trim: Provide Contura curved drywall trim by Gordon Inc. for locations indicated on the Drawings, in sizes required.

2.7 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
 - 2. Tile Backing Panels: As recommended by panel manufacturer.

- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints, beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use factory mixed drying-type, all-purpose compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use factory mixed drying-type, all-purpose compound.
 - 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.
- D. Joint Compound for Tile Backing Panels:
 - 1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.8 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- C. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 - 1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Provide mineral-fiber SAFB where required by the UL assembly.
- E. Acoustical Joint Sealant: As specified in Section 079200 "Joint Sealants"

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

1. Refer to Section 079200 for additional requirements.
 2. For assemblies containing acoustical (sound dampening) gypsum board, comply with manufacturer's directions for complete sound sealed installation. Seal room perimeter with recommended sealant and wrap electrical units with putty as per manufacturer's directions.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
1. Type X: Vertical surfaces unless otherwise indicated.
 2. Ceiling Type: Ceiling surfaces.
 3. Abuse-Resistant Type: As indicated on Drawings.
 4. Moisture- and Mold-Resistant Type: As indicated on Drawings.
 5. Type C: Where required for specific fire-resistance-rated assembly indicated.
 6. Flexible Type: Apply in double layer at curved assemblies.
- B. Single-Layer Application:
1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 3. Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- A. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

B. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- (300-mm-) long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c

3.4 APPLYING TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A108.11, at showers, tubs, and where indicated.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
 1. Install control joints on 30 foot maximum centers, for all partitions, at locations indicated, and as detailed. Align control joints with door frames wherever possible, with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels.
 2. Install control joints at 50 foot maximum centers, with areas not to exceed 2,500 sq. ft. for all ceiling areas, at locations indicated, and as detailed.
- C. Interior Trim: Install in the following locations:
 1. Cornerbead: Use at outside corners unless otherwise indicated.
 2. Bullnose Bead: Use where indicated.
 3. LC-Bead: Use at exposed panel edges.
 4. L-Bead: Use where indicated.
 5. Curved-Edge Cornerbead: Use at curved openings.
- D. Aluminum Trim: Install in locations indicated on Drawings.

3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 4: At all panel surfaces that will be exposed to view unless otherwise indicated.
 - 4. Level 5: Provide Level 5 finish at all areas where wall washed lighting is indicated and at surfaces scheduled to receive gloss paint, and elsewhere specifically indicated on Drawings and schedules.
- E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 IDENTIFICATION

- A. Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling. Such identification shall:
 - 1. Be located in accessible concealed floor, floor-ceiling or attic spaces.
 - 2. Be repeated at intervals not exceeding 30 feet (914 mm) measured horizontally along the wall or partition.
 - 3. Include lettering not less than 0.5 inch (12.7 mm)) in height, incorporating the followings wording: "FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS," or other wording to reflect the wall type as indicated on the Code Summary Drawings.

3.8 PROTECTION

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

END OF SECTION 092900

SECTION 093100 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Porcelain tile
 - 2. Ceramic tile
 - 3. Trim and edge accessories.
 - 4. Waterproof membrane for tile installations
 - 5. Stone thresholds.
- B. Sealing of expansion, contraction, control, and isolation joints in tile surfaces is specified in Division 07 Section "Joint Sealant."

1.2 ACTION SUBMITTALS

- A. Product data for each type of product specified.
- B. Samples of each color of tile, marble threshold, or accessory to be provided, for verification purposes.
- C. Samples of grout demonstrating full range of colors available, for initial selection purposes.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, plus other information specified.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
- B. Single-Source Responsibility for Setting and Grouting Materials: Obtain ingredients of a uniform quality from one manufacturer for each cementitious and admixture component and from one source or producer for each aggregate.
- C. Installer Qualifications: Engage an experienced Installer who has successfully completed tile installations similar in material, design, and extent to that indicated for Project.

- D. Unit Mock-up: Provide mock-up on a board min. 2' x 2' in size, one for each different tile and grout color to be provided in the work; for final approval of grout color before ordering grout.
- E. In-Place Mock-up: Prepare mock-ups of types indicated below following requirements of this section. Reprepare mock-ups as many times as required by Architect until satisfactory result is obtained, as judged solely by Architect. Obtain Architect's approval of visual qualities before proceeding with work. Protect approved mock-ups until all work has been completed. Approved mock-ups will represent the minimum standard of acceptability for each portion of the work.
 - 1. Provide in-place sample minimum 5' x 5' of typical flooring layout in location directed by Architect

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.
- B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

1.6 PROJECT CONDITIONS

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- B. Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.
- C. Maintain temperatures at 50 deg F (10 deg C) or more in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

1.7 EXTRA MATERIALS

- A. Extra Materials: Furnished from same production run as ceramic tile installed. Furnish 5% of each type and color of flooring material and 2% of each type and color of wall tile material provided in the work. Package materials with protective covering and identify with labels describing contents. Deliver extra materials to Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturers: The design for each tile type and other material specified is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the following manufacturers:

1. Tile:
 - a. American Olean; Div. of Dal-Tile International Corp
 - b. Creative Materials Corp.
 - c. Crossville Inc
 - d. Daltile; Div. of Dal-Tile International Inc.
 - e. Garden State Tile
 - f. Olympia Tile
 - g. Florida Tile Industries, Inc.
 - h. Summitville Tiles, Inc.
 - i. United States Ceramic Tile Company
2. Mortars and Grouts:
 - a. Bostik Construction Products Div. (Hydroment)
 - b. Laticrete International Inc.
 - c. Mapei Corp.
 - d. TEC Specialty Construction Brands Inc.
3. Waterproofing Membranes: The Noble Co.
4. Termination, Trim and Transition Strips: Schluter

2.2 PRODUCTS, GENERAL

- A. ANSI Standard for Ceramic Tile: Comply with ANSI A137.1 "American National Standard Specifications for Ceramic Tile" for types, compositions, and grades of tile indicated.
1. Furnish tile complying with "Standard Grade" requirements unless otherwise indicated.
- B. ANSI Standard for Tile Installation Materials: Comply with ANSI standard referenced with products and materials indicated for setting and grouting.
- C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
1. Match color, texture, and pattern indicated by reference to manufacturer's standard designations for these characteristics.
 2. Provide tile trim and accessories that match color and finish of adjoining flat tile.
- D. Factory Blending: For tile exhibiting color variations within the ranges selected during sample submittals, blend tile in factory and package accordingly so that tile units taken from one package show the same range in colors as those taken from other packages and match approved samples.

- E. Large Format Tiles: Large format tiles are defined to be tiles with any one single side larger than 15".

2.3 TILE PRODUCTS

- A. General: Refer to Attachment B "Wall Type to Finishes Schedule" following this section for cross referencing Wall Types (WT1 - WT8) noted on the Drawings with the corresponding finishes required for each Wall Type. For all locations of tile, see spec.
- B. Porcelain Floor Tile FPT1: Provide flat tile complying with the following requirements:
 - 1. Module Size: 24" x 48"
 - 2. Thickness: 9.5mm
 - 3. Finish: Natural
 - 4. Color: Beige
 - 5. Basis of Design Product: Creative Materials "Arden Chevron" or equal.
 - 6. Location: Auditorium Toilet Rooms + Corridor Lobby and Gym Toilet Room + Corridor Lobby
 - 7. Pattern: Monolithic.
 - 8. Note: Allow ample time to order tile from overseas.
- C. Porcelain Floor Tile FPT2: Provide flat tile complying with the following requirements:
 - 1. Module Size: 24" x 24"
 - 2. Thickness: 9.5mm
 - 3. Finish: Matte
 - 4. Color: Light Grey MN43
 - 5. Basis of Design Product: American Olean "Minimum" or equal.
 - 6. Location: Student toilet lobby/room floors, Nurse, main office.
 - 7. Pattern: Monolithic.
- D. Porcelain floor tile FPT3 - FPT6: DalTile Portfolio, 12" x 24" x 5/16"
 - 1. FPT3: Portfolio Vivid: Sea Breeze PF26
 - 2. FPT4: Portfolio PF02 - White
 - 3. FPT5: Portfolio PF04 - Dove Grey.
 - 4. FPT6: Portfolio PF05 - Ash Grey.
 - 5. Location: Café/Servery Floor Tile (Base Bid).
- E. Ceramic Wall Tile CT1: DalTile, Colorwheel Linear; color Arctic White 0190; 4" x 12" x 5/16" thick, Gloss.
 - 1. Location: Toilet rooms field, and Cafeteria corridor
 - 2. Pattern: Horizontal running bond.
- F. Ceramic Wall Tile CT2: DalTile Colorwheel Linear, bullnose cap S44C9, 4" x 12" x 5/16" thick, color Sea Breeze 1174.

1. Location: Single user toilet rooms.
- G. Ceramic Wall Tile CT3: NEMO Tile, Herringbone Twilight Gloss 3/8" x 2", 12" meshmounted
1. Location: Behind drinking fountains
- H. Ceramic Wall Tile CT4: Dal tile, Colorwheel, Retro, 3" x 3" Arabesque , Arctic white 0190
1. Location: Faculty backsplash
 2. Pattern: See drawings.
- I. Ceramic Wall Tile CT5: Dal tile, Colorwheel, Retro, 3" x 3" Arabesque , Desert Grey X114
1. Location: Faculty backsplash
 2. Pattern: See drawings
- J. Ceramic Wall Tile CT6: Dal tile, Colorwheel, Retro, 3" x 3" Arabesque , Galaxy 1469
1. Location: Faculty backsplash
 2. Pattern: See drawings
- K. Ceramic Wall Tile CT7, CT8, and CT9: Garden State Tile, Style: Bolt, Glossy Picket; format: 2" x 10"
1. Location: Servery wall accent
 2. Colors:
 - a. CT7: Blue Velvet
 - b. CT8: Pure White
 - c. CT9: Quicksilver
- L. Porcelain Wall Tile PT1 - PT4: Large format tiles from Oxide, Collection and Filo lines from Laminam; colors and sizes as per Attachment A to this Section.
1. Location: Corridors, tile over existing tile, and new corridors.
 2. Wood caps and corners required.
- M. Porcelain Wall Tile Accents PT6 - PT9: Marrazzi , Scenario 8" x 8". Style/ colors as follows:
1. PT6: #SR24 Blue Convex
 2. PT7: #SR25 Blu Crescent
 3. PT8: #SR21 Blu
 4. PT9: #SR20 Blanco; Cafeteria + Cafeteria Corridor
- N. Porcelain Wall Tile PT10: Creative Materials Corp, Bellissimo, 12" x 24". In three colors, as selected by Architect; 8mm thickness, honed.

1. Location: Base Bid to infill walls.
 2. Provide Schluter top caps and edges.
- O. Porcelain Wall Tile Accent PT11: Creative Materials Corp, Bellissimo, 12" x 24". Color Grey #11; 8mm thickness, honed.
1. Location: Stair walls.
- P. Trim Units: Provide tile trim units with inside and outside corners and to comply with following requirements:
1. Porcelain Wall Base PB1: American Olean , minimum, MN 43, #PB36C9TB, 6x12" cove base
 - a. Location: Some single user toilet rooms.
 2. Porcelain Wall Base PB2: Creative Materials- Arden, Natural Finish, Color Beige, 3" x 48" x 9.5mm bullnose
 - a. Location: Auditorium Toilet Rooms + Corridor Lobby and Gym Toilet Room + Corridor Lobby
 3. Porcelain Wall Base PB3: Crossville, Retro Active 2.0 and Patterns, Leaden, 4x12 bullnose unpolished
 - a. Location: Existing Corridor, Tech Corridor, Student Toilet Corridor, Cafeteria.
 4. Porcelain Wall Base PB4: Crossville, Retro Active 2.0 and Patterns, Leaden, 4x12 unpolished
 - a. Location: Stairwells
 5. Porcelain Wall Base PB5: Special Order Cove Base, DalTile Colorwheel Linear #A34C1MOD, x 5/16" thick, color Sea Breeze 1174.
 - a. Location: Single user toilet rooms
 6. Porcelain Wall Base PB6: Crossville, Retro Active 2.0 sanitary cove #RET07.106112CBS, 6" x 12" x 3/8" thick, finish UPS, color Leaden,
 - a. Location: Cafeteria

2.4 STONE THRESHOLDS

- A. General: Provide stone that is uniform in color and finish, fabricated to sizes and profiles indicated or required to provide transition between tile surfaces and adjoining finished floor surfaces.
1. Bevel edges at 1:2 slope, aligning lower edge of bevel with adjacent floor finish. Limit height of bevel to 1/2 inch (12.7 mm) or less, and finish bevel to match face of threshold.

- B. Marble Thresholds: Provide marble thresholds complying with ASTM C 503 requirements for exterior use and for abrasion resistance where exposed to foot traffic, a minimum hardness of 10 per ASTM C 241.

- 1. Provide white marble thresholds.

2.5 WATERPROOFING/CRACK ISOLATION FOR TILE INSTALLATIONS

- A. General: Provide products that comply with ANSI A118.10 and the descriptions in this Article.
- B. Polyethylene-Sheet Waterproofing: Manufacturer's standard proprietary product consisting of composite sheets, 60 inches (1524 mm) wide by a nominal thickness of 0.030-inch (0.76 mm), composed of an inner layer of nonplasticized, chlorinated polyethylene sheet faced on both sides with laminated, high-strength, nonwoven polyester material, designed for embedding in latex-portland cement mortar and as the substrate for latex-portland cement mortar setting bed. Provide at all locations for thin-setting.

- 1. Products: Provide Nobleseal TS manufactured by the Noble Company, or approved equal.
 - 2. Location: Use at all thin set tile floors in bathrooms.

2.6 SETTING MATERIALS

- A. Medium-Bed, Latex-Portland Cement Mortar. Comply with requirements in ANSI A118.4. Provide product that is approved by manufacturer for application thickness of up to 3/4 inch. Provide one of the following, or approved equal:
 - 1. MegaLite® Ultimate Crack Prevention Large Format Tile Mortar by Custom Building Products.
 - 2. 4-XLT by Laticrete.
 - 3. Large Tile and Stone Mortar by Mapei
- B. Latex-Portland Cement Mortar: Two component mortar system, comply with ANSI A118.4. Provide one of the following, or approved equal:
 - 1. Laticrete 317 with Laticrete 333 additive; Laticrete International, Inc.
 - 2. Kerabond with Keralastic; Mapei Corp.
 - 3. Or equivalent.

2.7 GROUTING MATERIALS

- A. Water-Cleanable Epoxy Grout for General Use: ANSI A118.3. with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24). Grout shall be stain resistant, color fast, mold and mildew inhibiting, non-sag, suitable for joints 1/16" to 1/2" and sanded type suitable for installing with glazed tiles.
 - 1. Basis of Design Product: Laticrete "Spectralock Pro Epoxy Grout" or equal.

2. Colors: As selected by Architect.

2.8 MISCELLANEOUS MATERIALS

- A. Metal Edge Strips: Zinc alloy or stainless steel terrazzo strips, 1/8-inch wide at top edge with integral provision for anchorage to mortar bed or substrate unless otherwise indicated.
- B. Notched Trowel: Use type recommended by tile manufacturer for setting large-format tiles, for setting bed thickness utilized.
- C. Termination, Trim and Transition Strips: Provide Schluter units in Type 304 stainless steel as scheduled below, or indicated on Drawings.
 1. At all floor tile color transitions provide Schluter "SCHIENE E-100".
 2. Wall Tile Outside Corners Trim : QUADec 3/16"
- D. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by tile manufacturer for applications indicated.
- E. Grout Release: Product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
 1. Mapei "UltraCare Grout Release".
 2. Miracle Sealants Co. "511 Impregnator"
- F. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- G. Grout Sealers: Water-based sealer for tile for protection from stains, as follows:
 1. Mapei "UltraCare Grout Sealer".
 2. Miracle Sealants Co. "511 Impregnator".
- H. Primer/Sealer for Application of Tile Over Tile: Provide one-component, solvent-free 100% acrylic water-based primer specially formulated to enhance bonding of tile over tile applications; PRIMER-U by Schluter or equal.

2.9 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with requirements of referenced standards and manufacturers including those for accurate proportioning of materials, water, or additive content; type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortars and grouts of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and areas where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm, dry, clean, and free from oil or waxy films and curing compounds.
 - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
 - 3. Verify that subfloors are free of cracks, ridges, depressions, scale, and foreign deposits of any kind.
 - 4. Perform moisture test at rate of one per 2,000 sq.ft.
 - 5. Verify that concrete substrates are within the flatness tolerances required for setting large format tiles.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with manufacturer's installation specifications to prepare substrates indicated to receive tile.
- B. Use trowelable leveling and patching compounds per manufacturer's directions to fill cracks, holes, and depressions in substrates and to patch and level floors as required to provide suitable substrate for tile application.
- C. Remove coatings, including curing compounds, and other substances that could interfere with adhesion of tile by using a grinder, sander, or polishing machine with a heavy-duty wire brush.
- D. Broom or vacuum clean substrates to be covered by tiles immediately before tile installation. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.
- E. Blending: For tile exhibiting color variations within the ranges selected during sample submittals, verify that tile has been blended in factory and packaged accordingly so that tile units taken from one package show the same range in colors as those taken from other packages and match approved samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- F. Transitions: Transitions of floor surfaces must be level. Use transition and edge pieces as required to obtain level abutting surfaces, meeting ADA requirements.

- G. For large format tiles thin-set with medium bed mortar, provide the following surface preparation:
1. Level substrates to 1/8-inch variance in 10 feet, with no more than 1/16 inch variation in 24 inches by one of the following methods:
 - a. Provide self-leveling hydraulic cement underlayment throughout project where new floor tile is installed.
 - b. Grind concrete floor substrates and patch with trowelable leveling and patching compound to achieve indicated flatness.
 - c. Skim coat and patch wall surfaces using manufacturer approved trowel-applied cement-based compound to bring surface into acceptable tolerances.
 2. There shall be no abrupt irregularities greater than 1/32"
- H. Installation of Primer: Provide bonding primer applied over existing tile in accordance with manufacturer's directions prior to installation of setting bed.

3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standard: Comply with parts of ANSI 108 series of tile installation standards included under "American National Standard Specifications for the Installation of Ceramic Tile" that apply to type of setting and grouting materials and methods indicated.
- B. TCNA Installation Guidelines: TCNA "Handbook for Ceramic Tile Installation"; comply with TCNA installation methods indicated.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions except as otherwise shown. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile.
1. Cut and grind tile edges where they abut curved surfaces to produce a close and uniform abutting joint.
- E. Jointing Pattern: Lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths unless otherwise shown.
1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so that extent of each sheet is not apparent in finished work

- F. Tile Patterns: Comply with pattern indicated on drawings.
- G. Expansion Joints: Provide expansion joints, control joints and pressure relieving joints of widths and at locations as per TCNA Handbook Construction #EJ171. Do not saw cut joints after installation of tiles.
 - 1. Sealing of joints is included in Division 07 Section "Joint Sealers."
- H. Apply grout release to tile surfaces prior to grouting. Prepare a small mock-up area of grout release application for Architect's approval before proceeding with application of grout release to installed tile surfaces.
- I. Grout tile to comply with ANSI A108.10.

3.4 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with waterproofing manufacturer's written instructions to produce a waterproof membrane of uniform thickness bonded securely to substrate.
- B. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 FLOOR INSTALLATION METHODS

- A. Floor Tile: Install tile to comply with requirements indicated below for setting bed methods, TCNA installation methods related to types of subfloor construction, and grout types:
 - 1. Concrete subfloor, TCNA F205, modified to comply with tile manufacturer's installation instructions, and as follows:
 - a. Bond Coat for Tile: Medium-Bed, Latex-Portland Cement Mortar, ANSI A108.5 over subfloor.
 - b. Grout: Epoxy grout.
 - c. Setting bed thickness shall be as required to produce finished floor surface at correct level for project.
 - d. Provide at non-wet floors.
 - 2. Concrete subfloor with waterproofing/crack suppression membrane, TCNA F205 modified to comply with membrane manufacturer's installation instructions, details on drawings and as follows:
 - a. Bond Coat for Membrane: Medium-Bed, Latex-Portland Cement Mortar, ANSI A108.5 over subfloor.
 - b. Sheet membrane over bond coat, extend up walls 4 inches
 - c. Bond Coat for Tile: Medium-Bed, Latex-Portland Cement Mortar—ANSI A108.5 over membrane
 - d. Grout: Epoxy grout.
 - e. Provide at toilet room floors.

B. Joint Widths:

1. Porcelain Tile: 3/32"

C. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

D. Transition Strips: Install at all edges where new tile meets existing flooring to ensure a smooth transition meeting ADA requirements.

E. Stone Thresholds: Install stone thresholds at tile transitions at restrooms. Allow for bevel/chamfer as required. Set in same type of setting bed as abutting field tile unless otherwise indicated. Sealant is specified in Section 079200.

3.6 WALL INSTALLATION METHODS

A. Wall Tile: Install tile to comply with requirements indicated below for setting-bed methods, TCNA installation methods related to subsurface wall conditions, and grout types:

1. Gypsum Board and Cement Board - TCNA W243, and as follows:
 - a. Bond Coat for Tile: Latex-portland cement mortar, ANSI A108.5 over gypsum board.
 - b. Grout: Epoxy.
2. Concrete Masonry Units - TCNA W202, and as follows:
 - a. Bond Coat for Large Format Tile: Medium-Bed, Latex-Portland Cement Mortar, ANSI A108.5 over concrete masonry units.
 - b. Bond Coat for Other Tile: Latex-portland cement mortar, ANSI A108.5, over concrete masonry units.
 - c. Grout: Epoxy

B. Joint Widths: 1/16".

3.7 CLEANING AND PROTECTION

A. Cleaning: Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but no sooner than 14 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.

B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

- C. Provide final protection and maintain conditions in a manner acceptable to manufacturer and installer that ensures that tile is without damage or deterioration at time of Substantial Completion.
 - 1. Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 093100

Laminam Porcelain Tile (PT1-PT4) SCHEDULE					
BASIC TYPE	BASIC COLOR	TAG	DESCRIPTION/FINISH	SIZE TO ORDER	CUT IN FIELD
<u>Porcelain Tile 1</u> <u>White</u>		PT1A	Laminam Oxide : Bianco	20x60	N/A
		PT1B	Laminam Collection : Neve	20x60	N/A
<u>Porcelain Tile 2</u> <u>Beige</u>		PT2A	Laminam Oxide : Avorio	20x60	N/A
		PT2B	Laminam Collection : Avorio	20x60	N/A
		PT2C	Laminam Oxide : Avorio	20x60	10x60
<u>Porcelain Tile 3</u> <u>Gray</u>		PT3A	Laminam Oxide : Perla	20x60	N/A
		PT3B	Laminam Collection : Perla	20x60	N/A
		PT3C	Laminam Oxide : Perla	20x60	10x60
<u>Porcelain Tile 4</u> <u>Blue</u>		PT4A	Laminam Filo : Mercurio	20x60	5x60
		PT4B	Laminam Filo : Mercurio	20x60	6x60

Laminam Porcelain Tile (PT1-PT4) SCHEDULE					
BASIC TYPE	BASIC COLOR	TAG	DESCRIPTION/FINISH	SIZE TO ORDER	CUT IN FIELD
<u>Porcelain Tile 1</u> <u>White</u>		PT1A	Laminam Oxide : Bianco	20x60	N/A
		PT1B	Laminam Collection : Neve	20x60	N/A
<u>Porcelain Tile 2</u> <u>Beige</u>		PT2A	Laminam Oxide : Avorio	20x60	N/A
		PT2B	Laminam Collection : Avorio	20x60	N/A
		PT2C	Laminam Oxide : Avorio	20x60	10x60
<u>Porcelain Tile 3</u> <u>Gray</u>		PT3A	Laminam Oxide : Perla	20x60	N/A
		PT3B	Laminam Collection : Perla	20x60	N/A
		PT3C	Laminam Oxide : Perla	20x60	10x60
<u>Porcelain Tile 4</u> <u>Blue</u>		PT4A	Laminam Filo : Mercurio	20x60	5x60
		PT4B	Laminam Filo : Mercurio	20x60	6x60

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes ceilings consisting of acoustical panels and exposed suspension systems.
- B. Related Sections include the following:
 - 1. Acoustical sealants are specified in Division 07 Section "Joint Sealants"

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product specified
- B. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:
 - 1. Ceiling suspension members.
 - 2. Method of attaching hangers to building structure.
 - 3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 - 4. Minimum Drawing Scale: 1:100
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on samples of size indicated below.
 - 1. 6-inch- (150-mm-) square samples of each acoustical panel type, pattern, and color.
 - 2. Set of 12-inch- (300-mm-) long samples of exposed suspension system members, including moldings, for each color and system type required.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Indicate compliance of acoustical panel ceilings and components with requirements based on comprehensive testing of current products.
- B. Research/Evaluation Reports: Evidence of acoustical panel ceiling's and components' compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
- C. Maintenance Data: For finishes to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system through one source from a single manufacturer..
- C. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:
 - 1. Fire-Resistance Characteristics: Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - a. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency .
 - b. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 2. Surface-Burning Characteristics: Provide acoustical panels with the following surface-burning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:
 - a. Smoke-Developed Index: 450 or less

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges, soiling panels or damaging units in any way.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.7 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Components: 2% of each type of panel installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Products: Subject to compliance with requirements, provide specified products by Armstrong World Industries or equivalent products.

2.2 ACOUSTICAL PANELS

- A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
 - 1. Mounting Method for Measuring Noise Reduction Coefficient: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface per ASTM E 795.
 - 2. Provide fire-resistance rated panels where indicated.
- B. Acoustical Panels for Acoustical Panel Ceiling ACT-1: Panels manufactured from polyester fiber made from 60% post-consumer recycled plastic PET water bottles; lightweight, high impact resistant, VOC-free, 100% recyclable and available in a variety of colors.
 - 1. Basis of Design Panel Material: EchoScape™ by MergeWorks, or equal.
 - 2. Design Pattern: D203 Prism.
 - 3. Colors: P114 Snow and P119 Midnight.
 - 4. Noise Reduction Coefficient: 0.85
 - 5. Fire Rating: Class A
 - 6. Edge Detail: Square.
 - 7. Thickness: 3/8".
 - 8. Size: 24 by 24 inches.
 - 9. Basis of Design Product: Echodeco by MergeWorks, or equal
 - 10. Location: Tech Classrooms.
- C. Acoustical Panels for Acoustical Panel Ceiling ACT-2: Where this designation is indicated, provide acoustical panels complying with the following:
 - 1. Classification: Panels fitting ASTM E 1264 for Type XII, fiberglass with membrane-faced overlay; Form 2, water felted.

2. Pattern: Panels fitting ASTM E 1264 pattern designation (description) E (lightly textured).
 3. Color: White.
 4. Light Reflectance Coefficient: Not less than LR 0.90.
 5. Noise Reduction Coefficient: 0.90
 6. Ceiling Attenuation Class: N/A
 7. AC: 180
 8. Fire Rating: Class A
 9. Sag Resistance Treatment: Armstrong HumiGuard Plus
 10. Anti-Mold and Mildew Treatment: Inherent
 11. Warranty: 30 year
 12. Edge Detail: Square lay-in.
 13. Thickness: 3/4 inch.
 14. Size: 24 by 24 inches.
 15. Basis of Design Product: Armstrong Optima Square Lay-in #3150.
 16. Location:
 - a. Classrooms, general use.
 - b. Corridors. Cut panels to accommodate installation of lighting fixtures.
- D. Acoustical Panels for Acoustical Panel Ceiling ACT-3: Where this designation is indicated, provide panels complying with the following:
1. Classification: Panels fitting ASTM E 1264 for Type IV, wet-formed mineral fiber with membrane-faced overlay; Form 2, water felted.
 2. Pattern: Panels fitting ASTM E 1264 pattern designation (description) E (lightly textured).
 3. Color: White.
 4. Light Reflectance Coefficient: Not less than LR 0.86
 5. Noise Reduction Coefficient: 0.80
 6. Ceiling Attenuation Class: 35
 7. Fire Rating: Class A
 8. Sag Resistance Treatment: Armstrong HumiGuard Plus
 9. Anti-Mold and Mildew Treatment: BioBlock+
 10. VOC: GREENGUARD Gold Certified low VOC emissions
 11. Warranty: 30 year
 12. Edge Detail: Square lay-in.
 13. Thickness: 7/8 inch.
 14. Size: 24 by 24 inches.
 15. Basis of Design Product: Armstrong Ultima Health Zone, High NRC #1445.
 16. Location: Kitchen.
- E. Acoustical Panels for Acoustical Panel Ceiling ACT-4: Where this designation is indicated, provide acoustical panels complying with the following:
1. Classification: Panels fitting ASTM E 1264 for Type XII, fiberglass with membrane-faced overlay; Form 2, water felted.
 2. Pattern: Panels fitting ASTM E 1264 pattern designation (description) E (lightly textured).
 3. Color: White.

4. Light Reflectance Coefficient: Not less than LR 0.88.
5. Noise Reduction Coefficient: 0.95
6. Ceiling Attenuation Class: N/A
7. AC: 190
8. Fire Rating: Class A
9. Sag Resistance Treatment: Armstrong HumiGuard Plus
10. Anti-Mold and Mildew Treatment: BioBlock
11. Warranty: 30 year
12. Edge Detail: Square tegular.
13. Thickness: 1 inch.
14. Size: 48 by 48 inches.
15. Basis of Design Product: Armstrong Optima Tegular #3256.
16. Location: Library/Servery

F. Acoustical Ceiling AD: Acoustical deck specified in Division 05.

1. AD1: Wood look - Cafeteria
2. AD2: White - Fitness room

2.3 METAL SUSPENSION SYSTEMS

A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.

1. Provide fire-resistance rated metal suspension system where indicated

B. Suspension System for Acoustical Panel Ceilings ACT-1, ACT-2 and ACT-3: Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, G30 (Z120) coating designation, with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges; other characteristics as follows:

1. Structural Classification: Intermediate-duty system.
2. End Condition of Cross Runners: Override (stepped) or butt-edge type, as standard with manufacturer.
3. Face Design: Flush face.
4. Cap Material: Steel sheet.
5. Cap Finish: Manufacturer's standard factory-applied painted finish in white.
6. Basis of Design Product: Armstrong Prelude XL.

C. Suspension System for Acoustical Panel Ceilings ACT-4: Narrow-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, G30 (Z120) coating designation, with prefinished 9/16-inch- wide metal caps on flanges; other characteristics as follows:

1. Structural Classification: Intermediate-duty system.

2. End Condition of Cross Runners: Override (stepped) or butt-edge type, as standard with manufacturer.
 3. Face Design: Flush face.
 4. Cap Material: Steel sheet.
 5. Cap Finish: : Manufacturer's standard factory-applied painted finish in white
 6. Basis of Design Product: Armstrong Suprafine.
- D. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
1. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.
- E. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) diameter wire.
- F. Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material, finish and color as that used for exposed flanges of suspension system runners.
- G. Hold-Down Clips: Where indicated or required for fire-rating, provide manufacturer's standard hold-down clips spaced 24 inches (610 mm) o.c. on all cross tees.
- 2.4 ACOUSTICAL SEALANT
- A. Refer to Division 07 Section "Joint Sealants".

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of acoustical panel ceilings.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.
- B. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with publications referenced below per manufacturer's written instructions and Cisca's "Ceiling Systems Handbook."
 - 1. Standard for Ceiling Suspension System Installations: Comply with ASTM C 636.
 - 2. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
 - 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 5. Do not attach hangers to steel deck tabs.
 - 6. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 7. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches (200 mm) from ends of each member.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m). Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned acoustical panels as indicated on reflected ceiling plans.
 2. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions, unless otherwise indicated.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 095416 - FABRIC WRAPPED ACOUSTICAL CEILING PANELS AND BAFFLES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Fabric-wrapped acoustical ceiling panels.
 - 2. Fabric-wrapped acoustical ceiling baffles.
- B. Refer to the Acoustical Panels Schedule following this Section for scope of acoustical ceiling panels and baffles.

1.2 SUBMITTALS

- A. Product Data: For each type of fabric, panel edge, acoustical fill and core material specified.
- B. Shop Drawings: Include attachment devices; and details at joints, corners, and intersections with ceiling-mounted components. Indicate panel edge and core materials.
 - 1. Include reflected ceiling plan showing panel and baffle sizes and direction of fabric weave.
 - 2. Include method of attaching hangers to building structure.
- C. Samples for Verification: For the following products. Prepare Samples from the same material to be used for the Work.
 - 1. Fabric: Full-width by 36-inch- (1000-mm-) long Sample from dye lot to be used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of fabric.
 - 2. Sample Panels: No larger than 36 by 36 inches. Show joints, panel edges, and attachment methods.
 - 3. Sample Baffles: No larger than 12 by 36 inches. Show joints, panel edges, and attachment methods
- D. Maintenance Data: For acoustical ceiling panels and baffles to include in maintenance manuals specified in Division 01. Include fabric manufacturers cleaning and stain-removal recommendations.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed work similar in material, design, and extent to that indicated for this Project and whose work has resulted in installation with a record of successful in-service performance.

- B. Fire-Test-Response Characteristics: Provide acoustical ceiling panels and baffles with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Flame Spread: 25 or less.
 - 2. Smoke Developed: 450 or less.

- C. Fabric facing shall meet NFPA 701.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect acoustical ceiling panels and baffles from excessive moisture in shipment, storage, and handling. Deliver in unopened bundles and store in a dry place with adequate air circulation.
- B. Before installing acoustical ceiling panels and baffles, permit them to reach room temperature and a stabilized moisture content.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical ceiling panels and baffles until spaces are enclosed and weatherproof, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Verify acoustical ceiling panels and baffles sizes by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.6 COORDINATION

- A. Coordinate layout and installation of acoustical ceiling panels and baffles with other construction that penetrates panels, including light fixtures, HVAC grilles or registers and similar assemblies.

1.7 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranty: Written warranty, signed by acoustical ceiling panel and baffle manufacturer agreeing to repair or replace panels that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, fabric sagging, distorting, or releasing from panel edge.
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ACOUSTICAL CEILING PANELS

- A. Acoustical Panels ACP1 - ACP4: Provide acoustical ceiling panels as follows:
1. Edge Profile: Square.
 2. Edge Material: Resined
 3. Nominal Panel Thickness: 2 inch
 4. Core: 6 to 7 pcf medium density core glass fiber board
 5. NRC: 1.0
 6. Fabric Facing: 56" W Guilford of Maine FR701 Style 2100 in colors as scheduled.
 7. Shapes: Flat ceiling panels in rectangular shape.
 8. Size: Refer to Acoustical Panel Schedule following this section for each panel size.
 9. Mounting Method: Manufacturer's standard mounting clips for suspending acoustical clouds; Rotofast clips by Kinetics.
 10. Basis of Design Product: Kinetics HardSide Acoustical Ceiling Clouds, or equal by one of the following:
 - a. Decoustics.

2.2 ACOUSTICAL CEILING BAFFLES

- A. Acoustical Panels ACP-5: Provide acoustical ceiling baffles as follows:
1. Edge Profile: Square.
 2. Nominal Baffle Thickness: 4 inch
 3. Core: 6 to 7 pcf medium density core glass fiber board, two-piece.
 4. NRC: 0.80
 5. Fabric Facing: 54" W Guilford of Maine Palette Style 2155 in colors as scheduled.
 6. Shapes: Rectangular shape baffles.
 7. Size: 12" high by 10'-0" maximum length; sizes and configurations as indicated on the Drawings for each location.
 8. Mounting Method: Manufacturer's standard zinc-plated steel eye-hook screwed along top edge.
 9. Basis of Design Product: Kinetics HardSide Acoustical Ceiling Baffles, or equal by one of the following:
 - a. Decoustics.

2.3 MATERIALS

- A. Glass-Fiber Board: ASTM C 612, Type IA or Types IA and IB; 6-7 pcf density, unfaced, dimensionally stable, molded rigid board, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively
- B. SUSPENSION SYSTEM MATERIALS

- C. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
 - 1. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 - 1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) diameter wire.

2.4 FABRICATION

- A. Acoustical Ceiling Panels and Baffles: Fabric straight and on the grain. No seams are allowed.
- B. Apply fabric to smooth side of panel.
- C. Stretch fabric tight and square without puckers, ripples, sagging, or distortions. Adhere fabric to panel face.
- D. Mounting Devices: Concealed Rotofast anchors for ceiling clouds and eye screws for baffles, supplied by manufacturer, and spaced as per manufacturer's recommendations.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and structural framing to which acoustical panel and baffle ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of acoustical panel and baffle ceilings.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.

3.3 INSTALLATION

- A. Suspend ceiling panels and baffles from building's structural members and as follows:
 - 1. Secure wire hangers to ceiling panels and baffles and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 2. Do not attach hangers to steel deck tabs.
 - 3. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 4. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches (200 mm) from ends of each member.

3.4 CLEANING AND PROTECTING

- A. Clean exposed faces of installed panels and baffles, and related materials, and adjacent surfaces. Comply with fabric manufacturer's recommendations for cleaning methods and materials.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure installation is without damage or deterioration at the time of Substantial Completion.

END OF SECTION 095416

Acoustic Panels	Ceiling panels	Wall panels	
Location/Room No.			Comments- Note: sizes and shapes as shown on drawings. All dimensions to be verified in the field. Shop drawings required for all layouts see specification. Install as per Manufacturers Instructions
Orchestra #156	Kinetics Noise Control, Hardside Acoustic Cloud, NRC 1'-0" , 2" thick panel wrapped with Guilford of Maine , FR701,2100 Silver Papier#538 Sizes: ACP1: 4'-0" x 5'-5" ACP2: 4'-0" X 2'-6"	Kinetics , High impact Hardside, 2-1/8" thick, square edge, wrapped in Guilford of Maine, Marin 1300, Color for all: Intertidal #1156. Sizes: AWP1; 3'-6" X 3'-6" AWP2; 2'-8" X 3'-6"	
Band #153	Kinetics Noise Control, Hardside Acoustic Cloud, NRC 1'-0" , 2" thick panel wrapped with Guilford of Maine , FR701,2100, Silver Papier#538. Sizes: ACP3: 4'-0" x 10'-0" panels.	Kinetics , High impact Hardside, 2-1/8" thick, square edge, wrapped in Guilford Marin 1300 fabric. Color/Sizes for this room: AWP1; 3'-6" X 3'-6"-#1147 Dolphin AWP3; 2'-3" X 3'-6" -#1147 Dolphin AWP4; 2'-0" X 4'-0"- # 1147 Dolphin AWP5; 1'-0" X 3'-0" -#1156 Intertidal AWP 7: 4'-0"w X 8'-0"h -#1147 Dolphin	
Practice Rooms- #155,#157	Axis Lighting, Spatial SoftZone- Pendant Linear #SSZU-2'-18"-AP-CA-SC-Panel Color -Tin,(Fixture color : Blue)	Kinetics , High impact Hardside, 2-1/8" thick, square edge, wrapped in Guilford FR701, 2100 fabric, Color Silver Papier #538 Format 3'-6" x 3'-6"	Contractor must provide anchoring rod to support load of ceiling baffles. See baffle pattern. Coordinate with light fixture type"T"
Control Room #159		Kinetics , High impact Hardside, 2-1/8" thick, square edge, wrapped in Guilford FR701, 2100 fabric, Color Silver Papier #538 Format 3'-6" x 3'-6"	
Recording studio #161	Acoustic Clouds angles at least 3-5 degree from horizontal in random directions Size; ACP4: 2'-0" x 2'-0". Fabric: Guilford FR701., 2100 series Color :TBD	Kinetics , High impact Hardside, 2-1/8" thick, square edge, wrapped in Guilford FR701, 2100 fabric, Color Silver Papier #538 Format 3'-6" x 3'-6"	
Chorus #151	Kinetics Hardside Acoustic ceiling baffles, 4" thick x 12" h NRC.8 Wrapped in Guilford of Maine, Palette 2155 , Colors Cutch #1135 and Alder #1136 ACP5: 10'-0" Max Length - Sizes In Design/configuration as shown on plan	Kinetics , High impact Hardside, 2-1/8" thick, square edge, wrapped in Guilford Marin 1300 fabric. Sizes/ Colors in this room: AWP1; 3'-6" X 3'-6"- #1156 Intertidal AWP2; 2'-8" X 3'-6"-#1147 Dolphin AWP3; 2'-3" X 6'-0" - #1147Dolphin	
Cafeteria -#170a, #170b		Kinetics , High impact Hardside, 2-1/8" thick, square edge, wrapped in Guilford FR701, 2100 .Color:Silver Papier #538 fabric. AWP6; 4'-0" X 4'-0"	

SECTION 095423 - METAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Perforated metal panel ceilings with integrated LED backlighting and suspension system (ACT4).

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product specified
- B. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:
 - 1. Layout of metal panels in relation to room orientation
 - 2. Joint patterns between metal panels.
 - 3. Ceiling suspension members.
 - 4. Method of attaching hangers to building structure.
 - 5. Lighting components
 - 6. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 - 7. Minimum Drawing Scale: 1:100
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on samples of size indicated below.
 - 1. 12-inch-long samples of each metal panel type, pattern, and color.
 - 2. Minimum 6" long section of each type of molding and trim required.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Indicate compliance of metal panel ceilings and components with requirements based on comprehensive testing of current products.
- B. Maintenance Data: For finishes to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed metal panel ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

- B. Source Limitations: Obtain each type of metal panel ceiling system including all attachment and suspension components through one source from a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver metal panels and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- B. Handle metal panels carefully to avoid denting edges or damaging units in any way.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install metal panel ceilings until spaces are enclosed and weatherproof, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.7 COORDINATION

- A. Coordinate layout and installation of metal panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Fire-Test-Response Characteristics: Provide metal metal panel ceilings that comply with the following requirements:
 - 1. Surface-Burning Characteristics: Class A tested per ASTM E 84.

2.2 METAL PANEL CEILING SYSTEM

- A. Perforated Metal Panel Ceiling System (ACT4): Integrated ceiling assemblies consist of a lay-in, downward accessible, back-lit, metal pan ceiling system comprised of aluminum perforated panels factory-finished for suspending from a direct-hung ceiling suspension system with a panel of LED luminaire modules secured to and supported above the suspension grid.
 - 1. Perforated Metal Panels: Factory-formed units consisting of aluminum panels with minimum 1 1/4 inch integral return edges formed for suspending from 24 by 48 inch ceiling grid system with spring steel clips factory machine riveted to and flush with the return edges of the panels.
 - a. Perforation Pattern: Custom; layout as supplied by Architect.
 - b. Finish: Anodized in color selected by Architect.

- c. Panel Size: As indicated on Drawings
- 2. Light Reflectance Coefficient: N/A.
- 3. Noise Reduction Coefficient: 0.70 (perforated only)
- 4. Fire Rating: Class A
- 5. Acoustics: Acoustibond
- 6. LED Panels: One 14-module LED boards secured to two U-shaped support arms set above the panels with lower ends factory pre-punched for attachment to vertical legs of suspension grid system.
- 7. Lighting Components: Interior, Fully integrated design, 24VDC, UL Listed, Dimmable 0-10V DMX, 2x4 panel 84 watts, Light output at 3500K, 107 degree beam angle, Single Bin LED +/- 30 CCT 3-step MacAdams Ellipse, 92 CRI
- 8. Basis of Design Product: USG Ceilings Plus ILLUSIONS + GLOW or equal products by one of the following:
 - a. Armstrong
 - b. CertainTeed.
- B. Installation Accessories: Provide all metal installation accessories, including clips, splice plates, corner and side closures, yokes and trim for integrating lighting fixtures, sprinklers and other components and all other installation accessories as required for complete installation.

2.3 METAL SUSPENSION SYSTEMS

- A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.
- B. Suspension System: Manufacturer's standard steel suspension system designed for metal metal ceiling with main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, G30 (Z120) coating designation, with prefinished 15/16-inch- wide metal caps on flanges; other characteristics as follows:
 - 1. Product: USG Donn® Brand AX™ Acoustical Suspension System by USG® Ceilings Plus®.
 - 2. Structural Classification: Light Duty.
 - 3. Color: Standard flat white 050
- C. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
 - 1. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.

- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) diameter wire.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and structural framing to which metal panels and suspension systems attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of metal ceilings.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other anchors whose installation is specified in other Sections.
- B. Measure each area and establish layout of metal panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width metal panels at borders, and comply with layout shown on reflected ceiling plans and shop drawings.

3.3 CEILING INSTALLATION

- A. General: Install metal panel ceilings to comply with publications referenced below per manufacturer's written instructions and Cisca's "Ceiling Systems Handbook."
 1. Standard for Ceiling Suspension System Installations: Comply with ASTM C 636.
- B. Suspend ceiling hangers from building's structural members and as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental

- suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 5. Do not attach hangers to steel deck tabs.
 6. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 7. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches (200 mm) from ends of each member.
- C. Install edge moldings and trim of type indicated at perimeter of ceiling areas and where necessary to conceal edges of metal panels.
- D. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install metal panels with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut metal panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned metal panels as indicated on reflected ceiling plans.
 2. Install snap lock inserts to close spaces between panels, in conformance with manufacturer's directions.

3.4 CLEANING

- A. Clean exposed surfaces of metal panels, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095423

SECTION 096500 - RESILIENT FLOORING AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Homogeneous sheet vinyl flooring.
 - 2. Homogeneous vinyl tile.
 - 3. Luxury vinyl tile
 - 4. Rubber floor tile
 - 5. Rubber wall base.
 - 6. Stair accessories.
 - 7. Resilient flooring accessories.

1.2 ACTION SUBMITTALS

- A. Product data for each type of product specified.
- B. Samples for verification purposes in form of actual flooring or sections of accessories for each color and pattern specified.
 - 1. For heat-welding bead, manufacturer's standard-size samples, but not less than 9 inches (230 mm) long, of each color specified.
- C. Shop Drawings: Indicate decorative pattern layout, if any. Show location of seams and edges. Indicate location of columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutout locations.

1.3 INFORMATIONAL SUBMITTALS

- A. Maintenance data for resilient flooring and accessories.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an installer who is competent in the technique required by sheet flooring manufacturer for heat-welding seams.
- B. Single-Source Responsibility for Floor Tile and Accessories: Obtain each type, color, and pattern of tile and accessory from a single source; all stair accessories shall be from one manufacturer.
- C. Single-Source Responsibility for Sheet Flooring and Accessories: Obtain each type, color, and pattern of sheet floor covering specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

- D. Fire Performance Characteristics: Provide resilient flooring with the following fire performance characteristics as determined by testing products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Critical Radiant Flux: 0.45 watts per sq. cm or more, Class 1, per ASTM E 648 or NFPA 253.
- E. In-Place Mock-up: Prepare mock-ups of types indicated below following requirements of this section. Reprepare mock-ups as many times as required by Architect until satisfactory result is obtained, as judged solely by Architect. Obtain Architect's approval of visual qualities before proceeding with work. Protect approved mock-ups until all work has been completed. Approved mock-ups will represent the minimum standard of acceptability for each portion of the work.
 - 1. Provide free-lay mock-ups of each type of resilient tile flooring to establish the installation pattern, in minimum size of 5' x 5' in locations as directed by Architect.
 - 2. Do not proceed with installation of resilient flooring until Architect has approved of the installation pattern accepted for each type of flooring.
 - 3. Protect mock-ups until the conclusion and acceptance of all of the resilient flooring work and turn over loose tiles used in mock-ups to Architect upon acceptance of all the resilient flooring work.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient materials on flat surface in dry space protected from the weather with ambient temperatures maintained between 50 deg F (10 deg C) and 90 deg F (32 deg C).
- B. Store rolls of sheet flooring upright.
- C. Move floor coverings and installation accessories into spaces where they will be installed at least 48 hours before installation, unless longer conditioning periods are recommended in writing by manufacturer.

1.6 PROJECT CONDITIONS

- A. Maintain a minimum temperature of 70 deg F (21 deg C) in spaces to receive resilient flooring for at least 72 hours prior to installation, during installation, and for not less than 72 hours after installation. After this period, maintain a temperature of not less than 55 deg F (13 deg C).
- B. Moisture Testing of Concrete Substrates: Perform moisture tests recommended by manufacturer and as follows:
 - 1. Testing Procedures: Perform calcium chloride or moisture meter tests as required by floor topping and resilient tile manufacturers.
 - a. Calcium Chloride Testing: Anhydrous calcium chloride test, ASTM F 1869.

- b. Moisture Meter Testing: Relative humidity test using in situ probes, ASTM F 2170.
- 2. Proceed with installation only after substrates do not exceed maximum moisture-vapor-emission rate or relative humidity level measurement acceptable to flooring material manufacturer.
- C. Do not install flooring or accessories until they are at the same temperature as the space where they are to be installed.
- D. Close spaces to traffic during flooring installation.

1.7 SEQUENCING AND SCHEDULING

- A. Install flooring and accessories after other finishing operations, including painting, have been completed.

1.8 EXTRA MATERIALS

- A. Extra Materials: Furnished from same production run as resilient tile, base and accessories installed. Furnish 5% of each type and color of material provided in the work. Package materials with protective covering and identify with labels describing contents. Deliver extra materials to Owner.
 - 1. Extra materials of sheet floor covering is not required.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
 - 1. Tiles and Sheet:
 - a. Armstrong World Industries
 - b. Mannington
 - c. Mohawk Group
 - d. Patcraft
 - e. Shaw Hard Surface
 - f. Tarkett
 - g. Toli
 - 2. Base and Other Accessories:
 - a. Armstrong
 - b. Endura
 - c. Roppe
 - d. Johnsonite

3. Rubber Landing Tiles and Stair Treads:
 - a. Endura Large Tile
 - b. Nora
 - c. Johnsonite
 - d. Roppe
 - e. Tarkett

2.2 PRODUCTS, GENERAL

- A. Colors, Textures, and Patterns: Provide tile, sheet goods and accessories in color, texture and pattern to match specified products. Colors and patterns indicated by reference to manufacturer's name and designations are for color and pattern identification only and are not intended to limit selection of other manufacturer's products with similar colors and patterns. If no colors or patterns are indicated, provide color(s) and pattern(s) as selected by Architect from manufacturer's standards.
- B. Resilient flooring and base shall comply with RFCI FloorScore Program.

2.3 RESILIENT TILE FLOORING

- A. Homogeneous Vinyl Tile LVT1: Homogeneous vinyl tile complying with ASTM F1066, Class II, and as follows:
 1. Basis of Design Product: Toli Linotesta; Color 517 Iron; Format 17.7" x 17.7" x 3mm thick; wear layer thickness 120 mils.
 2. Location: Classrooms.
 3. Warranty: 10 years.
 4. Installation: As selected by Architect.
- B. Luxury Vinyl Tile LVT2: Commercial luxury vinyl tile complying with ASTM F1700, Class III, Type A and B and as follows:
 1. Basis of Design Product: Toli, Kareina Asento; Color: 7082 Frost Curatif Oak; size: 7" x 48" x 2.5mm, Wear layer 0.5mm.
 2. Location: Offices, Guidance
 3. Warranty: 10 years.
 4. Installation: As selected by Architect.
- C. Luxury Vinyl Tile LVT3: Commercial luxury vinyl tile complying with ASTM F1700, Class III, Type B and as follows:
 1. Basis of Design Product: Patcraft Style 1426V CMYK; Color: 00530 Smoke V2; size 12" x 24" x 0.098" thick; wearlayer thickness 20 mil.
 2. Location: Tech
 3. Warranty: 15 years
 4. Installation: As selected by Architect.

- D. Luxury Vinyl Tile LVT4, LVT5 and LVT6: Heavy commercial luxury vinyl tile complying with ASTM F1700, Class III, Type B and as follows:
1. Basis of Design Product: Shaw, Vertical Layers Collection, Style Unveil 0601V; 9" x 36" x 0.118" thick; 30 mil wear layer thickness.
 2. Colors:
 - a. LVT4: Bleached 01111
 - b. LVT5: Alter 01518
 - c. LVT6: Burnish 01486
 3. Location: Music wing.
 4. Warranty: 15 years.
 5. Installation: As selected by Architect.
- E. Homogeneous Vinyl Tile LVT7, LVT8 and LVT9: Commercial grade homogeneous vinyl tile complying with ASTM F1700, Class I, Type A and as follows:
1. Basis of Design Product: Mohawk Creative Terrain, Style No. CO181, Format 18" x 36" x 3mm thick.
 2. Colors:
 - a. LVT7: Torrent 745
 - b. LVT8: Cascade 547
 - c. LVT9: Graphite 987.
 3. Location: Base bid for new corridor floors.
 4. Note: Coordinate with the manufacturer to be onsite for the installation and finishing of the project. (Required by Mohawk)
 5. Warranty: 25 year
 6. Installation: As selected by Architect.
- F. Rubber Floor Tile RF1: Rubber floor tile complying with ASTM F1344, Class 1-B and as follows:
1. Basis of Design Product: Tarkett Color Splash; Color: VE7 Mt. Rainier; hammered surface (HRTSP) tile; 24" x 24" x 0.125" thick.
 2. Location: PT/OT room.
 3. Warranty: 5 years
 4. Installation: As selected by Architect.

2.4 RESILIENT SHEET FLOORING

- A. Homogeneous Sheet Vinyl Flooring LSV1: High performance homogeneous sheet vinyl flooring
1. Basis of Design Product: Tarkett iQ Eminent #21030904
 2. Roll Width: 6.5 ft.
 3. Wear Layer Thickness: 0.080" (2mm)
 4. Total Thickness: 0.080" (2mm)
 5. Surface Treatment: Polyurethane - Reinforced, meeting ASTM F410

6. Color: White.
7. Location: Nurses Suite
8. Accessories: Provide white welding rod. Wrap up wall as base and cap.
9. Warranty: 20 year.

2.5 RESILIENT WALL BASE

- A. Rubber Wall Base: ASTM F 1861, Type TP, Group 1 (solid), 4" high, 1/8" thick, smooth surface, and as follows:
 1. Style: Straight (toeless) style for all carpeted areas and cove base with toe (set-on type) elsewhere
 2. Lengths: Coils in manufacturer's standard length.
 3. Inside and Outside Corners: Preformed.
 4. Products: Rubber Base by Johnsonite/Tarkett.
 5. Colors:
 - a. RB1: Grey #48
 - b. RB2: Black #40
 - c. RB3: Mink #TG6.
- B. Homogeneous Sheet Vinyl Cove Base: Provide integral flash cove wall base using sheet flooring.

2.6 RESILIENT STAIR ACCESSORIES

- A. Stair Treads and Risers (RS) : Rubber one-piece tread/riser combination meeting ASTM F-2169, Type TS, Class 2, Group 1 and/or 2, Grade 2 and as follows:
 1. Basis of Design Product: Tarkett Angle Fit stair and Integrated Riser with rubber insert for the visually impaired. Bamboo Texture. Color: VN5 The Blues with Silver Grey insert
- B. Rubber Tile at Stair Landings (RF2): Rubber tile matching tread/riser units for each location.
 1. Basis of Design Products: Tarkett Landing tile 24" x 24" Smooth
 2. Colors: Match adjacent tread/riser units.

2.7 MISCELLANEOUS RESILIENT ACCESSORIES

- A. Colors: As selected by Architect from manufacturer's full range of colors produced for accessory molding complying with requirements indicated.
- B. Rubber Accessory Moldings: Provide rubber accessory molding complying with the following:
 1. Product Description: Carpet edge for glue-down applications, carpet nosing, reducer strip for resilient flooring, and tile and carpet joiner.
 - a. Provide rubber transition strip at resilient floor tile color changes - at doors.

2. Profile and Dimensions: As indicated or required.
- C. Heat-Welding Bead: Solid-strand product of floor covering manufacturer for heat-welding seams.
 1. Color and Pattern: Match color and pattern of sheet floor covering.
- D. Metal Accessories for Homogeneous Sheet Wall Base:
 1. Tarkett Covecap CCC-XX-C in color and pattern matching sheet floor covering.

2.8 INSTALLATION ACCESSORIES

- A. Concrete Slab Primer: Nonstaining type as recommended by flooring manufacturer.
- B. Concrete Sealer: Type recommended and approved by resilient flooring manufacturer and adhesive manufacturer to ensure proper adhesion of resilient flooring to substrate.
- C. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by flooring manufacturer for applications indicated.
- D. Adhesives (Cements): Products supplied by resilient flooring and accessory manufacturers, of type recommended to suit resilient products and substrate conditions.
- E. Heat-Welding Bead: Solid-strand product of floor covering manufacturer for heat-welding seams.
 1. Color and Pattern: Match color and pattern of sheet floor covering.
- F. Floor Polish: Acrylic type, as recommended by flooring material manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. General: Examine areas where installation of flooring will occur, with Installer present, to verify that substrates and conditions are satisfactory for flooring installation and comply with flooring manufacturer's requirements and those specified in this Section.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials whose presence would interfere with bonding of adhesive. Determine adhesion and dryness characteristics by performing bond tests recommended by flooring manufacturer.

2. Finishes of subfloors comply with tolerances and other requirements specified in Division 03 Section "Cast-In-Place Concrete" for slabs receiving resilient flooring.
 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits of any kind.
- C. Concrete Moisture Emission Tests: Perform calcium chloride test and moisture meter test as per manufacturer's directions, as follows, and other tests if recommended by resilient flooring and adhesive manufacturer:
1. Perform moisture test at rate of one per 2,000 sq.ft. of new and existing floor area to be covered.
 2. Report test results in writing to Architect, and Contractor within 24 hours after tests are completed. Reports of concrete moisture emission tests shall contain the Project identification name and number, date of test location of test within structure.
 3. Perform additional moisture emission tests of in-place concrete when test results indicate specified moisture content has been exceeded, as directed by Architect.
 - a. Repeat test one week after initial test minimally and additionally repeat test if required by field conditions to determine moisture levels in area of resilient flooring application.
- D. Do not proceed with installation until unsatisfactory conditions have been corrected.
- E. Only if it is not possible to provide a concrete substrate with acceptable moisture levels, then a surface applied moisture mitigation system shall be used that meets the requirements of ASTM F3010 Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings.

3.2 PREPARATION

- A. General: Comply with manufacturer's installation specifications to prepare substrates indicated to receive flooring.
- B. Use trowelable leveling and patching compounds per flooring manufacturer's directions to fill cracks, holes, and depressions in substrates and to patch and level floors as required to provide suitable substrate for flooring application.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives by using a grinder, sander, or polishing machine with a heavy-duty wire brush.
- D. Broom or vacuum clean substrates to be covered by flooring immediately before installation of flooring. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.
- E. Apply concrete slab primer, if recommended by flooring manufacturer, prior to applying adhesive. Apply according to manufacturer's directions.
- F. Seal concrete substrates as required by moisture test results to ensure proper adhesion of resilient flooring to substrate.

3.3 SHEET FLOORING INSTALLATION

- A. General: Comply with sheet floor covering manufacturer's written installation instructions.
- B. Unroll sheet floor coverings and allow them to stabilize before cutting and fitting, if recommended in writing by manufacturer.
- C. Lay out sheet floor coverings to comply with the following requirements:
 - 1. Maintain uniformity of sheet floor covering direction.
 - 2. Arrange for a minimum number of seams and place them in inconspicuous and low-traffic areas, and not less than 6 inches (150 mm) away from parallel joints in flooring substrates.
 - 3. Match edges of sheet floor coverings for color shading and pattern at seams according to manufacturer's written recommendations.
 - 4. Avoid cross seams.
- D. Scribe, cut, and fit sheet floor coverings to butt neatly and tightly to vertical surfaces and permanent fixtures, including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.
- E. Extend sheet floor coverings into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent, nonstaining marking device.
- G. Install sheet floor coverings on covers for telephone and electrical ducts, and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on covers. Tightly adhere edges to perimeter of floor around covers and to covers.
- H. Adhere sheet floor coverings to flooring substrates to comply with floor covering manufacturer's written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.
 - 1. Produce completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- I. Heat-Welded Seams: Rout joints and heat weld with welding bead, permanently fusing sections into a seamless floor covering. Prepare, weld, and finish seams according to manufacturer's written instructions and ASTM F 1516 to produce surfaces flush with adjoining floor covering surfaces.
- J. Hand roll sheet floor coverings in both directions from center out to embed floor coverings in adhesive and eliminate trapped air. At walls, door casings, and other locations where access by roller is impractical, press floor coverings firmly in place with flat-bladed instrument.

3.4 TILE INSTALLATION

- A. General: Comply with tile manufacturer's installation directions and other requirements indicated that are applicable to each type of tile installation included in Project.
- B. Lay out tiles from center marks established with principal walls so tiles at opposite edges of room are of equal width. Install tiles square with room axis, unless otherwise indicated.
- C. Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles in decorative patterns as indicated on Drawings.
- D. Scribe, cut, and fit tiles to butt tightly to vertical surfaces and edgings.
- E. Extend tiles into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent, nonstaining marking device.
- G. Install tiles on covers for telephone and electrical ducts, and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on covers. Tightly adhere edges to perimeter of floor around covers and to covers.
- H. Adhere tiles to flooring substrates without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed tile installation.
- I. Use full spread of adhesive applied to substrate in compliance with tile manufacturer's directions including those for trowel notching, adhesive mixing, and adhesive open and working times.
- J. Hand roll tiles where required by tile manufacturer.

3.5 INSTALLATION OF WALL BASE AND ACCESSORIES

- A. General: Install resilient accessories according to manufacturer's written installation instructions.
- B. Provide integral flash cove wall base by extending homogeneous sheet vinyl flooring 4 in. up the wall using adhesive, welding rod, and accessories recommended and approved by the flooring manufacturer. Install metal cap at top of base.
- C. Apply resilient wall base to walls, pilasters, casework, and other permanent fixtures in rooms and areas where base is required. Install wall base in lengths as long as

practicable. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

1. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
 2. Install preformed corners as per manufacturer's directions.
- D. Place resilient accessories so they are butted to adjacent materials of type indicated and bond to substrates with adhesive. Install reducer strips at edges of flooring that otherwise would be exposed.

3.6 INSTALLATION OF RESILIENT STAIR TREADS/RISERS

- A. Apply resilient treads/risers to stairs as indicated and according to manufacturer's written installation instructions.
- B. Use stair-tread-nose filler, according to resilient tread manufacturer's written instructions, to fill nosing substrates that do not conform to tread contours.

3.7 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing installation:
1. Remove visible adhesive and other surface blemishes using cleaner recommended by manufacturers.
 2. Sweep or vacuum floor thoroughly.
 3. Do not wash floor until after time period recommended by resilient flooring manufacturer.
 4. Damp-mop flooring to remove black marks and soil.
- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by flooring manufacturer.
1. Apply protective floor polish to flooring surfaces that are free from soil, visible adhesive, and surface blemishes. Coordinate selection of floor polish with Owner's maintenance service requirements.
 2. Cover flooring with undyed, untreated building paper until inspection for Substantial Completion.
- C. Clean flooring not more than 4 days prior to dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean flooring using method recommended by manufacturer.
1. Strip protective floor polish that was applied after completing installation prior to cleaning.
 2. Reapply floor polish after cleaning.

December 14, 2023
Construction Documents
SED No. 44-10-00-01-0-001-041

Enlarged City School District of Middletown
Twin Towers Middle School
Additions and Alterations

END OF SECTION 096500

SECTION 096566 - RESILIENT ATHLETIC FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Resilient athletic tile flooring (SF).

1.2 ACTION SUBMITTALS

- A. Product data for each type of product specified.
- B. Samples for verification purposes in form of actual flooring or section of accessory for each color selected.
- C. Shop Drawings: Show installation details including location and layout of each layer of resilient athletic-flooring assembly and accessory. Include the following:
 - 1. Expansion provisions and trim details.

1.3 INFORMATIONAL SUBMITTALS

- A. Maintenance data for resilient flooring, to include in Operating and Maintenance Manual specified in Division 01.
- B. Certificates indicating product compliance with performance characteristics specified.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed resilient athletic flooring similar in material, design, and extent to that indicated for this Project and whose work has resulted in resilient athletic-flooring installations with a record of successful in-service performance.
- B. Single-Source Responsibility for Resilient Tile and Accessories: Obtain each type, color, and pattern of tiles and accessory from a single source and one manufacturer.
- C. Fire Performance Characteristics: Provide resilient flooring with the following fire performance characteristics as determined by testing products per ASTM test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Critical Radiant Flux: 0.45 watts per sq. cm or more per ASTM E 648.
 - 2. Smoke Density: Less than 450 per ASTM E 662.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver resilient-flooring materials in unopened cartons or bundles.
- B. Store resilient materials on flat surface in dry space protected from the weather with ambient temperatures maintained between 65 deg F and 85 deg F.
- C. Move floor coverings and installation accessories into spaces where they will be installed at least 48 hours before installation, unless longer conditioning periods are recommended in writing by manufacturer.

1.6 PROJECT CONDITIONS

- A. Maintain a minimum temperature of 70 deg F (21 deg C) in spaces to receive resilient flooring for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 65 deg F.
- B. Do not install flooring or accessories until they are at the same temperature as the space where they are to be installed.
- C. Close spaces to traffic during flooring installation and for a minimum of 72 hours after completion of installation.
- D. Moisture Testing of Concrete Substrates: Perform moisture tests recommended by manufacturer and as follows. Do not install flooring if subfloor moisture emission rate exceeds indicated amounts.
 - 1. Moisture Meter Testing: Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have relative humidity level measurement acceptable to flooring material manufacturer.

1.7 SEQUENCING AND SCHEDULING

- A. Install flooring and accessories after other finishing operations, including painting, have been completed.

1.8 WARRANTY

- A. Provide resilient flooring manufacturer's standard warranty against wear for a period of fifteen years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Provide Basis of Design products manufactured by Ecore (distributed by Centaur) or equal products by one of the following:
1. Gerfloor
 2. Tarkett Sports.
 3. Robbins
 4. Mondo

2.2 RESILIENT TILE FLOORING

- A. Resilient Tile Sport Surface (SF): Provide molded resilient tile flooring material 14.5 mm thick fabricated from ultra-high density vulcanized composition rubber with a fusion bonded EPDM surface layer.
1. Tile Dimensions: 14.5mm (0.57") thick x 23" x 23"
 2. Tile Edges: Interlocking
 3. Color: CS500 Push Up.
 4. Performance:
 - a. Force Reduction; Deltec Test: 35.4%
 - b. Energy Restitution; Deltec Test: 53.7%
 - c. STC; ASTM E90: 52
 - d. NRC; ASTM C423: 0.15
 - e. Impact Insulation Class (IIC); ASTM E492: 59
 - f. Delta IIC; ASTM E2179: 28
 5. Basis of Design Product: Drive Vulcanized Composition Rubber Molded Tile by Ecore, or equal. Distributed by Centaur Floor Systems LLC.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. General: Examine areas where installation of flooring will occur, with Installer present, to verify that substrates and conditions are satisfactory for flooring installation and comply with flooring manufacturer's requirements and those specified in this Section.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials whose presence would interfere with bonding of adhesive. Determine adhesion and dryness characteristics by performing bond tests recommended by flooring manufacturer.
 2. Finishes of subfloors comply with tolerances and other requirements specified in Division 03 Section "Cast-In-Place Concrete" for slabs receiving resilient flooring.
 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits of any kind.
 4. Installation Tolerances: 1/8 inch in 10 feet (3 mm in 3 m) variance from level.

- C. Concrete Moisture Emission Tests: Perform moisture meter tests as per manufacturer's directions, as follows, and other tests if recommended by resilient athletic flooring and adhesive manufacturer:
 - 1. Perform moisture test at rate of one per 2,000 sq.ft. of floor area to be covered unless otherwise required by manufacturer.
 - 2. Report test results in writing to Architect, and Contractor within 24 hours after tests are completed. Reports of concrete moisture emission tests shall contain the Project identification name and number, date of test location of test within structure.
 - 3. Perform additional moisture emission tests of in-place concrete when test results indicate specified moisture content has been exceeded, as directed by Architect.
 - a. Repeat test one week after initial test minimally and additionally repeat test if required by field conditions to determine moisture levels in area of resilient flooring application.
- D. Do not proceed with installation until unsatisfactory conditions have been corrected.
- E. Only if it is not possible to provide a concrete substrate with acceptable moisture levels, then a surface applied moisture mitigation system shall be used that meets the requirements of ASTM F3010 Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings.

3.2 PREPARATION

- A. General: Comply with manufacturer's installation specifications to prepare substrates indicated to receive flooring.
- B. Use trowelable leveling and patching compounds per flooring manufacturer's directions to fill cracks, holes, and depressions in substrates and to patch and level floors as required to provide suitable substrate for flooring application.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives by using a grinder, sander, or polishing machine with a heavy-duty wire brush.
- D. Broom or vacuum clean substrates to be covered by flooring immediately before installation of flooring. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.
- E. Apply concrete slab primer, if recommended by flooring manufacturer, prior to applying adhesive. Apply according to manufacturer's directions.
- F. Seal concrete substrates as required by moisture test results to ensure proper adhesion of resilient flooring to substrate.

3.3 TILE INSTALLATION

- A. General: Comply with tile floor covering manufacturer's written installation instructions.

- B. Lay out tiles from center marks established with principal walls so tiles at opposite edges of room are of equal width. Install tiles square with room axis, unless otherwise indicated.
- C. Loose lay tiles and interlock edges as per manufacturer's directions.
- D. Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles in decorative patterns as indicated on Drawings.
- E. Scribe, cut, and fit tiles to butt tightly to vertical surfaces and edgings.
- F. Extend tiles into toe spaces, door reveals, closets, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent, nonstaining marking device.
- H. Install tiles on covers for telephone and electrical ducts, and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on covers.
- I. Hand roll tiles where required by tile manufacturer.
- J. Completed installation shall not exhibit open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing installation:
 - 1. Remove visible surface blemishes using cleaner recommended by manufacturers.
 - 2. Sweep or vacuum floor thoroughly.
 - 3. Do not wash floor until after time period recommended by resilient flooring manufacturer.
 - 4. Damp-mop flooring to remove black marks and soil.
- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by flooring manufacturer.
- C. Clean flooring not more than 4 days prior to dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean flooring using materials and method recommended by manufacturer.

END OF SECTION 096566

SECTION 096616 - PORTLAND CEMENT TERRAZZO FLOORING RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Extent of terrazzo repair and restoration work is as shown on the Drawings and as specified herein.
- B. Terrazzo repair and restoration work includes:
 - 1. Patching and repair of existing terrazzo floor in locations where existing floor is spalled or damaged, to match existing.
 - 2. Cleaning and refinishing existing terrazzo floor.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information and installation instructions for each type of terrazzo, accessory item, and material required.
- B. Certification: Submit 2 copies of supplier's/manufacture's written certification that terrazzo materials meet or exceed specified NTMA properties.
- C. Samples:
 - 1. Flooring: Submit 6" minimum square samples of each pattern, color and type of terrazzo required for flooring. Submit samples after existing floor has been cleaned and refinished to ensure best color match of new terrazzo to existing. Include with each sample a listing of the ingredients used to produce the mixture and proportions of each ingredient in the mix.
- D. Maintenance Instructions: Submit 2 copies of written instructions for recommended periodic maintenance of each type of terrazzo.
- E. Mock-Ups: Prepare mock-ups of types indicated below following requirements of this section. Reprepare mock-ups as many times as required by Architect until satisfactory result is obtained, as judged solely by Architect. Obtain Architect's approval of visual qualities before proceeding with work. Protect approved mock-ups until all work has been completed. Approved mock-ups will represent the minimum standard of acceptability for each portion of the work.
 - 1. Provide in-place sample of at least 25 sq. ft. in area, demonstrating cleaning and refinishing of existing terrazzo floor.
 - 2. Provide in-place sample of approximately 10 sq. ft. in area, demonstrating patching of existing terrazzo floor.

1.3 QUALITY ASSURANCE

- A. Installer: Work must be performed by a firm having not less than five (5) years successful experience in terrazzo repair and restoration work similar to work of this project.
- B. Restoration Specialists: Terrazzo repair and restoration work shall be done only by skilled workers who have demonstrated experience in the type of work specified and who are thoroughly familiar with the requirements of the work. In acceptance or rejection of terrazzo work, no allowance will be made for lack of skill on the part of the workers.
- C. NTMA Standards: Comply with applicable provisions and recommendations of National Terrazzo and Mosaic Association, Inc., as specified.
- D. Manufacturer's Instructions: In addition to specified requirements, comply with resin manufacturer's instructions and recommendations, including preparation of substrate, storing, mixing and applying materials, finishing, and curing of resinous matrix terrazzo work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide terrazzo products by one of the following manufacturers (within each product category) or equal:
 - 1. Cleaners and Sealers:
 - a. Bestal.
 - b. General Polymers Corp.
 - c. Hillyard Chemical Company.
 - d. Multi-Clean Div./H.B. Fuller Company.
 - e. National Laboratories.

2.2 CEMENTITIOUS TERRAZZO MATERIALS

- A. Portland Cement: ASTM C 150, Type I, except as modified to comply with NTMA requirements for compressive strength. Obtain cement from a single source for all work of each required color.
 - 1. Provide non-staining white cement for terrazzo matrix as required to match existing.
 - 2. Provide standard gray cement for underbed.
- B. Sand: ASTM C33.
- C. Water: Clean, free of oil, soluble salts or other deleterious substances.
- D. Aggregate: Natural, sound, crushed marble chips without excessive flats or flakes, complying with NTMA requirements.

1. Colors and gradation of aggregate sizes as required to match existing.

- E. Matrix Pigments: Pure mineral or synthetic pigments, resistant to alkalies and non-fading. Mix pigments with matrix to provide required colors.

2.3 REPAIR MATERIALS FOR SMALL HOLES AND SPALLS

- A. At Contractor's option, provide one of the following matrices for repairing small holes or spalls in terrazzo:
 1. Polyester Resin Terrazzo Matrix: Two-component polyester resin and hardener, mineral filler and color pigment, complying with NTMA "Guide Specification for Polyester Terrazzo" and as required to match appearance of existing terrazzo.
 2. Epoxy Resin Terrazzo Matrix: Thermosetting, amine-cured epoxy resin and hardener, mineral filler and color pigment, complying with NTMA "Guide Specification for Epoxy Terrazzo" and as required to match appearance of existing terrazzo.
- B. Aggregates: Natural, sound, crushed marble chips, colors selected and graded to match existing terrazzo, but with maximum size within limits of workability for the terrazzo crack to be patched.
- C. Substrate Primer: Two-component resin or other compound, recommended by matrix manufacturer, to penetrate and seal substrate and provide maximum bond of terrazzo to substrate.
- D. Finishing Grout: Resin or other compound with filler and pigments, as recommended by matrix manufacturer.

2.4 TERRAZZO ACCESSORIES

- A. Divider Strips: Depth and style as required for type and thickness of terrazzo. Width, material and color to match existing. Provide angle or "T"-type for adhesive bonding to substrate.
- B. Control or Expansion Strips: Double or split units, 1/8" wide, of same material and color as the divider strips. Provide 1/8" wide filler of same depth as strips, laminated between the strips.
- C. Divider Strip Adhesive: Trowelable mixture of fine sand and bonding agent, specially compounded by manufacturer for this use.
- D. Cleaner: Liquid, neutral chemical cleaner, with Ph factor between 7 and 10, of formulation recommended by sealer manufacturer for type of terrazzo used, and complying with NTMA requirements.

- E. Interior Floor Sealer: Colorless, slip and stain resistant penetrating sealer with Ph factor between 7 and 10, which will not affect color or physical properties of terrazzo surface.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with NTMA and manufacturer's recommendations for proportioning mixes, installation of strips, and for preparation, placing, curing, grinding, grouting, finishing, and all other repair and restoration operations required.
- B. Install divider and accessory strips where required and to replace damaged or deteriorated existing strips in areas of repair and restoration. Place in an adhesive setting bed, in accordance with manufacturer's instructions and without voids below strips. Provide mechanical anchorage as required for adequate attachment of strips to substrate.
- C. Provide control joints and expansion joints where required and to replace damaged or deteriorated existing strips in areas of repair and restoration, by installing angle-type divider strips back-to-back with filler cemented between strips, flush with finish floor.
- D. Provide new cementitious underbed as required in areas of repair and restoration; comply with NTMA "Guide Specification for Bonded Terrazzo". Prepare sub-slab surfaces if required to insure positive bonding with underbed. Thoroughly clean areas of foreign matter immediately before placing underbed.
- E. Exercise extreme care to ensure fluids from grinding operation do not react with divider or control strips to produce a stain on aggregate.
- F. Joint sealants and installation are specified in Division 07.

3.2 CLEANING AND REFINISHING EXISTING TERRAZZO

- A. Clean and refinish existing terrazzo to restore the original finish before patching existing terrazzo to allow for a close color match of patched areas to existing.
- B. Cleaning and Sealing:
 - 1. Thoroughly wash all surfaces with a neutral cleaner; follow by rinsing with clean water and allow to dry thoroughly.
 - 2. Apply one coat of sealer, acrylic type, as per manufacturer's directions.
- C. Protection: Protect the finished terrazzo surfaces from all trades that will follow.

3.3 PATCHING EXISTING TERRAZZO

- A. Preparation:

1. Prepare void to receive new terrazzo by cutting perimeter of the void perpendicular to the surface to create vertical edges on the existing surrounding terrazzo. If the patch is of a small size, 6" square or less, slightly undercut at the base of this edge.
2. Remove all foreign matter from the surface and saturate void with ample water to avoid quick surface drying. If the water does not penetrate into the surface, the substrate shall be further prepared to remove the foreign matter and allow for a proper bond.
3. Apply cement paste to the substrate and vertical edges and scrub into the surface. Do not allow cement paste to dry before placing terrazzo composition.
4. Color Matching: Do not patch existing floors until cleaning and refinishing has been completed in area of patch to ensure new terrazzo material matches existing to the greatest extent possible. Predetermine color of existing marble chips and matrix before attempting any patching work; modify as necessary by substituting to achieve close match to existing terrazzo. Do not use any mixtures that have not been approved by Architect.

B. Placement:

1. Mixture: Two parts of blended marble chips to one part of portland cement; add enough water to make the mix plastic.
2. Place mixture in void and level with a trowel. Seed additional marble chips of the same blend over the patch. Compact and extract all excess cement and water from this mixture.

C. Curing: Cover with polyethylene sheeting to prevent quick hydration.

D. Finishing:

1. Initial Grinding: Use a #40 or finer grit stone, exposing the marble chips. Pass fine #80 grit stone before grouting with cement to fill all pinholes. Cover grouted surface with polyethylene for at least 72 hours.
2. Final Grinding: Use a #80 or finer grit stone. Take care to limit the grinding and polishing to a limited distance beyond the perimeter of the patched area, resulting in a neat workmanlike appearance. Patch shall blend with existing floor to the greatest extent possible. Seal the patch with a penetrating-type terrazzo sealer according to manufacturer's directions.

3.4 REPAIRING SMALL HOLES AND SPALLS

- A. General: Repair small holes and spalls in existing terrazzo using epoxy or polyester resin materials where use of cementitious terrazzo is not feasible.
- B. Remove all foreign matter from the void. Remove all sealer from the surface adjacent to the void with a stripper or ammonia.
- C. Blend epoxy or polyester resin materials to match color matrix of existing terrazzo by adding colored marble dust or pigment.

- D. Force mixed resin into the void, making sure it is pressured into the void as deep as possible. Use a substrate primer if so recommended by matrix manufacturer.
- E. If the void is large enough, place marble chips of same blend as the existing floor in the void approximately one to two inches on center; apply while patching resin is still in a wet state and press into wet matrix.
- F. Tool off surface of repaired area, cover with polyethylene and allow to cure.
- G. When material has hardened, sand surface with a hand sander or small grinding equipment, using fine stones. Take care to limit the grinding and polishing to a limited distance beyond the perimeter of the patched area, resulting in a neat workmanlike appearance. Patch shall blend with existing floor to the greatest extent possible. Seal the patch with a penetrating-type terrazzo sealer according to manufacturer's directions.

3.5 ADJUSTING, CLEANING AND PROTECTION

- A. Defective Work: Any terrazzo work that does not match approved mock-up and/or does not result in a consistent appearance with adjacent terrazzo surfaces shall be considered defective. The Contractor shall correct all defective areas to the satisfaction of the Architect at no additional cost to the Owner.
- B. Protection: Protect terrazzo from damage and wear during construction operation.
- C. Final Cleaning: Clean terrazzo as recommended by manufacturer of sealer and machine buff if required when building is ready for occupancy.

END OF SECTION 096616

SECTION 096623 - RESINOUS MATRIX TERRAZZO FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Epoxy-resin, thin-set terrazzo
 - 2. Thin-set, precast epoxy terrazzo coved base.
 - 3. Crack suppression/isolation membrane.
- B. Related Work Specified Elsewhere:
 - 1. Division 03 Section "Cast-in-Place Concrete" for concrete substrate requirements.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of terrazzo, component material, and accessory specified.
- B. Shop Drawings: Include terrazzo fabrication and installation requirements. Include plans, elevations, sections, component details, and attachments to other Work. Show layout of the following:
 - 1. Divider and control- and expansion-joint strips.
 - 2. Base and border strips.
 - 3. Precast terrazzo jointing and edge configurations.
 - 4. Terrazzo patterns and logos.
 - 5. Abrasive strip placement.
 - 6. Crack suppression/isolation membrane placement.
- C. Samples for Verification: Maximum of three 6-inch- (150-mm-) minimum square samples of each precast and cast-in-place terrazzo color and type required, showing the full range of color, texture, and pattern variations expected. Prepare samples of the same thickness and from the same material to be used for the Work. Provide minimum 6-inch- (150-mm-) long samples of each exposed strip item required.
 - 1. Provide up to three sets of samples for verification of color for epoxy terrazzo flooring and precast units, as required to obtain Architect's approval.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with

project names and addresses, names and addresses of architects and owners, and other information specified.

- B. Material Certificates: Certificates signed by suppliers or manufacturers certifying that each material complies with requirements.
- C. Maintenance Data: Submit two copies of maintenance recommendations of NTMA or maintenance product members of NTMA.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Installer shall be a contractor member of NTMA and shall perform all work in accordance with NTMA standards.
 - 2. Installer not a contractor member of NTMA shall have 10 years experience, completed terrazzo installations similar in material, design, and extent to that indicated for this Project, and shall submit a record of successful in-service performance.
- B. Source Limitations: Obtain primary terrazzo materials through one source from a single manufacturer. Provide secondary materials including patching and fill material, joint sealant, and repair materials of type and from source recommended by manufacturer of primary materials.
- C. Source Limitations for Marble: Obtain each color, grade, type, and variety of marble from one source with resources to provide materials of consistent quality in appearance and physical properties without delaying the Work.
- D. NTMA Standards: Comply with the National Terrazzo and Mosaic Association's (NTMA) Guide Specification and written recommendations for terrazzo type indicated, unless more stringent requirements are specified.
- E. Mockups: Before installing terrazzo, construct mockups for each type and color required to verify selections made under Sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for completed Work.
 - 1. Locate mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
 - 2. Include integral base with poured-in-place floor.
 - 3. Notify Architect 7 days in advance of dates and times when mockups will be constructed.
 - 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 5. Obtain Architect's approval of mockups before proceeding with terrazzo installation.
 - 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

7. Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 01 Section "Project Meetings." Review methods and procedures related to installation including, but not limited to, the following:
1. Inspect and discuss condition of substrate and preparatory work required to be performed.
 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 3. Review dust-control procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in suppliers' original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name, and lot number, if any. Deliver materials in a manner to prevent damage to containers and/or bags.
- B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity. Storage area temperature to be between 50 deg F (10 deg C) and 90 deg F (32 deg C).

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Maintain temperature above 50 deg F (10 deg C) for 72 hours before and during terrazzo installation. The minimum slab temperature for crack suppression system must be conditioned to 60°F before commencing installation, during installation, and for at least 72 hours after installation is complete.
- B. Do not install flooring if subfloor moisture emission rate exceeds indicated amounts when tested by calcium chloride moisture test or relative humidity test, with subfloor temperatures not less than 55 deg F.
1. Calcium Chloride Moisture Test: Not more than 3 lb/1000 sq. ft./24 hours when tested according to ASTM F1869 using anhydrous calcium chloride.
 2. Relative Humidity Test: Maximum 75 percent relative humidity measurement when tested according to ASTM F2170 using in-situ probes.
- C. Control and collect dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.
1. Provide dustproof partitions and temporary enclosures to limit dust and migration and to separate areas from noise.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Provide Basis of Design System by Key Resin Company (Key Epoxy Terrazzo #108 system) or one of the following systems:
1. Crossfield Products Corp., Dex-O-Tex Division; Cheminert Terrazzo
 2. General Polymers Corporation, a Sherwin Williams Company; Thin-Set Epoxy Terrazzo #1100.
 3. Concord Terrazzo Company, Inc.; TERRAZZCO Groutless™ EZPour Epoxy 158
 4. Terrazzo & Marble Supply Companies; Terroxy Resin Systems Epoxy Matrix

2.2 MATERIALS

- A. Water: Potable.
- B. Marble Chips: Sizes conforming to NTMA gradation standards for mix and thickness indicated, with Ha 10 minimum abrasive-hardness value when tested according to ASTM C 241, 0.75 percent maximum 24-hour absorption rate, dust content of less than 1 percent by weight, and containing no deleterious or foreign matter. Colors as required to match Architect approved samples.
- C. Other Aggregates: One-sided mirror fragments or glass, as required.
- D. Epoxy-Resin Matrix: Provide matrix complying with NTMA's "Guide Specification for Epoxy Terrazzo" in color required for mix indicated.
1. Shore Hardness at 24 Hours: 85/65 at 24 hours, when tested per ASTM D 2240.
 2. 100% concrete failure minimum, with 350 psi minimum tensile strength.
 3. Compressive Strength: Minimum of 11,000 psi when tested per ASTM D 695.
 4. Tensile Strength: Minimum of 6,000 psi when tested per ASTM D 638.
 5. Flexural Strength: Minimum of 10,000 psi when tested per ASTM D 790.
 6. Flammability: Self-extinguishing over concrete, tested per ASTM D 635.
 7. Abrasion Resistance: 70-90 milligrams lost when tested per ASTM D 4060.
- E. Thin-Set Divider Strips: Angle or T type, 3/8 inch (9.5 mm) deep, and as follows:
1. Material: White zinc alloy.
 2. Top Width: 1/8 inch (3.2 mm).
 3. Thickness: 16 gage.
- F. Control-Joint/Expansion Joint Strips: T-type strips with neoprene expansion insert matching material, thickness, and color of divider strips in depth required for topping thickness indicated.
1. Top Width: 1/8 inch (3.2 mm).

- G. Accessory Strips: Match divider-strip width, material, and color, unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:
 - 1. Edge beads for exposed edges of terrazzo.
 - 2. Base-bead strips for exposed top edge of terrazzo base.
 - 3. Non-slip metal bar strips at ramp surfaces.
- H. Patching and Fill Material for Epoxy Terrazzo: Resinous product of or approved by terrazzo manufacturer and recommended by manufacturer for application indicated.
- I. Joint Sealants: Recommended by terrazzo and sealant manufacturers and complying with requirements in Division 07 Section "Joint Sealants"
- J. Moisture-Vapor-Emission-Control Membrane: Two-component, high-solids, high-density, low-odor, epoxy-based membrane-forming product produced by epoxy terrazzo manufacturer that reduces moisture emission from concrete substrate to not more than 3 lb of water/1000 sq. ft. in 24 hours.
- K. Crack Suppression/Isolation Membrane: As recommended, produced and supplied by approved terrazzo resin formulator, having minimum 120 percent elongation potential per ASTM D 412.
 - 1. Reinforcement: Fiberglass scrim, as required.
 - 2. Basis of Design Product: Key #580 Waterproofing and Crack Isolation Membrane
- L. Divider-Strip Adhesive: Epoxy-resin adhesive recommended by manufacturer for this use and acceptable to thin-set terrazzo resin manufacturer.
- M. Thin-Set Terrazzo Primer: Two-component resin or other compound recommended by thin-set terrazzo resin manufacturer for priming substrate.
- N. Thin-Set Terrazzo Finishing Grout: Thin-set terrazzo resin manufacturer's resin-based finishing grout.
- O. Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, and recommended by cleaner manufacturer for use on terrazzo type indicated.
- P. Sealer: Slip- and stain-resistant, penetrating-type sealer that is chemically neutral with pH factor between 7 and 10, does not affect color or physical properties of terrazzo type indicated, is recommended by sealer manufacturer for this use, and complies with NTMA Guide Specification for terrazzo type indicated.
 - 1. Use sealers that have a VOC content of not more than 200 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24)

2.3 MIXES

- A. Epoxy-Resin, Thin-Set Terazzo: Comply with NTMA's "Guide Specification for Epoxy Terrazzo" and resin manufacturer's written instructions for component proportions and mixing.
 - 1. Basis of Design System: Key Resin Company; Key Epoxy Terrazzo #108.
 - 2. Colors and Patterns: Provide the following based on Wausau colors:
 - a. Field (TZ1): T23-016 , MO# 331420, CO#8220185
 - b. Accent 1 (TZ2) and Base (Grey): Color TZ303 Sterling
 - c. Accent 2 (TZ3) (Blue) TBD,
 - d. Accent 3 (TZ4) (Black) TBD
 - 3. Location: Corridors, Café Servery
 - 4. Thickness: 1/4" or 3/8" depending on aggregates used.

2.4 PRECAST EPOXY TERRAZZO

- A. Manufacturers: Subject to compliance with requirements, provide products one of the following or equal:
 - 1. Romoco Precast Terrazzo Products
 - 2. Wausau Tile, Inc.; Terra Paving Products Division
 - 3. Concord Terrazzo Company, Inc.; TERRAZZCO
- B. Precast Epoxy Terrazzo Base Units: 1/4 inch (6.4 mm) thick; cast in maximum lengths possible, but not less than 36 inches (900 mm); with rounded, finished top edge.
 - 1. Type: Cove base.
 - 2. Height:
 - a. 6" at Cafeteria, Servery and Café Corridor
 - b. 4" at new Corridors.
 - 3. Outside Corner Units: With finished returned edges at outside corner.
 - 4. Color and Pattern: Match adjacent grey terrazzo floor (TZ2).
- C. Setting Materials for Precast Terrazzo:
 - 1. Epoxy Adhesive: Two component, compatible with terrazzo units and substrate.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of terrazzo. Do not

proceed with installation until unsatisfactory conditions, including levelness tolerances, have been corrected.

- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials whose presence would interfere with bonding of terrazzo
 - 2. Finishes of subfloors comply with tolerances and other requirements specified in Division 03 Section "Cast-In-Place Concrete" for slabs receiving resilient flooring.
 - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits of any kind.
 - 4. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions
- C. Concrete Moisture Emission Tests: Perform calcium chloride test or relative humidity test as per manufacturer's directions, as follows, and other tests if recommended by terrazzo flooring manufacturer:
 - 1. Perform moisture test at rate of one per 2,000 sq.ft. of floor area to be finished.
 - 2. Report test results in writing to Architect, and Contractor within 24 hours after tests are completed. Reports of concrete moisture emission tests shall contain the Project identification name and number, date of test location of test within structure.
 - 3. Perform additional moisture emission tests of in-place concrete when test results indicate specified moisture content has been exceeded, as directed by Architect.
 - a. Repeat test one week after initial test minimally and additionally repeat test if required by field conditions to determine moisture levels in area of terrazzo flooring application.
- D. Do not proceed with installation until unsatisfactory conditions have been corrected or after installation of moisture-vapor-emission-control membrane on substrate areas that fail testing.

3.2 PREPARATION

- A. Prepare thin-set-terrazzo substrates according to resin manufacturer's written instructions.
 - 1. Clean substrates of substances that impair terrazzo's bond, including oil, grease, and curing compounds.
 - 2. Repair damaged and deteriorated concrete substrates to acceptable condition.
 - 3. Level existing concrete subfloor to required flatness tolerances; not to vary more than 1/4 inch from true plane in a 10 foot span.
 - 4. Roughen concrete substrates before installing terrazzo according to NTMA's and epoxy flooring manufacturer's written recommendations.
 - 5. Leave surface free of dust, dirt, laitance and efflorescence.
- B. Cracks: Locate cracks and joints in concrete substrates. Verify location of control joints and expansion joints in epoxy terrazzo flooring.

1. After examining existing conditions of substrate, prepare and submit a written report of existing conditions and Installer's proposed plan for installation of crack suppression membrane; include specific recommendations on type and location of crack suppression membrane system to be provided. Obtain Architect's approval of proposed plan before commencing with installation of crack suppression membrane system.
- C. Moisture-Vapor-Emission-Control Membrane: Install according to manufacturer's written instructions.
 1. Install on concrete substrates that fail preinstallation moisture testing.
- D. Substrate-Crack-Suppression Membrane: Install crack suppression/isolation membrane in accordance with manufacturer's recommendations and as per Installer's approved plan.
 1. Prepare and prefill substrate cracks with membrane material.
 2. Install membrane in areas to receive terrazzo.
 3. Reinforce membrane with fiberglass scrim as required.
- E. Protect other work from dust generated by grinding operations. Control dust to prevent air pollution and comply with governing environmental protection regulations.
 1. Erect and maintain temporary enclosures and other suitable methods to limit dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

3.3 EPOXY TERRAZZO INSTALLATION

- A. General: Comply with NTMA Guide Specification for terrazzo type indicated and NTMA's written recommendations for substrate preparation and terrazzo installation.
- B. Prime thin-set-terrazzo substrates according to resin manufacturer's written instructions.
- C. Install divider and accessory strips according to NTMA's written recommendations.
- D. Install control-joint strips back-to-back directly above substrate control joints and according to NTMA's written recommendations.
- E. Install angle- or T-type strips and similar accessories in adhesive setting bed without voids below strips. Provide mechanical anchorage of strips as required for adequate attachment of strips to substrate.
- F. Install and finish poured-in-place terrazzo base at the same time the adjacent terrazzo flooring is installed.
- G. Thin-Set Terrazzo: Place, cure, grind, grout, and finish thin-set terrazzo according to resin manufacturer's written instructions and NTMA Guide Specification for thin-set terrazzo

type indicated. Ensure fluids from grinding operations do not react with divider and control-joint strips and stain marble chips. Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted.

- H. Cut out and replace terrazzo areas that evidence lack of bond with substrate or underbed, including areas that emit a "hollow" sound when tapped. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo, or repair panels according to NTMA's written recommendations, as approved by Architect.
- I. Construction Tolerances: Limit terrazzo surfaces' variation from level to 1/4 inch in 10 feet (6.4 mm in 3 m).

3.4 PRECAST EPOXY TERRAZZO

- A. Set units using method recommended by NTMA and manufacturer unless otherwise indicated. Set units with alignment level and true to dimensions, varying 1/8 inch (3.2 mm) maximum in length, height, or width.
 - 1. Use epoxy adhesive to install wall base according to ANSI 108.6.
- B. Seal joints between units with joint sealants.

3.5 CLEANING AND PROTECTING

- A. Remove grinding dust from installation and adjacent areas.
- B. Cure the thin-set epoxy terrazzo flooring in compliance with manufacturer's directions, taking care to prevent contamination during stages of the installation and prior to completion of the curing process.
- C. Rinse surfaces with water and allow to dry thoroughly.
- D. Seal surfaces according to NTMA's written recommendations. Apply sealer according to sealer manufacturer's written instructions.
- E. Protect the thin-set epoxy terrazzo flooring system from damage and wear during other phases of the construction operation, using temporary coverings as recommended by the manufacturer, if required. Remove temporary covering just prior to Substantial Completion.
- F. Clean the thin-set epoxy terrazzo flooring system just prior to final inspection, using materials and procedures suitable to the system manufacturer.

END OF SECTION 096623

SECTION 096723 - RESINOUS FLOORING

1.1 SUMMARY

A. This Section includes the following:

1. Four-component decorative double broadcast epoxy flooring system with integral base (BE1).
2. Three-component self-leveling urethane concrete flooring system with integral base (BE2)

1.2 SUBMITTALS

- A. Product Data: For each type of product specified. Include manufacturer's technical data, installation instructions, and recommendations for each resinous flooring component required.
- B. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- C. Material Certificates: In lieu of material test reports, when permitted by Architect, signed by manufacturers certifying that materials furnished comply with requirements.
- D. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer (applicator) who has specialized in installing resinous flooring similar in material, design, and extent to that indicated for this Project and who is acceptable to resinous flooring manufacturer.
1. Engage an installer who employs only persons trained and approved by resinous flooring manufacturer for installing resinous flooring systems specified.
 2. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to install resinous flooring systems specified.
- B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, and sealing or finish coats, through one source from a single manufacturer. Provide secondary materials including patching and fill material, joint sealant, and repair materials of type and from source recommended by manufacturer of primary materials.
- C. Mockups: Before installing resinous flooring, construct mockups for each type and color required to verify selections made under Sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for completed Work.

1. Locate mockups in the locker room in location and of the size indicated or, if not indicated, as directed by Architect.
2. Include integral base with poured-in-place floor.
3. Notify Architect 7 days in advance of dates and times when mockups will be constructed.
4. Demonstrate the proposed range of aesthetic effects and workmanship.
5. Obtain Architect's approval of mockups before proceeding with terrazzo installation.
6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.
- B. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring installation.
- B. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Products: Provide specified materials of Sherwin Williams or equal products of one of the following:
 1. Dex-O-Tex.
 2. DUR-A-FLEX Inc.
 3. Stonhard

2.2 MATERIALS

- A. Resinous Flooring:
 1. BE1: Resinous floor surfacing system consisting of primer; broadcast coats, grout coat, and topcoat, including resin, hardener, aggregates, and colorants, if any. Comply with requirements indicated in this Article.
 - a. Provide Fiberglass scrim for maximum tensile strength and crack isolation.

- b. Provide antimicrobial agent.
- 2. BE2: Resinous floor surfacing system consisting of primer, slurry coat, broadcast cot and topcoat. Comply with requirements indicated in this Article.
- B. Substrate Patching and Fill Material: Cementitious product approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.
- C. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated.
- D. Four Component Epoxy Flooring System with Decorative Broadcast (BE1): Stain-resistant decorative epoxy flooring system with decorative colored quartz aggregates, high solids epoxy resins, and chemical resistant grout and topcoats to form a slip-resistant surface. System consists of a first broadcast coat, second broadcast coat, grout coat and clear epoxy sealer topcoat complying with the following:
 - 1. Basis of Design System: Resuflor Deco Quartz BC23 by Sherwin Williams or equal.
 - 2. Thickness of System: 1/8 inch.
 - 3. Primer: Resuprime 3579 at 250 sq. ft. per gallon.
 - 4. 1st Receiver Coat: Resuflor 3561 at 140-145 sq. ft. per gallon
 - 5. 1st Broadcast: GP5900F to excess at 0.4 lbs. per sq. ft.
 - 6. 2nd Receiver Coat: Resuflor 3561 at 65-70 sq. ft. per gallon
 - 7. 2nd Broadcast: GP5900F to excess at 0.4 lbs. per sq. ft.
 - 8. Grout Coat: Resuflor 3746 at 100 sq. ft. per gallon.
 - 9. Topcoat: Resuflor 3746 at 200 sq. ft. per gallon.
 - 10. Pre-Applied Cove Base (BEB1): 6" high. Install cove base prior to the floor. Once base has cured, install floor, tying into base material.
 - 11. Provide ant-microbial agent and fiberglass scrim crack suppression membrane.
 - 12. Color: Mid-Grey.
 - 13. Location: Locker rooms, Janitor closets.
- E. Three Component Urethane Flooring System (BE2): Stain-resistant self-leveling urethane flooring system with urethane concrete slurry, broadcast coat and topcoat to form a slip-resistant surface, complying with the following:
 - 1. Basis of Design System: Fastop Multi Topfloor SL45 by Sherwin Williams or equal.
 - 2. Thickness of System: 1/4 inch.
 - 3. Cove Base: FasTop Multi Cove Base, 15-20 linear feet per kit at 6" with 1" radius.
 - 4. Primer: Resuflor Aqua 3477 at 250 sq. ft. per gallon.
 - 5. Slurry (1/4"): Fastop Multi SL45 @ 32-35 sq. ft. per unit.
 - 6. Broadcast: 5310 Dry Silica (20-40 mesh) into wet slurry.
 - 7. Topcoat: FasTop Multi T100, cementitious urethane topcoat, 15 mils.
 - 8. Integral Cove Base (BEB2): 6" high
 - 9. Color: Foggy Morning.
 - 10. Location: Kitchen and kitchen serving.

PART 3 - EXECUTION

3.1 PREPARATION

- A. General: Prepare and clean substrate according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral substrate for resinous flooring application.
- B. Use patching and fill material as required to fill holes and depressions in substrate to provide a flat and even surface for flooring system. Apply patching and fill material according to manufacturer's written instructions.
- C. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
 - 1. Roughen concrete substrates as follows:
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - 2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.
 - 3. Verify that concrete substrates are dry. Perform calcium chloride test as per manufacturer's directions, as follows, and other tests if recommended by resinous flooring manufacturer:
 - a. Calcium Chloride Test: Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) of slab in 24 hours.
 - b. Perform moisture test at rate of three for the first 1,000 sq. ft. (92.9 sq. m) and one additional test for each 1,000 sq. ft. (92.9 sq. m) of new and existing floor area to be covered unless otherwise recommended by flooring manufacturer.
 - 4. Verify that concrete substrates have neutral Ph and that resinous flooring will adhere to them. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
 - 5. Verify that substrates and conditions are satisfactory for resin floor installation and comply with requirements specified. Do not proceed with installation until unsatisfactory conditions have been corrected.
- D. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

3.2 APPLICATION

- A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
 - 1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate and optimum intercoat adhesion.

2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
3. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.
 - a. Apply joint sealant to comply with manufacturer's written recommendations.
- B. Pre-apply epoxy treatment to substrate cracks as required.
- C. Apply primer over prepared substrate at manufacturer's recommended rate and allow to cure as recommended by manufacturer.
- D. Apply resinous waterproofing membrane to primed concrete surfaces in accordance with manufacturer's directions to produce a waterproofing membrane.
- E. Four Component Epoxy Flooring System with Decorative Broadcast: Apply primer with spray, roller or brush to prepared surfaces. Allow primer to dry to tacky consistency and pour and spread by squeegee the first base coat. Broadcast aggregate into first base coat. Pour and spread by squeegee the second base coat and broadcast aggregate into second base coat. Allow to cure. Sweep off excess aggregate, and apply grout coat using a squeegee. Allow to cure and apply topcoat.
- F. Three Component Urethane Flooring System: Install cove base prior to the flooring in accordance with manufacturer's directions. Apply primer with roller to prepared surfaces. Allow primer to dry to tack-free consistency and pour and spread by rake or trowel and allow to self-level. Broadcast sand aggregate into slurry. Allow to cure. Sweep off excess aggregate, and apply topcoat using a squeegee and allow to cure
- G. Integral Cove Base and Pre-Applied Cove Base: Apply cove base mix to wall surfaces at locations indicated. Round internal and external corners. Install cove base according to manufacturer's written instructions and details including taping, mixing, priming, troweling, and topcoating of cove base and tie-ins to pre-applied base.

3.3 CLEANING AND PROTECTING

- A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.
- B. Clean resinous flooring not more than 4 days before dates scheduled for inspections intended to establish date of Substantial Completion in each Project area. Use cleaning materials and procedures recommended in writing by resinous flooring manufacturer.

END OF SECTION 096723

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes modular carpet tile.
- B. Related Requirements:
 - 1. Division 09 Section "Resilient Flooring and Accessories" for resilient wall base and accessories installed with carpet tile.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site
 - 1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:
 - a. Review delivery, storage, and handling procedures.
 - b. Review ambient conditions and ventilation procedures.
 - c. Review subfloor preparation procedures.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
 - 2. Include installation recommendations for each type of substrate.
- B. Shop Drawings: Show the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Carpet tile type, color, and dye lot.
 - 3. Type of subfloor.
 - 4. Type of installation.
 - 5. Pattern of installation.
 - 6. Pattern type, location, and direction.
 - 7. Pile direction.
 - 8. Type, color, and location of insets and borders.
 - 9. Type, color, and location of edge, transition, and other accessory strips.
 - 10. Transition details to other flooring materials.
- C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.
- D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.
- E. Maintenance Data: For carpet tile to include in maintenance manuals specified in Division 01. Include the following:
1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.
- F. Sustainability: Provide the Statement of the Achievement Level the carpet has attained for Gold, 52 to 70 points, based on specific Sustainable Attribute Performance for all product stages according to ANSI/NSF 140.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
- C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
- B. Performance Characteristics of Carpet Tile: Provide carpet tile identical to that tested for the following performance characteristics, per test methods indicated:
 - 1. Flammability: Passes DOC FF 1-70 Pill Test.
 - 2. Flame Spread: Meets NFPA Class 1 when tested under ASTM E-648 Glue Down.
 - 3. Smoke Density: 450 or less, Flaming Mode when tested under NBS Smoke Chamber NFPA-258.
 - 4. Static: No more than 3.5 KV when tested under AATCC-134.
 - 5. Specific Optical Density: Not more than 300 in first 4 minutes tested in flaming or non-flaming mode when tested under ASTM E662.
 - 6. Critical Radiant Flux: 0.45 watts per sq. cm or more per ASTM E 648 or NFPA 253.
- C. Mockups: Before installing carpet tile, install mockups for each type of carpet tile installation required to demonstrate aesthetic effects and qualities of materials and execution. Install mockups to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Install mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
 - 2. Notify Architect seven days in advance of dates and times when mockups will be installed.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 4. Obtain Architect's approval of mockups before starting work.
 - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 6. Remove mockups when directed.
 - 7. Approved mockups may become part of the completed Work if undamaged at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI Carpet Installation Standard 2011.
- B. Store carpeting per manufacturer's recommendations for allowable temperature and humidity range. Products shall not be allowed to become damp.
- C. Remove carpeting from packaging and store in unoccupied, ventilated areas (100% outside air supply, minimum of 1.5 air changes per hour, no recirculation) for 24-72 hours prior to installation. Carpeting shall not be stored with materials which have high emissions of VOCs or other contaminants. Materials with high short-term emissions include, but are not limited to: adhesives, sealants and glazing compounds (specifically those with petrochemical vehicles or carriers); paint, wood preservatives, and finishes; control and/or expansion joint fillers; hard finishes requiring adhesive installation;

gypsum board (with associated finish processes and products); and composite or engineered wood products with formaldehyde binders

1.9 FIELD CONDITIONS

- A. Comply with CRI Carpet Installation Standard 2011 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.10 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.
 - 3. Warranty Period: Lifetime.

PART 2 - PRODUCTS

2.1 CARPET TILE

- A. Manufacturers: Provide specified Basis of Design products or equal manufactured by one of the following manufacturers:
 - 1. Bentley
 - 2. Interface
 - 3. Mannington
 - 4. Milliken
 - 5. Mohawk Commercial Carpet
 - 6. Shaw
 - 7. Tandus Centiva

- B. Sustainable Carpet Certification: Provide carpet tile that has a NSF/ANSI 140 rating of Gold or better.
- C. Emissions: Provide carpet tile that complies with testing and product requirements of Carpet and Rug Institute's "Green Label Plus" program.
- D. Carpet Tile CPT1: Bentley Math Club TechUp8 4TDT4 Intgra 400007 w/ cushion. 18" x36"
 - 1. Location: Offices
 - 2. Backing: Standard PVC WellBac Comfort Cushion
- E. Carpet Tile CPT2: Mohawk Group Living Product Challenge 2.0 Smart City, Urban Mobility GT430, Pattern #12CP723U, Custom color per sample 50W31-Q4629-0600
 - 1. Location: Tech
 - 2. Backing: Standard PVC WellBac Comfort Cushion
- F. Carpet Tile CPT3: Miliken Moraine- Explorer, Stratum EXP123-19, Format: 19.7" x 19.7"
 - 1. Location: Library
 - 2. Backing: Standard PVC WellBac Comfort Cushion
- G. Carpet Tile CPT4: Miliken Moraine Navigator, NAC133-6 , MeasureFormat: 19.7" x 19.7"
 - 1. Location: Library.
 - 2. Backing: Standard PVC WellBac Comfort Cushion
- H. Carpet Tile CPT5: Miliken Moraine Explorer EXR 13-6 ,Elevate Format: 19.7" x 19.7"
 - 1. Location: Library.
 - 2. Backing: Standard PVC WellBac Comfort Cushion
- I. Carpet Tile CPT6: Miliken Moraine Explorer EXR19-13-6 ,Elevate with Navy, Format: 19.7" x 19.7"
 - 1. Location: Library.
 - 2. Backing: Standard PVC WellBac Comfort Cushion

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.
 - 1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- C. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.
- D. Carpet Edge Guard: Refer to Division 09 Section "Resilient Flooring and Accessories."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer. Do not install flooring if subfloor moisture emission rate exceeds indicated amounts.
 - a. Calcium Chloride Testing: Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates do not exceed the maximum moisture-vapor-emission rate acceptable to flooring manufacturer.
 - b. Moisture Meter Testing: Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have relative humidity level measurement acceptable to flooring material manufacturer.
 - c. Testing Procedures
 - 1) Where flooring is indicated to be applied to structural concrete topping or concrete slab-on-grade substrates, perform moisture meter tests.
 - 2) Where flooring is indicated to be applied to areas where hydraulic cement topping is installed, perform calcium chloride or moisture meter tests as required by topping manufacturer.
 - 2. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" for slabs receiving carpet tile.
 - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI Carpet Installation Standard 2011, Section 7, "Site Conditions; All Installations," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.

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

3.3 INSTALLATION

- A. General: Comply with CRI Carpet Installation Standard 2011, Section 18, "Modular Carpet," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye lot integrity. Do not mix dye lots in same area.
- D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- G. Install pattern parallel to walls and borders, unless otherwise indicated.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.

- B. Protect installed carpet tile to comply with CRI Carpet Installation Standard 2011, Section 20, "Protecting Indoor Installations."
 - 1. Restrict traffic over adhesive installations for a minimum of 48 hours to allow proper adhesive cure.
 - 2. Restrict exposure to water from cleaning or other sources for a minimum of 30 days.
 - 3. If required to protect the finished floor covering from dirt or paint, or if additional work is to be done after the installation, cover carpeting with a non-staining building material paper.
 - 4. Protect the installation from rolling traffic by using sheets of hardboard or plywood in affected areas.
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

SECTION 097750 - FIBER REINFORCED PLASTIC COATED PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes fiberglass reinforced polyester (FRP) panels for cladding walls.

1.2 ACTION SUBMITTALS

- A. Product data for each type of product specified. Include data on physical characteristics, durability, fade resistance, and flame resistance characteristics.
- B. Samples for initial selection purposes of each type and color available for fiber reinforced plastic coated panels and molding accessory required of size indicated below:
 - 1. 3 inch square sample of each fiber reinforced plastic coated panel specified.
 - 2. 6-inch long sample of each molding accessory.

1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates signed by fiber reinforced plastic coated panel manufacturer certifying materials furnished comply with specified requirements.
- B. Certified test reports showing compliance with requirements for fire performance characteristics and physical properties.
- C. Maintenance data for inclusion in Division 01 Section "Closeout Procedures." Include the following:
 - 1. Methods for maintaining fiber reinforced plastic coated panels.
 - 2. Precautions for use of cleaning materials and methods that could be detrimental to finishes and performance.

1.4 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Provide fiber reinforced plastic coated panels with the following surface burning characteristics as determined by testing identical products per ASTM E 84 by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify fiber reinforced plastic coated panels with appropriate markings of applicable testing and inspecting organization.
 - 1. Flame Spread: 25 or less.
 - 2. Smoke Developed: 450 or less.

- B. Installer Qualifications: Arrange for installation of fiber reinforced plastic coated panels by a firm that can demonstrate successful experience in installing similar in type and quality to those required for this Project.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect units during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.

1.6 PROJECT CONDITIONS

- A. Maintain a constant temperature not less than 70°F in installation areas for at least ten (10) days before and ten (10) days after installation.
- B. Field Measurements: Where units are indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide FRP products as manufactured by Marlite, Division of Commercial and Architectural Products, Inc. or an approved equivalent by one of the following:
 - 1. Crane Composites, Inc.
 - 2. Kal-Lite.

2.2 FRP PANELS:

- A. FRP Panels (FRP-1): High gloss fiberglass reinforced polyester panels 0.09" thick with pebbled embossed textured surface, Class A fire rating, 4-feet wide by height required.
 - 1. Color: As selected by Architect.
 - 2. Basis of Design Product: Standard FRP by Marlite, or equal.
 - 3. Location: Wall cladding in kitchen, food prep areas and elsewhere as scheduled.
- B. Tile-Embossed FRP Panels (FRP-2): High gloss fiberglass reinforced polyester panels 3/32" thick with smooth embossed surface producing a tile-like appearance, Class A fire rating, 4-feet wide by 8 feet high.
 - 1. Color: As selected by Architect.
 - 2. Pattern: Subway tile 3" x 6"
 - 3. Basis of Design Product: Symmetrix by Marlite, or equal.
 - 4. Location: Wall cladding in Cafeteria Servery.

- 5. Provide Smart Seam technology and all required trims and corner guards as selected by Architect.
- C. Accessories: Provide inside corner, outside corner, division molding and edge trim moldings by same manufacturer, matching wall panels.
- D. Adhesive: Manufacturer's standard low odor, VOC compliant, non-flammable latex based adhesive for use and substrate.
- E. Sealant: Manufacturer's standard clear silicone sealant meeting local VOC requirements.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting installation and performance of fiber reinforced plastic coated panels. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Acclimate panels to room temperature for 48 hours prior to installation.
- C. Follow manufacturer's printed instructions for surface preparation.

3.3 INSTALLATION

- A. Do not use materials that are unsound, warped, bowed or twisted.
- B. Install fiber reinforced plastic coated panels plumb, level, true, and aligned with adjacent materials.
 - 1. Scribe and cut panels to fit adjoining work.
 - 2. Install to tolerance of 1/32 inch in 8 feet for plumb and level.
 - 3. Coordinate with materials and systems that may be in or adjacent to panels. Provide cutouts for mechanical and electrical items that penetrate.
- C. Plan fiber reinforced plastic coated panel layout, balancing panel sizes at corners.
 - 1. Adhere division molding and work from center of wall to corners.
 - 2. Adhere FRP panels to substrate in accordance with manufacturer's written instructions.
 - 3. Stagger joints between panels and substrate material.
 - 4. Provide moldings at all sides of panels. Adhere ceiling line and curb moldings in place with sealant, and provide sealant in molding channels prior to insertion of panels.

5. Remove excess sealant from panel surfaces immediately.

3.4 ADJUSTING AND CLEANING

- A. Repair damaged or defective fiber reinforced plastic coated panels where possible to eliminate functional or visual defects. Where not possible to repair, replace fiber reinforced plastic coated panels.
- B. Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.
- C. Use cleaning methods recommended by the fiber reinforced plastic coated panel manufacturer.
- D. Replace panels that cannot be cleaned.

3.5 PROTECTION

- A. Provide final protection and maintain conditions that ensure panels are without damage or deterioration at time of Substantial Completion.

END OF SECTION 097750

SECTION 097800 - ULTRACOMPACT (PORCELAIN) WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes ultracompact, sintered porcelain wall panels (PT5)

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Each variety of ultracompact material
 - 2. Accessories and other manufactured products.
- B. Shop Drawings: Include plans, sections, details, and attachments to other work.
- C. Samples for Verification: For each ultracompact material color and pattern indicated, in sets of samples not less than 12 inches (300 mm) square. Include two or more Samples in each set and show the full range of variations in appearance characteristics expected in completed Work.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Sealant Compatibility Test Report: From sealant manufacturer, complying with requirements in Division 07 Section "Joint Sealants" and indicating that sealants will not stain or damage ultracompact material.
- C. Maintenance Data: For ultracompact material wall panels to include in maintenance manuals. Include Product Data for maintenance products used or recommended by Installer, and names, addresses, and telephone numbers of local sources for products.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate ultracompact material wall panels similar to that indicated for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Engage an experienced Installer who has successfully completed large format tile installations similar in material, design, and extent to that indicated for Project.
- C. Source Limitations: Obtain each variety of ultracompact material from a single manufacturer with resources to provide materials of consistent quality in appearance and physical properties.

- D. In-Place Mock-up: Prepare mock-ups of types indicated below following requirements of this section. Reprepare mock-ups as many times as required by Architect until satisfactory result is obtained, as judged solely by Architect. Obtain Architect's approval of visual qualities before proceeding with work. Protect approved mock-ups until all work has been completed. Approved mock-ups will represent the minimum standard of acceptability for each portion of the work.

1. Provide in-place sample minimum of two adjacent wall panels in location directed by Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store ultracompact material on wood A-frames or pallets with nonstaining separators and nonstaining, waterproof covers. Ventilate under covers to prevent condensation.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions of construction to receive ultracompact material wall panels by field measurements before fabrication

PART 2 - PRODUCTS

2.1 ULTRACOMPACT MATERIAL

- A. Ultracompact Material: High performance porcelain comprised of natural minerals and pigments sintered under high pressure into slabs, sheets or panels.
1. Basis of Design Product: Provide Corian Endura manufactured by DuPont or equal product by one of the following:
 - a. Neolith
 - b. Lapitec
 - c. DEKTON
 - d. Laminam
 2. Thickness: 6 mm
 3. Panel Size: 126" X 63".
 4. Color: Ancient Marble.
 5. Finish: Glossy.
 6. Edges: 2 mm bevel.
 7. Flame Spread: Class A.
 8. Warranty: 10 year limited.

2.2 ADHESIVES, GROUT, SEALANTS, AND STONE ACCESSORIES

- A. General: Use only adhesives formulated for ultracompact material and recommended by their manufacturer for the application indicated. Use adhesives that have a VOC content

of not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- B. Medium-Bed, Latex-Portland Cement Mortar. Comply with requirements in ANSI A118.4. Provide product that is approved by manufacturer for application thickness of up to 3/4 inch. Provide one of the following, or approved equal:
 - 1. MegaLite® Ultimate Crack Prevention Large Format Tile Mortar by Custom Building Products.
 - 2. 4-XLT by Laticrete.
 - 3. Large Tile and Stone Mortar by Mapei dhesives based installation are based on tile installation techniques.
- C. Water-Cleanable Epoxy Grout: ANSI A118.3. with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24). Grout shall be stain resistant, color fast, mold and mildew inhibiting, non-sag, suitable for joints 1/16" to 1/2" and sanded type suitable for installing with glazed tiles.
 - 1. Basis of Design Product: Laticrete "Spectralock Pro Epoxy Grout" or equal.
 - 2. Colors: As selected by Architect from manufacturer's full range.
- D. Cleaner: Cleaner specifically formulated for ultracompact material types, finishes, and applications indicated, as recommended by ultracompact material producer and, if a sealer is specified, by sealer manufacturer. Do not use cleaning compounds containing acids, caustics, harsh fillers, or abrasives.
- E. Termination, Trim and Transition Strips: Provide Schluter units in Type 304 stainless steel as indicated on Drawings.
- F. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by tile manufacturer for applications indicated.

2.3 FABRICATION, GENERAL

- A. Fabricate ultracompact material wall panels in sizes and shapes required to comply with requirements indicated, including details on Drawings and Shop Drawings.
 - 1. Dress joints straight and at right angle to face, unless otherwise indicated.
 - 2. Provide openings, reveals, and similar features as needed to accommodate adjacent work.
 - 3. Fabricate molded edges with machines having abrasive shaping wheels made to reverse contour of edge profile to produce uniform shape throughout entire length of edge and with precisely formed arris slightly eased to prevent snipping, and matched at joints between units.
 - 4. Finish exposed faces of ultracompact material to comply with requirements indicated for finish of each type of ultracompact material required and to match approved Samples and mockups.

- B. Carefully inspect finished ultracompact material units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates indicated to receive ultracompact material wall panels and conditions under which ultracompact material wall panels will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of ultracompact material wall panels .
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Use trowelable leveling and patching compounds per manufacturer's directions to fill cracks, holes, and depressions in substrates and to patch and level walls as required to provide suitable substrate for wall panels application.
- B. Remove coatings, including curing compounds, and other substances that could interfere with adhesion of wall panels by using a grinder, sander, or polishing machine with a heavy-duty wire brush.
- C. Broom or vacuum clean substrates to be covered by wall panels immediately before tile installation. Following
- D. Level substrates to 1/8-inch variance in 10 feet, with no more than 1/16 inch variation in 24 inches by skim coating and patching wall surfaces using manufacturer approved trowel-applied cement-based compound to bring surface into acceptable tolerances. There shall be no abrupt irregularities greater than 1/32".

3.3 INSTALLATION OF WALL PANELS

- A. General: Install panels by adhering to substrate in accordance with manufacturer's directions.
- B. Do not cut ultracompact material in field, unless otherwise indicated. If ultracompact material wall panels require additional fabrication not specified to be performed at Project site, return to fabrication shop for adjustment.
- C. Set ultracompact material to comply with requirements indicated on Drawings and Shop Drawings. Adjust ultracompact wall panels to provide uniform joints of 3/32" (2mm) widths and with edges and faces aligned according to established relationships and indicated tolerances.

- D. Grout vertical joints in accordance with manufacturer's directions.
- E. Install panels flat and true to within 3 mm (1/8 inch) of a flat surface over a 10-foot length.

3.4 ADJUSTING AND CLEANING

- A. In-Progress Cleaning: Clean wall panels as work progresses. Remove adhesive and sealant smears immediately.
- B. Remove and replace ultracompact material wall panels of the following description:
 - 1. Broken, chipped, stained, or otherwise damaged ultracompact material.
 - 2. Defective wall panels .
 - 3. Defective joints, including misaligned joints.
 - 4. Interior ultracompact material wall panels and joints not matching approved Samples and mockups.
 - 5. Interior ultracompact material wall panels not complying with other requirements indicated.
- C. Replace in a manner that results in ultracompact material wall panels matching approved Samples and mockups, complying with other requirements, and showing no evidence of replacement.
- D. Clean ultracompact material wall panels not less than six days after completion of grout installation, using clean water and soft rags. Do not use wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods that could damage ultracompact material.

END OF SECTION 097800

SECTION 098200 - ACOUSTIC BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes acoustical board material applied to ceilings in recording studio.

1.2 ACTION SUBMITTALS

- A. Product data for each type of product specified. Include data on physical characteristics, material densities, fastening and attachment methods, acoustical performance data, and flame resistance characteristics.
- B. Samples for verification purposes of each type and color of acoustic board of size indicated below:
 - 1. 6 inch square sample of each acoustic board specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates signed by acoustic board manufacturer certifying materials furnished comply with specified requirements.
- B. Certified test reports showing compliance with requirements for fire performance characteristics and physical properties.

1.4 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Provide acoustic boards with the following surface burning characteristics as determined by testing identical products per ASTM E 84 by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify acoustic boards with appropriate markings of applicable testing and inspecting organization.
 - 1. Flame Spread: 25 or less.
 - 2. Smoke Developed: 450 or less.
- B. Installer Qualifications: Arrange for installation of acoustic boards by a firm that can demonstrate successful experience in installing similar in type and quality to those required for this Project.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect units during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.

1.6 PROJECT CONDITIONS

- A. Maintain a constant temperature not less than 70°F in installation areas for at least ten (10) days before and ten (10) days after installation.
- B. Field Measurements: Where units are indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide acoustic board manufactured by Owens Corning or an approved equivalent by one of the following, or equal:
 - 1. Acoustical Solutions, Inc.; "Black Acoustical Theater Board"
 - 2. Knauf; "Wall and Ceiling Liner"

2.2 ACOUSTIC BOARDS:

- A. Acoustic Board: Lightweight, resilient insulation material with black mat facing on each side designed to reduce sound and/or light reflection. Product shall be dimensionally stable, resistant to mildew contamination and rot, and be cleanable by vacuuming surfaces. Product shall comply with the following:
 - 1. Acoustic Board Size: 4' x 8'
 - 2. Acoustic Board Thickness: 2"
 - 3. Insulation Content: Inorganic glass fibers.
 - 4. Surface Burning/Flame Spread Characteristics: Class A.
 - 5. Density: 3.0 pcf
 - 6. Fungus Resistance: Passes ASTM C1338.
 - 7. Acoustical Properties (Sound Absorbing Performance):
 - a. .11 at 125 Hz
 - b. .64 at 250 Hz
 - c. 1.12 at 500 Hz.
 - d. 1.14 at 1000 Hz
 - e. 1.06 at 2000 Hz
 - f. 1.08 at 4000 Hz
 - g. NRC: 1.00
 - 8. Basis of Design Product: "SelectSound Black Acoustic Board" manufactured by Owens Corning; or approved equivalent
- B. Adhesive: Manufacturer's standard low odor, VOC compliant, non-flammable latex based adhesive recommended for use and substrate.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting installation and performance of acoustic boards. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Acclimate acoustic boards to room temperature for 48 hours prior to installation.
- C. Follow manufacturer's printed instructions for surface preparation.

3.3 INSTALLATION

- A. Do not use materials that are unsound, warped, bowed or twisted.
- B. Install acoustic boards plumb, level, true, and aligned with adjacent materials.
 - 1. Scribe and cut acoustic boards to fit adjoining work.
 - 2. Install to tolerance of 1/32 inch in 8 feet for plumb and level.
 - 3. Coordinate with materials and systems that may be in or adjacent to acoustic boards. Provide cutouts for mechanical and electrical items that penetrate.
- C. Plan acoustic board layout, balancing acoustic board sizes at corners.
 - 1. Adhere acoustic boards to substrate in accordance with manufacturer's written instructions.
 - 2. Stagger joints between acoustic boards and substrate material.

3.4 ADJUSTING AND CLEANING

- A. Repair damaged or defective acoustic boards where possible to eliminate functional or visual defects. Where not possible to repair, replace acoustic boards.
- B. Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.
- C. Use cleaning methods recommended by the acoustic board manufacturer.
- D. Replace acoustic boards that cannot be cleaned.

3.5 PROTECTION

- A. Provide final protection and maintain conditions that ensure acoustic boards are without damage or deterioration at time of Substantial Completion.

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END OF SECTION 098200

SECTION 098413 - ACOUSTICAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Fabric-wrapped acoustical wall panels.
- B. Refer to the Acoustical Panels Schedule following Section 095416 for scope of acoustical ceiling panels and baffles.

1.2 SUBMITTALS

- A. Product Data: For each type of fabric, panel edge, acoustical fill and core material specified.
- B. Shop Drawings: Include attachment devices; and details at head, base, joints, corners, and intersections with shelves, countertops, doors, electrical outlets and switches, thermostats, and other components. Indicate panel edge and core materials.
 - 1. Include elevations showing panel sizes and direction of fabric weave.
- C. Samples for Verification: For the following products. Prepare Samples from the same material to be used for the Work.
 - 1. Fabric: Full-width by 36-inch- (1000-mm-) long Sample from dye lot to be used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of fabric.
 - 2. Sample Panels: No larger than 36 by 36 inches (1000 by 1000 mm). Show joints, panel edges, and attachment methods.
- D. Maintenance Data: For acoustical wall panels to include in maintenance manuals specified in Division 01. Include fabric manufacturers cleaning and stain-removal recommendations.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed work similar in material, design, and extent to that indicated for this Project and whose work has resulted in installation with a record of successful in-service performance.
- B. Fire-Test-Response Characteristics: Provide acoustical wall panels with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Flame Spread: 25 or less.
2. Smoke Developed: 450 or less.

C. Fabric facing shall meet NFPA 701.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect acoustical wall panels from excessive moisture in shipment, storage, and handling. Deliver in unopened bundles and store in a dry place with adequate air circulation.
- B. Before installing acoustical wall panels, permit them to reach room temperature and a stabilized moisture content.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical wall panels until spaces are enclosed and weatherproof, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Verify acoustical wall panels sizes by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.6 COORDINATION

- A. Coordinate layout and installation of acoustical wall panels with other construction that penetrates panels, including light fixtures, electrical outlets, HVAC thermostats and similar assemblies.

1.7 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranty: Written warranty, signed by acoustical wall panel manufacturer agreeing to repair or replace panels that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, fabric sagging, distorting, or releasing from panel edge.
 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ACOUSTICAL WALL PANELS

A. Acoustical Panels AWP1 - AWP7: Provide acoustical wall panels as follows:

1. Edge Profile: Square.
2. Edge Material: Resined
3. Nominal Panel Thickness: 2-1/8 inch
4. NRC: 1.05
5. Core: 6 to 7 pcf medium density core glass fiber board
6. High Impact Layer: 1/8" non-PVC plastic sheet bonded to the core and under the fabric.
7. Fabric Facing: Provide the following where scheduled; refer to Acoustical Panel Schedule following Section 095416 for locations:
 - a. 56" W Guilford of Maine FR701 Style 2100 in colors as scheduled.
 - b. 67" W Guilford of Maine Marin Style 1300 in colors as scheduled.
8. Shapes: Flat wall panels in rectangular shape.
9. Sizes: Refer to Acoustical Panel Schedule following Section 095416 for each panel size.
10. Mounting Method: Manufacturer's standard mounting clips and leveling clips concealed attachment system.
11. Basis of Design Product: Kinetics High Impact HardSide Acoustical Wall Panels, or equal by one of the following:
 - a. Decoustics.

2.2 MATERIALS

- A. Glass-Fiber Board: ASTM C 612, Type IA or Types IA and IB; 6-7 pcf density, unfaced, dimensionally stable, molded rigid board, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively
- B. Fasteners: Types and sizes recommended by core manufacturer, steel drill screws complying with ASTM C 1002 for applications over steel framing.

2.3 FABRICATION

- A. Acoustical Wall Panels: Fabric straight and on the grain. No seams are allowed.
- B. Apply fabric to smooth side of panel.
- C. Stretch fabric tight and square without puckers, ripples, sagging, or distortions. Adhere fabric to panel face.
- D. Mounting Devices: Concealed mounting Z-clips and leveling clips on back of panel, as supplied by manufacturer to support weight of panel and for substrate being fastened to.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fabric, substrates, and conditions, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of acoustical wall panels.

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

3.2 INSTALLATION

- A. Install acoustical wall panels in locations indicated with vertical surfaces and edges plumb, top edges level and in alignment with other panels, and scribed to fit adjoining work accurately at borders and at penetrations; and with fabric installed square to the grain. Comply with panel core manufacturer's written instructions for installation of panels using type of mounting accessories indicated or, if not indicated, as recommended by manufacturer.

- 1. Coordinate panel layout with steel framing locations for fastener placing and spacing

- B. Panel Joints: No greater than 1/16-inch expansion space between adjoining panels, and 1/4-inch at floor, ceiling and around windows and door frames, etc.
- C. Take care in handling panels with clean hands, so as not to soil fabric material.
- D. Attach acoustical wall panels to underlying construction according to manufacturer's written instructions, through use of z-clip system.
- E. At exterior corners, butt panels together with light contact to produce close fitting, uniform joints. Do not force panels into place.
- F. At interior corners, butt adjoining panels together with light contact to produce close fitting, uniform joints. Do not force panels into place.
- G. At vertical joints between panels in the same plane, butt panels at edges with light contact to produce close fitting, uniform joints. Do not force panels into place.
- H. Cut holes in panels for services according to manufacturer's written instructions to avoid loosening facing at openings.

3.3 CLEANING AND PROTECTING

- A. Clean exposed faces of installed panels, and related materials, and adjacent surfaces. Comply with fabric manufacturer's recommendations for cleaning methods and materials.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure installation is without damage or deterioration at the time of Substantial Completion.

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END OF SECTION 098413

SECTION 099100 - PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes surface preparation and the application of paint and stain systems on the following interior and exterior substrates:
 - 1. Concrete masonry units (CMU).
 - 2. Concrete
 - 3. Steel and iron.
 - 4. Galvanized metal.
 - 5. Gypsum board.
 - 6. GFRG
 - 7. Wood
 - 8. Metal decking and framing at ceilings
- B. Related Sections include the following:
 - 1. Division 05 Sections for shop priming of metal substrates with primers specified in this Section.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of topcoat product indicated.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.
 - 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.3 QUALITY ASSURANCE

- A. MPI Standards: Maintain copy of this standard at the Project site at all times.
 - 1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
 - 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.
- B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.
 - b. Stained Wood Trim: Provide 4 samples each minimum 6" long with stain applied.
 - c. Other Items: Architect will designate items or areas required.
 - 2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
 - 3. Final approval of color selections will be based on benchmark samples.
 - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.5 PROJECT CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
- C. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
- D. Do not use torches, heat guns, or any other heat generating equipment to remove paint or coatings.
- E. Do not use abrasive methods to remove paint; chemical strippers and hand cleaning methods only may be used.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Benjamin Moore & Co.
 2. PPG Architectural Finishes, Inc.
 3. Sherwin-Williams Company (The).
 4. Tnemec

2.2 PAINT, GENERAL

- A. Material Compatibility:
1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the OTC (Ozone Transport Commission) restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
 2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
 3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
 4. Floor Coatings: VOC not more than 100 g/L.
 5. Shellacs, Clear: VOC not more than 730 g/L.
 6. Shellacs, Pigmented: VOC not more than 550 g/L.
 7. Flat Topcoat Paints: VOC content of not more than 50 g/L.
 8. Nonflat Topcoat Paints: VOC content of not more than 150 g/L.
 9. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
 10. Floor Coatings: VOC not more than 100 g/L.
 11. Shellacs, Clear: VOC not more than 730 g/L.
 12. Shellacs, Pigmented: VOC not more than 550 g/L.
 13. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
 14. Dry-Fog Coatings: VOC content of not more than 400 g/L.
 15. Zinc-Rich Industrial Maintenance Primers: VOC content of not more than 340 g/L.
 16. Pre-Treatment Wash Primers: VOC content of not more than 420 g/L.
 17. Fire Retardant Paint: VOC content of not more than 60 g/L.

- C. Colors: 12 colors as selected by the Architect, plus black and white.
- D. Paint Strippers: Where refinishing of existing wood and metal members and components is indicated on Drawings, use paint removers specifically designed for removing paint from substrates indicated, and approved by Architect for use on each substrate.
- E. Detergent: Mild detergent, approved by the Architect

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry: 12 percent.
 - 3. Gypsum Board: 12 percent.
 - 4. Wood: 15 percent
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
- G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- H. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.
- I. 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.
 - 1. 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.
 - 2. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling.
 - 3. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
 - 4. When transparent finish is required, backprime with spar varnish or polyurethane.
- J. Existing Wood and Metal to be Stripped and Refinished:
 - 1. Comply with stripper manufacturer's printed directions.
 - 2. Apply chemical stripper with a brush and remove the stripper and liquified finish by hand with scraping knives, steel wool and denatured alcohol. Use all necessary care to avoid scraping, scaring, or damaging profiles and surfaces.
 - 3. Apply and remove stripper as many times as required to completely remove the finish buildup and provide a uniform surface appearance. Take care that grain of wood is not raised any more than required to achieve desired appearance.
 - 4. After buildup has been removed, clean surface with steel wool and denatured alcohol and wipe with a clean dry cloth.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- B. Application Procedures: Apply paints and coatings by brush or roller according to the manufacturer's directions, except as noted below. Spray application is not permitted for trim, ceilings and walls, unless specifically approved by Architect in advance for each individual situation. Roller application on woodwork is not permitted.
 - 1. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
 - 2. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
 - 3. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
- C. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.
- D. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- E. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- F. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- G. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
 - 1. Mechanical Work:
 - a. Uninsulated metal piping.
 - b. Uninsulated plastic piping.
 - c. Pipe hangers and supports.
 - d. Tanks that do not have factory-applied final finishes.

- e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 - f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
2. Electrical Work:
- a. Switchgear.
 - b. Panelboards.
 - c. Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.4 FIELD QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
- 1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

- A. General: Provide listed products or equal products of other named manufacturers in Part 2.
- B. Steel and Iron Substrates: Polyurethane, Pigmented, Epoxy Zinc Rich Primer and High-Build Epoxy Coating System: Gloss or Semi-Gloss as selected by the Architect.
 - 1. Prime Coat: Epoxy Zinc Rich Primer. Tnemec: Tneme-Zinc Series 90-97 or equal.
 - 2. Intermediate Coat: High-performance, polyamide-epoxy coating; High-Build Epoxy Marine Coating, Low Gloss: Tnemec: Hi-Build Epoxoline, Series 66, tinted slightly lighter than top coat., or equal
 - 3. Topcoat (Gloss): Aliphatic Acrylic Polyurethane, Two-Component, Pigmented, Gloss: Tnemec Endura-Shield II Series 1074.
 - 4. Topcoat (Semi-Gloss): Aliphatic Acrylic Polyurethane, Two-Component, Pigmented, Semi-Gloss: Tnemec Endura-Shield II Series 1075.
- C. Zinc-Coated (Galvanized) Metal: Full-gloss, acrylic latex enamel finish - 2 coats - self-priming.
 - 1. Prime Coat: Gloss acrylic latex enamel paint; MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
 - a. Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28
 - 2. Top Coat: Gloss acrylic latex enamel paint; MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
 - a. Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28

3.7 INTERIOR PAINTING SCHEDULE

- A. General: Provide listed products or equal products of other named manufacturers in Part 2.
- B. Gypsum Board Ceilings: Eggshell acrylic finish.
 - 1. Prime Coat: Latex-based, interior primer; MPI # 50, X-Green 50, 149, X-Green 149, LEED 2009, LEED V4, CHPS Certified.
 - a. Benjamin Moore; Ultra Spec 500 Interior Latex Primer N534
 - 2. Intermediate Coat and Topcoat: Low-luster (eggshell or satin), acrylic-latex, interior enamel; MPI # 52, X-Green 52, 145, X-Green 145, 139, X-Green 139, LEED 2009 LEED V4, CHPS Certified.
 - a. Benjamin Moore; Ultra Spec 500 Interior Latex Eggshell T538.
- C. Gypsum Drywall Walls and GFRG Column Covers: Semi-gloss, acrylic finish.
 - 1. Prime Coat: Latex-based, interior primer; MPI # 50, X-Green 50, 149, X-Green 149, LEED 2009, LEED V4, CHPS Certified.
 - a. Benjamin Moore; Ultra Spec 500 Interior Latex Primer N534

2. Intermediate Coat and Topcoat: Semigloss acrylic-latex, interior enamel; MPI # 43, X-Green 43, 146, X-Green 146, 140, X-Green 140, LEED 2009, LEED V4, CHPS Certified.
 - a. Benjamin Moore; Ultra Spec 500 Latex Semigloss N539.
- D. Gypsum Drywall Walls at Bathrooms and Janitor's Closets (and where scheduled): Semi-Gloss, waterborne acrylic epoxy finish.
 1. Prime Coat: Latex or two component epoxy-based, interior primer; MPI # 6, 17, X-Green 17, 39, 137, X-Green 137, LEED Credit, CHPS Certified.
 - a. Benjamin Moore; Fresh Start Multi-Purpose Primer N023.
 2. Intermediate Coat and Topcoat: Two component semi-gloss acrylic-epoxy; Interior/Exterior Epoxy (water based), LEED 2009.
 - a. Benjamin Moore; Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341.
- E. Hollow Metal Doors, Frames, and Sidelights, and Ferrous Metals: Semigloss, acrylic-enamel finish.
 1. Prime Coat: Rust-Inhibitive Primer (Water Based), MPI #107, X-Green 107, 134, LEED 2009, CHPS Certified.
 - a. Benjamin Moore; Super Spec HP Acrylic Metal Primer P04.
 2. Intermediate Coat and Topcoat: Factory-formulated semigloss acrylic-latex enamel for interior application; MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
 - a. Benjamin Moore; Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel, HP29
- F. Exposed Structural Steel Coated with Intumescent Fireproofing: Semigloss, acrylic-enamel finish. Note: Paint must be compatible with intumescent coating and must be approved by the intumescent fireproofing manufacturer for topcoating their product
 1. Topcoat: Factory-formulated semigloss acrylic-latex enamel for interior application; MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
 - a. Benjamin Moore; Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel, HP29
- G. Concrete Masonry Units (CMU): Alkyd, water-based finish; in sheen as selected by Architect.
 1. Prime Coat/Block Filler: MPI # 4, X-Green 4, LEED 2009, LEED V4, CHPS Certified.
 - a. Benjamin Moore Super Spec Masonry Interior/Exterior Hi-Build Block Filler 206.
 2. Intermediate Coat and Topcoat: Alkyd, water-based finish; LEED 2009, LEED V4, CHPS Certified. One of the following:
 - a. Satin: Benjamin Moore Advance Waterborne Interior Alkyd Satin 792.

- b. Semi-Gloss: Benjamin Moore Advance Waterborne Interior Alkyd Semi-Gloss 793.
 - c. High Gloss: Benjamin Moore Advance Waterborne Interior Alkyd Gloss 794.
- H. Concrete Masonry Units (CMU) at Bathrooms and Janitor's Closets (and where scheduled): Semi-Gloss, waterborne acrylic epoxy finish.
 - 1. Prime Coat: Acrylic block filler/primer; LEED 2009.
 - a. Benjamin Moore; Corotech Acrylic Block Filler V114.
 - 2. Intermediate Coat and Topcoat: Two component semi-gloss acrylic-epoxy; Interior/Exterior Epoxy (water based), LEED 2009.
 - a. Benjamin Moore; Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341
- I. Painted Woodwork: Semigloss, acrylic finish.
 - 1. Prime Coat: Latex-based, interior primer; MPI # 50, X-Green 50, 149, X-Green 149, LEED 2009, LEED V4, CHPS Certified.
 - a. Benjamin Moore; Ultra Spec 500 Interior Latex Primer N534
 - 2. Intermediate Coat and Topcoat: Semigloss acrylic-latex, interior enamel; MPI # 43, X-Green 43, 146, X-Green 146, 140, X-Green 140, LEED 2009, LEED V4, CHPS Certified.
 - a. Benjamin Moore; Ultra Spec 500 Latex Semigloss N539.
- J. Stained Wood and Woodwork: Satin, waterborne clear acrylic urethane over stain.
 - 1. Stain Coat: Penetrating wood stain, water-based; MPI # 186 LEED Credit.
 - a. Lenmar (Benjamin Moore); Waterborne Interior Wiping Stain 1WB.1300 (240 g/L)
 - 2. Intermediate Coat and Topcoat: Satin, interior waterborne clear acrylic urethane varnish; MPI # 121, 128.
 - a. Lenmar (Benjamin Moore); Waterborne Aqua-Plastic Urethane Satin, 1WB.1427 (335 g/L)
- K. Natural-Finish Wood and Woodwork: Satin, waterborne clear acrylic urethane.
 - 1. Three Finish Coats: Satin, interior waterborne clear acrylic urethane varnish; MPI # 121, 128.
 - a. Lenmar (Benjamin Moore); Waterborne Aqua-Plastic Urethane Satin, 1WB.1427 (335 g/L).
- L. Metal Decking and Framing Exposed at Ceilings: Flat dryfall finish.
 - 1. Prime Coat: Benjamin Moore; Corotech Prep All Universal Metal Primer V132.
 - 2. Top Coat: Benjamin Moore; Coronado Super Kote 5000 Dry Fall Alkyd Flat 105, MPI # 55.

- M. Concrete Floors: Semigloss, waterborne epoxy Polyamide self-priming finish - VOC Range <250.
 - 1. Intermediate Coat and Topcoat: Benjamin Moore; I.M.C. Acrylic Epoxy Gloss #M43/M44. Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).

END OF SECTION 099100

SECTION 101000 - VISUAL DISPLAY SURFACES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following types of visual display boards:

1. Porcelain enamel markerboards.
2. Cork tackboards

1.2 SUBMITTALS

- A. Product Data: Provide manufacturer's product data for each type of visual display board specified.
- B. Shop Drawings: For each type of visual display board required, including dimensioned elevations. Show location of joints between individual panels where unit dimensions exceed maximum panel length. Include sections of typical trim members. Show anchors, grounds, reinforcement, accessories, layout, and installation details.
- C. Samples for initial selection purposes in form of manufacturer's color charts showing full range of colors available for tackboards.
- D. Samples for Verification: Of the following products, showing color and texture or finish selected. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected. Prepare Samples from the same material to be used for the Work.
1. Markerboards: Actual sections of porcelain enamel finish for each type of markerboard required not less than 8-1/2 by 11 inches, mounted on the substrate indicated for the final Work. Include a panel for each type, color, and texture required.
 2. Tackboards: Sample panels of actual materials to be supplied in the finished Work, not less than 8-1/2 by 11 inches (215 by 280 mm), mounted on the substrate indicated for the final Work. Include a panel for each type, color, and texture required.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain visual display boards through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide materials with the surface-burning characteristics indicated, as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Class A

- C. Provide GREENGUARD certified products.

1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify field measurements before preparation of Shop Drawings and before fabrication to ensure proper fitting. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating markerboards without field measurements. Coordinate wall construction to ensure actual dimensions correspond to established dimensions.

1.5 WARRANTY

- A. General Warranty: The special porcelain enamel warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

- B. Porcelain Enamel Warranty: Furnish the manufacturer's written warranty, agreeing to replace porcelain enamel markerboards that do not retain their original writing and erasing qualities, become slick and shiny, or exhibit crazing, cracking, or flaking, provided the manufacturer's instructions with regard to handling, installation, protection, and maintenance have been followed.

1. Warranty Period: 50 years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Porcelain Enamel Markerboards:
 - a. Claridge Products and Equipment, Inc.
 - b. Greensteel, Inc.
 - c. Lemco, Inc.
2. Tackboards:
 - a. Best-Rite Chalkboard Co.
 - b. Carolina Chalkboard Co.
 - c. Claridge Products and Equipment, Inc.

- d. Ghent Manufacturing, Inc.
- e. Greensteel, Inc.
- f. Lemco, Inc.
- g. Marsh Chalkboard Company.

2.2 MATERIALS, GENERAL

- A. Low-Emitting Materials: All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard) shall contain no added urea-formaldehyde resins. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI)
- B. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Wood Glues: 30 g/L.
 - 2. Contact Adhesive: 80 g/L

2.3 TACKBOARDS

- A. Cork Tackboards: Color impregnated cork board composed of 1/4" thick self-healing, burlap backed cork laminated to a 1/4" hardboard backing, surrounded by 1-1/4" wide aluminum face trim.
 - 1. Color(s): As selected by Architect for each location.
 - 2. Size(s): As indicated on Drawings. Refer to Tackboard and Whiteboard Schedule.
 - 3. Frame Style: 1-1/4" face, mitered corners, white powder coat painted finish.
 - 4. Corkboard Material: Claridge Cork
 - 5. Accessories: Full length marker tray and 1" map rail with two map hooks.
 - 6. Basis of Design Product: Series 3 Tackboard by Claridge or equal.

2.4 MARKERBOARDS, FIXED

- A. Porcelain Enamel Markerboards: Provide balanced, high-pressure-laminated porcelain enamel boards of 3-ply construction consisting of face sheet, core material, and backing, that will accept magnetic accessories..
- B. Face Sheet: 0.024-inch (0.61-mm) enameling grade steel especially processed for temperatures used in coating porcelain on steel. Coat exposed face and edges with a 3-coat process consisting of primer, ground coat, and color cover coat. Coat concealed face with a 2-coat process consisting of primer and ground coat. Fuse cover and ground coats to steel at manufacturer's standard firing temperatures, but not less than 1200 deg F (649 deg C).
 - 1. Cover Coat (Markerboards): Provide manufacturer's standard, light-colored, special writing surface with gloss finish intended for use with erasable dry markers.

- C. Core: Core: 3/8-inch- (9.5-mm-) thick, particleboard core material complying with requirements of ANSI A208.1, Grade 1-M-1.
- D. Backing Sheet: Backing Sheet: 0.015-inch- (0.38-mm-) thick, aluminum-sheet backing.
- E. Laminating Adhesive: Provide the manufacturer's standard moisture-resistant thermoplastic-type adhesive.
- F. Markerboard Color: White.
- G. Basis of Design Product: LCS 3 Markerboard by Claridge, or equivalent.
- H. Unit Markerboards: Basis of Design is Claridge Series 3 Markerboard or equal.
 - 1. Accessories: Full length flat style marker tray and 2" map rail with two map hooks.
 - 2. Frame Style: 1-1/4" face, mitered corners, white powder coat painted finish.
 - 3. Sizes: As indicated on Drawings. Refer to Tackboard and Whiteboard Schedule.

2.5 ACCESSORIES

- A. Mounting Accessories: Provide angle clip hangers and mounting adhesive supplied by manufacturer.
- B. Flag Holders: Provide a flag holder accessory for each classroom.

2.6 FABRICATION

- A. Assembly: Provide factory-assembled tackboards and markerboard units in single units without joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine wall surfaces, with Installer present, for compliance with requirements and other conditions affecting installation of visual display boards.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Deliver factory-built visual display boards completely assembled in one piece without joints, where possible. If dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to the Architect. When overall dimensions require delivery in separate units, prefabricate components at the factory, disassemble for delivery, and make final joints at the site. Use splines at joints to maintain surface alignment.

- B. Install units in locations and at mounting heights as indicated on drawings; comply with manufacturer's installation instructions. Keep perimeter lines straight, plumb, and level. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for a complete installation.
- C. Coordinate Project-site-assembled units with grounds, trim, and accessories. Join parts with a neat, precision fit.

3.3 ADJUST AND CLEAN

- A. Verify that accessories required for each unit have been properly installed
- B. Clean units in accordance with the manufacturer's instructions. Break in markerboards only as recommended by the manufacturer.

END OF SECTION 101000

SECTION 101200 - DISPLAY CASES

PART 1 - GENERAL.

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Non-illuminated display cases, recessed.
- B. Related Sections include the following:
 - 1. Division 26 Sections for wiring, light fixtures and other electrical work associated with display cases that are field installed.

1.2 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for display cases.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of product through one source from a single manufacturer.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of display casesbulletin boards and are based on the specific system indicated.
 - 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.
- C. Fire-Test-Response Characteristics: Provide Case back panels with the surface-burning characteristics indicated, as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency

1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify recessed openings by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating

products without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Hardboard: AHA A135.4, tempered.
- B. Particleboard: ANSI A208.1, Grade 1-M-1, made with binder containing no urea formaldehyde.
- C. Fiberboard: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.
- D. Extruded-Aluminum Bars and Shapes: ASTM B 221, Alloy 6063.
- E. Aluminum Tubing: ASTM B 429, Alloy 6063.
- F. High-Pressure Plastic Laminate: NEMA LD 3.
- G. Clear Tempered Glass: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3, with exposed edges seamed before tempering, and 3/16" thick, unless otherwise indicated.
- H. Fasteners: Provide screws, bolts, and other fastening devices made from same material as items being fastened. Provide types, sizes, and lengths to suit installation conditions.

2.2 DISPLAY CASE

- A. Recessed, Plywood-Framed Cabinet (DC-1): Factory-fabricated cabinet, with top, bottom, and sides fabricated from plywood with laminate finish on back inside surface, glazed doors at front, and extruded-aluminum angle trim on face to cover edge of recessed opening.
 - 1. Frame: Aluminum capping angle frame with heavy duty built-in sliding glass door track.
 - 2. Doors: Aluminum bottom framed sliding doors, with ground in finger pulls and built-in locks, fabricated from clear tempered glass.
 - 3. Aluminum Finish: Clear anodized.
 - 4. Plywood Board Sides, Returns and Backs: Plywood covered in white laminate.
 - 5. Shelving: 1/2" thick clear tempered glass shelves with polished edges, supported on steel shelving hardware. Provide standards mounted in rear surface for full height of display case.
 - 6. Lock: Ratchet type.
 - 7. Display Case Size: 48"h x 60"w x 16"d.
 - 8. Basis-of-Design Product: The design for display cases is based on Model 14405 -WB-SN Waddell Display Collection by Ghent Manufacturing. Subject to

compliance with requirements, provide the named product or a comparable product by one of the following:

- a. A-1 Visual Systems.
- b. ADP/Lemco, Inc.
- c. Best-Rite Manufacturing.
- d. Tablet and Ticket.
- e. Poblocki & Sons.

2.3 FABRICATION

- A. Fabricate display cases to requirements indicated for dimensions, design, and thickness and finish of materials.
- B. Use metals and shapes of thickness and reinforcing to produce flat surfaces, free of oil canning, and to impart strength for size, design, and application indicated.
- C. Fabricate cabinets and door frames with reinforced corners, mitered to a hairline fit, with no exposed fasteners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of work.
- B. Examine walls and partitions for suitable framing depth where recessed units will be installed
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare recesses for display cases as required by type and size of unit.

3.3 INSTALLATION

- A. General: Install units in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, plumb, and level. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
 - 1. Mounting Height: Install product at heights to conform to Americans with Disabilities Act Accessibility Guidelines (ADAAG) and applicable local amendments and regulations.

- B. Recessed Display Cases: Attach units to wall framing with fasteners at not more than 16 inches o.c. Attach aluminum trim over edges of recessed display cases and conceal grounds and clips. Attach trim with fasteners at not more than 24 inches o.c.
- C. Install display case shelving level and straight.

3.4 ADJUSTING AND CLEANING

- A. Adjust doors to operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.
- B. Touch up factory-applied finishes to restore damaged or soiled areas.

END OF SECTION 101200

SECTION 101400 - SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Panel signs.
2. Plaques
3. Signage accessories
4. Dimensional letters.

1.2 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of sign.

B. Shop Drawings: Include plans, elevations, and large-scale sections of typical members and other components. Show mounting methods, grounds, mounting heights, layout, spacing, reinforcement, accessories, and installation details.

1. Provide message list for each sign, including large-scale details of wording, lettering, and braille layout.
2. Provide full size template of engraved plaque sign.
3. Provide full-size spacing templates for individually mounted dimensional letters and numbers

C. Samples for Initial Selection: For each type of sign material indicated that involves color selection.

1. Panel Signs: Samples of each finish type and color, on not less than 4-inch squares of plastic material, showing the full range of colors available

D. Samples for Verification: For each type of sign, include the following Samples to verify color selected:

1. Panel Signs: Full-size Samples of each type of sign required.
2. Dimensional Letters and Symbols: Provide full-size representative samples of each dimensional letter type and symbol required, showing letter style, color, and material finish and method of attachment
3. Approved samples will be returned for installation into Project.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

- B. Maintenance Data: For signage cleaning and maintenance requirements to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by signage manufacturer.
- B. Source Limitations: Obtain each sign type through one source from a single manufacturer.
- C. Regulatory Requirements: Comply with ANSI A.117.1 - 2017 and with code provisions as adopted by authorities having jurisdiction.
 - 1. Interior Code Signage: Provide signage as required by accessibility regulations and requirements of authorities having jurisdiction. These include, but are not limited to, the following:
 - a. Room Capacity.
 - b. Elevator Signs.
 - c. Stairway Identification.
 - d. Signs for Accessible Spaces.

1.5 COORDINATION

- A. For signs supported by or anchored to permanent construction, advise installers of anchorage devices about specific requirements for placement of anchorage devices and similar items to be used for attaching signs.
 - 1. For signs supported by or anchored to permanent construction, furnish templates for installation of anchorage devices.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Manufacturers of Panel Signs: Crown Sign Systems.
 - 2. Manufacturers of Plaques:
 - a. Advance Corporation; Braille-Tac Division.
 - b. A. R. K. Ramos.
 - c. Gemini Incorporated.
 - d. Matthews International Corporation; Bronze Division.
 - e. Metal Arts; Div. of L&H Mfg. Co.
 - f. Mills Manufacturing Company.
 - g. Nelson-Harkins Industries.

- h. Southwell Company (The).
- 3. Manufacturers of Dimensional Letters and Symbols:
 - a. Advance Corporation; Braille-Tac Division.
 - b. A. R. K. Ramos.
 - c. ASI-Modulex, Inc.
 - d. Gemini Incorporated.
 - e. Innerface Sign Systems, Inc.
 - f. Metal Arts; Div. of L&H Mfg. Co.
 - g. Mills Manufacturing Company.
 - h. Mohawk Sign Systems.
 - i. Nelson-Harkins Industries.
 - j. Southwell Company (The).

2.2 PANEL SIGNS

- A. General: Provide signs that comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
 - 1. Produce sign surfaces constructed to remain flat under installed conditions within tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally.
 - 2. Sign materials shall meet a Class A finish.
- B. Interior Panel Signs: Provide lettering, graphics and background materials in styles and colors to match those specified on Drawings, and below. .
 - 1. Produce smooth, even, level sign surfaces, constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch (1.58 mm) measured diagonally.
 - 2. Lettering and Braille Content: Provide uppercase letters raised 1/32 inch (.79 mm), and grade 2 braille for each specific location. Minimum text height: 5/8 inch (15.8 mm).
 - 3. Pictograms: Provide graphics raised 1/32 inch (.79 mm), with minimum 6 inch (152.4 mm) high background field, and lettering and braille written description directly below.
 - 4. Basis of Design Products: Crown Sign Systems Snap Lock Insert
 - 5. Typical Signage Type A through T:
 - a. Insert Background: 1/16" acrylic
 - b. Text: 1/32" applied acrylic
 - c. Frame: Plastic
 - d. Sign Mounting: Tape and screws
 - e. Colors: As selected by the Architect for each location.
 - 6. Type W Directional Signage:
 - a. Insert Background: 1/16" acrylic
 - b. Text Subsurface: Engraved and paint filled
 - c. Frame: Plastic

7. Directional maps shall have graphics of floor plan taken off the Contract Documents.
8. Provide specified signage as scheduled.

2.3 PANEL ACCESSORIES

A. Mounting Methods:

1. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch (1.14 mm) thick, with adhesive on both sides; 3M "VHB Heavy Duty Mounting Tape" or equal.
2. Adhesive: As recommended by sign manufacturer.
3. Mechanical Fasteners: Stainless steel screws.

2.4 PLAQUES

A. Cast Plaques: Provide cast metal plaque, as follows:

1. Plaque Material: Bronze.
2. Edge Style: Single line border.
3. Mounting: Concealed studs for projected mounting on substrate.
4. Thickness: 3/4" thick.
5. Finish: Leatherette with brushed surface.
6. Color: 1315 Dark Oxide polished. with satin clear coat.
7. Copy, Size and Shape: Raised copy, Arial font, and as indicated on Drawings.

2.5 DIMENSIONAL LETTERS AND SYMBOLS

A. Metal Cutout Characters (Type X): Characters with uniform faces; square-cut, smooth edges; precisely formed lines and profiles. Comply with the following requirements.

1. Material: Sheet or plate stainless.
2. Thickness: 1 inch thick.
3. Finish: #4 directional satin finish
4. Height: As indicated on Drawings for each location.
5. Lettering Style/Font: As indicated on Drawings
6. Lettering Content: As indicated on Drawings
7. Mounting: Pin mounted, flush to wall surface.

B. Acrylic Cutout Characters (Type Z): Characters with uniform faces; square-cut, smooth edges; precisely formed lines and profiles. Comply with the following requirements.

1. Material: Integral colored acrylic.
2. Thickness: 1 inch thick.
3. Color: As selected by the Architect for each location.
4. Height: As indicated on Drawings for each location.
5. Lettering Style/Font: As indicated on Drawings
6. Lettering Content: Numerals as indicated on Drawings, and corresponding to the room number.

7. Mounting: Pin mounted, flush to wall surface.
- C. Anchors and Inserts: Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Verify that items, including anchor inserts, provided under other sections of Work are sized and located to accommodate signs.
- C. Examine supporting members to ensure that surfaces are at elevations indicated or required to comply with authorities having jurisdiction and are free from dirt and other deleterious matter.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Locate interior wall signs and accessories where indicated, in accordance with ANSI A.117.1 - 2017 and with code provisions as adopted by authorities having jurisdiction, using mounting methods of the type described and in compliance with the manufacturer's instructions.
 1. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
 2. Mount signs on wall adjacent to the latch side of door, unless otherwise indicated. Where there is no wall space to the latch side of the door, including at double leaf doors, mount sign on the nearest adjacent wall as approved by the Architect. Mount signs at 48-inches (1219 mm) from the baseline of the lowest characters to the finished floor.
 3. Locate signs to allow approach within 3-inches (75 mm) of sign without encountering protruding objects or standing within swing of door.
- B. Wall-Mounted Panel Signs and Directories: Attach signs to wall surfaces using methods indicated below:
 1. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.

- C. Glass-Mounted Panel Signs: Provide backer panel that matches color and size of panel sign and adhere to glass surface. Mount panel signs to backer panel using self-adhesive methods.
- D. Dimensional Letters and Symbols: Mount letters and symbols using standard fastening methods recommended by the manufacturer for letter form, type of mounting, mounting substrate, and condition of exposure indicated. Provide heavy paper template to establish letter spacing and to locate holes for fasteners

3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

3.4 INTERIOR SIGN SCHEDULE

- A. Provide signage as indicated and scheduled on Drawings.
- B. Coordinate with Architect for occupancy capacity numbers to include on signage

END OF SECTION 101400

SECTION 102113 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes solid-plastic polymer resin units as follows:
 - 1. Toilet and Changing Room Enclosures: Floor-mounted, overhead braced.
 - 2. Urinal Screens: Wall hung
- B. Related Requirements:
 - 1. Section 102800 "Toilet and Bath Accessories" for toilet tissue dispensers, grab bars, and similar accessories mounted on toilet compartments.

1.2 ACTION SUBMITTALS

- A. Product data for each type and style of toilet compartment and screen specified. Include details of construction relative to materials, fabrication, and installation. Include details of anchors, hardware, and fastenings.
- B. Shop drawings for fabrication and erection of toilet compartment assemblies not fully described by product drawings, templates, and instructions for installation of anchorage devices built into other work.
 - 1. Show locations of reinforcement and cutouts for compartment-mounted toilet accessories.
- C. Samples for Verification: Of each type of color and finish required for units, prepared on 6-inch- (150-mm-) square samples of same thickness and material indicated for Work

1.3 QUALITY ASSURANCE

- A. Coordination: Furnish inserts and anchorages which must be built into other work for installation of toilet compartments and related items. Coordinate delivery with other work to avoid delay.
- B. Fire-Test-Response Characteristics: Provide toilet compartment materials with surface-burning characteristics as indicated below, as determined by testing identical to those required in this Section, per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Identify toilet compartments with appropriate markings of applicable testing and inspecting agency.
 - 1. Flame Spread: 200 or less.
 - 2. Smoke Developed: Less than 450, or Smoke Density: less than 75 per ASTM D 2843

- C. Flammability of Self-Supporting Plastics: 1.2 inches (30.5-mm) per minute or less per ASTM D 635.
- D. Ignition Properties of Plastic: Not less than 650 Deg. F (343.3 Deg. C) per ASTM D 1929.

1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions in areas of installation by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.5 WARRANTY

- A. Warranty shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and is in addition to and runs concurrent with other warranties made by the Contractor under requirements of the Contract Documents.
- B. Provide a manufacturer's warranty covering the material and workmanship for a period of ten years from the date of final acceptance.
- C. Repair or replace any part which becomes defective or breaks during the warranty period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. ASI Accurate Partitions
 - 2. Bradley
 - 3. General Partitions Mfg. Corp.
 - 4. Global Partitions
 - 5. Metpar Corp.
 - 6. Scranton Products (Santana/Comtec/Capital)

2.2 MATERIALS

- A. General: Provide materials which have been selected for surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections on finished units are not acceptable.
- B. Solid-Plastic, Polymer Resin: High-density polyethylene (HDPE) with homogenous color throughout. Provide material not less than 1 inch (25 mm) thick with seamless construction and eased edges in color and pattern as follows:

1. Texture: Pebble grained.
 2. Color: Match existing partitions which are Scranton "Blueberry".
 3. Basis of Design Product: HDPE Solid Plastic Partitions by ASI Accurate Partitions, or equal.
- C. Pilaster Shoes and Sleeves (Caps): ASTM A 666, Type 302 or 304 stainless steel, not less than 0.0312 inch (0.8 mm) thick and 3 inches (75 mm) high, finished to match hardware.
- D. Full-Height (Continuous) Brackets: Manufacturer's standard design for attaching panels and screens to walls and pilasters of the following material:
1. Material: Clear-anodized aluminum.
- E. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories of the following material:
1. Material: Stainless steel.
 2. Provide vertical privacy piece where the door and sides of partitions meet each other.
- F. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile in manufacturer's standard finish.
- G. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum strip fastened to exposed bottom edges of solid-polymer components to prevent burning .
- H. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match hardware, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.

2.3 FABRICATION

- A. General: Provide standard doors, panels, screens, and pilasters fabricated for compartment system. Provide units with cutouts and drilled holes to receive compartment-mounted hardware, accessories, and grab bars, as indicated.
- B. Overhead-Braced Compartments: Provide anodized aluminum angle supports and leveling bolts at pilasters as recommended by manufacturer to suit floor conditions. Make provisions for setting and securing continuous, extruded, aluminum, antigrip, overhead bracing at top of each pilaster. Provide shoe at each pilaster to conceal supports and leveling mechanism.
- C. Screens: Attach with anchoring devices as recommended by manufacturer to suit supporting structure. Set units to provide support and to resist lateral impact.

- D. Doors: Unless otherwise indicated, provide 24-inch- (610-mm-) wide in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide out-swinging doors with a minimum 32-inch- (813-mm-) wide clear opening for compartments indicated to be handicapped accessible.
1. Hinges: Continuous spring-loaded type fabricated from stainless steel with nylon separators at knuckles and stainless pivot pins, that can be adjusted to hold door open at any angle up to 90 degrees. Provide theft proof fasteners concealed under a snap-on cover.
 2. Latch and Keeper: Manufacturer's standard surface-mounted latch unit with combination rubber-faced door strike and keeper designed for emergency access. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be handicapped accessible.
 3. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
 4. Door Bumper: Manufacturer's standard rubber-tipped bumpers at out-swinging doors or entrance screen doors.
 5. Door Pull: Manufacturer's standard unit that complies with accessibility requirements of authorities having jurisdiction at out-swinging doors. Provide units on both sides of doors at compartments indicated to be handicapped accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, plumb, and level. Provide clearances of not more than 1/2 inch (13 mm) between pilasters and panels and not more than 1 inch (25 mm) between panels and walls. Secure units in position with manufacturer's recommended anchoring devices.
1. Secure panels to walls and panels with continuous brackets attached to the panel. Locate wall bracket fasteners so holes for wall anchors occur in masonry or tile joints. Secure panels in position with manufacturer's recommended anchoring devices.
- B. Overhead-Braced Compartments: Secure pilasters to floor and level, plumb, and tighten installation with devices furnished. Secure overhead brace to each pilaster with not less

than two fasteners. Hang doors and adjust so that tops of doors are parallel with overhead brace when doors are in closed position.

- C. Screens: Attach with anchoring devices according to manufacturer's written instructions and to suit supporting structure. Set units level and plumb and to resist lateral impact.

3.3 ADJUST AND CLEAN

- A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and swing doors in entrance screens to return to fully closed position.
- B. Provide final protection and maintain conditions that ensure toilet compartments and screens are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 102113

SECTION 102123 - CUBICLE TRACKS AND CURTAINS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Ceiling mounted cubicle curtains and tracks.
- B. Related Sections: The following sections contain requirements that relate to this Section:
 - 1. Division 05 Section "Metal Fabrications" for support framing above ceiling.

1.2 SUBMITTALS

- A. Product Data including durability, fade resistance, and fire-test-response characteristics for each type of curtain fabric specified.
- B. Shop Drawings showing layout and types of cubicles, size of curtains, number of carriers, anchorage details, and conditions requiring accessories. Indicate dimensions taken from field measurements.
- C. Coordination Drawings for reflected ceiling plans drawn accurately to scale and coordinating penetrations and ceiling-mounted items. Show the following:
 - 1. Ceiling suspension assembly members.
 - 2. Method of attaching cubicle curtain track hangers to building structure.
 - 3. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, and access panels.
- D. Samples for initial selection in the form of manufacturer's color charts for each type of curtain fabric indicated.
- E. Samples for verification of the following products, showing the full range of color, texture, and pattern variations expected.
 - 1. Curtain Fabric: 12-inch- (300-mm-) square swatch from dye lot used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of material.
 - 2. Mesh Fabric: Manufacturer's standard-size unit, not less than 4 inches (100 mm) square.
 - 3. Cubicle Curtain Track: Manufacturer's standard-size unit, not less than 4 inches (100 mm) long.
 - 4. Curtain Carrier: Manufacturer's full-size unit.
- F. Schedule of cubicles using same room designations indicated on Drawings.

- G. Product certificates signed by manufacturers of cubicle tracks and curtains certifying that their products comply with specified requirements.
- H. Maintenance data for cubicle tracks and curtains to include in the operation and maintenance manual specified in Division 1.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. Fire Performance Characteristics: Provide cubicle curtain fabric which complies or exceeds with the requirements of NFPA Bulletin 701.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain cubicle curtain and track system from one source from a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site in original factory wrappings and containers, clearly labeled with identification of manufacturer, brand name, quality or grade, fire performance characteristics, and lot number.
- B. Comply with instructions and recommendations of manufacturer for special delivery, storage, and handling requirements.

1.6 EXTRA MATERIALS

- A. Furnish extra materials described below, before construction begins, that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.
 - 1. Curtain Carriers and Track End Caps: Before installation begins, furnish quantity of full-size units equal to 3 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include but are not limited to, the following:
 - 1. Arc-Com Fabrics, Inc.
 - 2. General Cubicle Company
 - 3. Imperial Fastener Company
 - 4. A.R. Nelson Co., Inc.

5. Construction Specialties

2.2 CUBICLE TRACK

- A. Curtain Track: Extruded 6063-T5 aluminum alloy track with clear satin anodized finish designed for surface mounting to ceiling. Track shall be nominally 1-3/8"W x 3/4"H with .058" wall thickness. Provide tracks with all necessary connectors, end stops and other accessories as required.
 - 1. Curved Track: Factory fabricated, not less than 12-inch- (300-mm-) radius bends.
 - 2. Splicing Clamp: Same material and finish as track.
 - 3. Basis of Design Track: C/S 6062 by Construction Specialties, or equal.
- B. Curtain Carriers: Roller-type carriers with virgin nylon wheels and axles, metal bead chains, and metal hooks; provide one per curtain grommet.
 - 1. Spool Carriers: C/S SP062 by Construction Specialties or equal.
- C. Track Accessories: Provide end caps, connectors, end stops, coupling sleeves, wall brackets, and other accessories as required for secure and operational installation. Provide a quantity of carriers for 6-inch (150-mm) spacing the full length of the curtain plus 1 additional carrier.

2.3 CUBICLE CURTAIN

- A. Fabric: Provide cubicle curtain fabrics with the following characteristics:
 - 1. Fabric Content: 100% Trevira CS.
 - 2. Width: 72 inches.
 - 3. Repeat: 0"V, 72"H
 - 4. Passes NFPA 701.
 - 5. Curtain Color/Pattern: Tranquil, Railroaded.
 - 6. Basis of Design Fabric: RX 1008 by Architex International, or equal.
- B. Curtain Top: 20-inch- (510-mm-) wide no. 40 nylon mesh Overlap seams and double-lock stitch to body of curtain.
- C. Provide curtains fabricated to comply with the following requirements:
 - 1. Width: Equal to track length from which curtain is hung plus 10 percent, but not less than 12 inches (300 mm).
 - 2. Length: Equal to floor-to-ceiling height minus 18 inches (460 mm) from finished ceiling at top and 12 inches (300 mm) above finished floor.
 - 3. Top Hem: Not less than 1 inch (25 mm) and not more than 1-1/2 inches (40 mm) wide, triple thickness, reinforced with integral web, and double stitched.
 - a. Grommets: 2-piece, rolled-edge, rustproof, nickel-plated brass and spaced not more than 6 inches (150 mm) o.c.

- 4. Bottom and Side Hems: Not less than 1 inch (25 mm) wide, reinforced, triple thickness, and single stitched.
- 5. Seams: Not less than 1/2 inch (13 mm) wide, double turned and double stitched.
- D. Curtain Drop: Beaded chain with aluminum hook.
- E. Curtain Tieback: At each termination.
- F. Operating Wand: Fiberglass baton, not less than 30 inches (762 mm) long.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine ceilings for suitable conditions where cubicle track is to be installed.
- B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install cubicle curtain and track system and accessories in compliance with manufacturer's recommendations.
- B. Surface-mount curtain track on ceiling surface by fastening track through finished ceiling to steel support framing above ceiling using metal fasteners of type and at spacing recommended by manufacturer.
 - 1. Install ceiling-mounted tracks at intervals of not less than 24 inches (610 mm).
 - 2. Center fastener in track to insure unencumbered carrier operation.
- C. Wherever possible, install curtain track in uninterrupted lengths to avoid splices.
- D. Attach curtain to hangers just prior to Substantial Completion to ensure curtain is clean and undamaged at time of Owner's acceptance of work.

3.3 ADJUSTING

- A. Where recommended by the manufacturer, lubricate bearings and sliding parts; adjust to ensure smooth, easy operation.

3.4 PROTECTION

- A. Protect installed track opening with a nonresidue adhesive tape to prevent debris from the ceiling finishing operation from impeding carrier operation.

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Enlarged City School District of Middletown
Twin Towers Middle School
Additions and Alterations

END OF SECTION 102123

SECTION 102600 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:

1. Corner guards.

1.2 ACTION SUBMITTALS

- A. Product Data: Include physical characteristics for each wall and door protection system component indicated.
1. Include product data for adhesives indicating VOC content.
- B. Shop Drawings: Show locations, extent, and installation details of each wall and door protection system component. Show methods of attachment to adjoining construction. Show layout of wall panels and proposed reveal locations.

1.3 INFORMATIONAL SUBMITTALS

- A. Certified test reports showing compliance with requirements for fire performance characteristics and physical properties.
- B. Maintenance Data: For each wall and door protection system component to include in maintenance manuals specified in Division 01. Include the following:
1. Precautions for use of cleaning materials and methods that could be detrimental to finishes and performance.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of wall and door protection units through one source from a single manufacturer.
- B. Fire Performance Characteristics: Provide wall and door protection units with the following surface burning characteristics as determined by testing identical products per ASTM E 84 by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction.
1. Flame Spread: 75 or less.
 2. Smoke Developed: 450 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store wall and door protection materials in original undamaged packages and containers inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install wall and door protection components until the space is enclosed and weatherproof and ambient temperature within the building is maintained at not less than 70 deg F (21 deg C) for not less than 72 hours before beginning installation.
- B. Field Measurements: Where units are indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering wall and door protection products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Alpar Architectural Products, LLC
 - 2. Arden Architectural Specialties, Inc
 - 3. Boston Retail Products.
 - 4. Construction Specialties, Inc.
 - 5. IPC Door and Wall Protection Systems, InPro Corp.
 - 6. Pawling Corporation.

2.2 MATERIALS

- A. Stainless-Steel Sheet: ASTM A 240/A 240M.
- B. Adhesives: Type recommended by manufacturer for applications indicated. .

2.3 CORNER GUARDS

- A. Surface-Mounted, Metal Corner Guards: Fabricated from 1-piece, formed or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.
 - 1. Material: Stainless steel, Type 304.
 - a. Thickness: Minimum 0.059 inch (16 gauge).
 - b. Finish: Directional satin, No. 4.
 - 2. Wing Size: 3-1/2 by 3-1/2 inches.
 - 3. Corner Radius: 1/8 inch.

4. Height: 4 ft.
5. Mounting: Adhesive, of type recommended by manufacturer.
6. Basis of Design Product: CG-60 by Pawling Corp., or equal.

2.4 FABRICATION

- A. General: Fabricate wall and door protection systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including thicknesses of components.
- B. Fabricate components with tight seams and joints with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.5 METAL FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 1. Remove tool and die marks and stretch lines or blend into finish.
 2. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
- B. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
- C. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions in which wall and door protection system components and materials will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing wall and door protection system components.
- B. General: Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

- A. General: Install wall and door protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
 - 1. Install wall and door protection units in locations and at mounting heights indicated on Drawings.
- B. Do not use materials that are unsound, warped, bowed or twisted.

3.4 ADJUSTING AND CLEANING

- A. Clean installed wall and door protection units. Use cleaning methods recommended by the manufacturer.

3.5 PROTECTION

- A. Provide final protection and maintain conditions that ensure wall and door protection units are without damage or deterioration at time of Substantial Completion.

END OF SECTION 102600

SECTION 102800 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Washroom accessories.
2. Mirrors (including framed mirror in Room 166 Stage Prep)
3. Shower accessories
4. Installation of Owner furnished washroom accessories

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated on Contract Drawings.
2. Identify products using designations indicated on Contract Drawings.

C. Maintenance Data: For toilet and bath accessories to include in maintenance manuals, including replaceable parts and service recommendations.

1.3 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same articles in Part 2, provide products of same manufacturer unless otherwise approved by Architect.

B. Inserts and Anchorages: Furnish accessory manufacturer's standard inserts and anchoring devices that must be set in concrete or built into masonry. Coordinate delivery with other work to avoid delay.

1.4 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.5 WARRANTY

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Fifteen (15) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Products: The design for toilet accessories is based on certain named equipment. Subject to compliance with requirements, provide the named product or an equivalent product by one of the following:
 - 1. A & J Washroom Accessories, Inc.
 - 2. American Dryer, Inc.
 - 3. American Specialties, Inc.
 - 4. Bradley Corporation.
 - 5. Bobrick Washroom Equipment
 - 6. Construction Specialties Inc.

2.2 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.0312-inch (0.8-mm) (22-gage) minimum nominal thickness, unless otherwise indicated.
- B. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.0359-inch (0.9-mm) (20-gage) minimum nominal thickness.
- C. Galvanized Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.
- D. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- E. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- F. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

- G. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.3 GRAB BARS

- A. Grab Bars; Stainless Steel Type: Provide grab bars with wall thickness not less than 18 gage (1.27 mm thick), concealed mounting with snap lock covers, satin finish, 1-1/2-inch (38.1 mm) clearance between wall surface and inside face of bar, outside diameter of 1-1/4 inches (32 mm).
1. Basis of Design Product: Bobrick Series B-5806, or equal, in dimensions and configurations as indicated on Contract Drawings..

2.4 MIRROR UNITS

- A. Stainless Steel Framed Mirror Units: Fabricate frame from 1/2 by 1/2 by 3/8 inch channel shapes with square corners mitered, welded, and ground smooth, from satin-finished stainless. Provide shock absorbing strips and perimeter frame and for full size of back, with galvanized steel back, concealed wall hanger and theft-proof fasteners. Bobrick B-165, or approved equivalent.
1. Sizes:
 - a. Toilet Rooms: As indicated on Drawings.
 - b. Room 166: 48"w x 36"h

2.5 SHOWER ACCESSORIES

- A. Shower Curtain Rod: Straight shower rod fabricated from Type 304 stainless steel tube, 1" diameter x .035" wall thickness (20 gauge), Finish – BS, Bright Stainless; provide Model Number CE100753 by Inpro or equal.
1. Flanges (2-Pack): Type 304 Stainless Steel exposed mount shower rod flange .031" thick. Includes two 3/16" (4.8mm) diameter mounting holes; provide Model CE100753-F (2 Pack) by Inpro or equal.
 2. Hooks: 2-1/2" high chrome rings for a 1" diameter rod; provide Model CE100766 by Inpro or equal.
- B. Shower Curtain: Curtain fabric shall be non-woven: 100% flame retardant polyester modified with molecular antimicrobial and liquid repellent technologies. Provide Shield by Panaz in color "Aloft/ River Water". Fabricate as follows:
1. Width: 36".
 2. Length: 72".
 3. Top Hem: Not less than 1 inch and not more than 1-1/2 inches wide, triple thickness, reinforced with integral web, and double stitched.
 - a. Grommets: 2-piece, rolled-edge, rustproof, nickel-plated brass and spaced not more than 6 inches o.c.

4. Bottom and Side Hems: Not less than 1 inch wide, reinforced, triple thickness, and single stitched.
5. Seams: Not less than 1/2 inch wide, double turned and double stitched.

2.6 OTHER WASHROOM ACCESSORIES

- A. All other washroom accessories indicated on Drawings shall be furnished by Owner. Install all Owner-furnished washroom accessories.

2.7 FABRICATION

- A. General: No names or labels are permitted on exposed faces of toilet and bath accessory units. On either interior surface not exposed to view or on back surface, provide identification of each accessory item either by a printed, waterproof label or a stamped nameplate indicating manufacturer's name and product number
- B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- C. Recessed Toilet Accessories, General: Except where otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors or access panels with full-length, stainless steel piano hinge. Provide anchorage that is fully concealed when unit is closed.
- D. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six (6) keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Secure mirrors to walls in tamperproof manner with special hangers, toggle bolts, or screws. Set units plumb, level, and square at locations indicated, according to manufacturer's written instructions for type of substrate involved.
- C. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446, and in compliance with ADA Regulations.
- D. Shower Curtain Rod: Surface-mount curtain track on wall surface by fastening flanges to blocking in wall using metal fasteners of type and at spacing recommended by manufacturer.

- E. Shower Curtain: Attach curtain to hangers just prior to Substantial Completion to ensure curtain is clean and undamaged at time of Owner's acceptance of work.

3.2 ADJUSTING AND CLEANING

- A. Adjust toilet accessories for unencumbered, smooth operation. Verify that mechanisms function smoothly. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations after removing temporary labels and protective coatings.

END OF SECTION 102800

SECTION 102900 - MEDICAL ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:

1. Medicine storage cabinet.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
1. Identify locations using room designations indicated on Contract Drawings.
 2. Identify products using designations indicated on Contract Drawings.
- C. Submit keys to cabinet with closeout submission.

1.3 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace cabinets that exhibit defects and that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Twelve (12) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LOCKING MEDICINE STORAGE CABINET

- A. Narcotics Cabinet: Provide heavy-duty, 20 gauge painted steel cabinet with one double locking door, having the following characteristics:
1. Two Shelves: One fixed and one adjustable and removable shelf with choice of four locations
 2. High security pick-resistant tubular lock with four keys. keys have unique lock sequences
 3. Full length stainless steel pinned non-removable door hinge.
 4. Predrilled holes in the back for mounting on a wall, cabinet or other solid surface (wall mounting hardware included).
 5. Dimensions of 29.5"H x 23.5"W x 10.5"D
 6. Powder coat paint finish in gloss beige.

7. Basis of Design Product: Narcotics Cabinet, Large, Standard Line, Single Door/Double Lock, #2830AQ by Harloff, or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Secure cabinet to walls in concealed, tamperproof manner with special hangers, toggle bolts, or screws. Set units plumb, level, and square at locations indicated, according to manufacturer's written instructions for type of substrate involved.

3.2 CLEANING

- A. Remove temporary labels and protective coatings.
- B. Clean exposed surfaces according to manufacturer's written recommendations after removing temporary labels and protective coatings.

END OF SECTION 102900

SECTION 105113 - METAL LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Wardrobe lockers, single tier, knocked-down type, including ADA compliant lockers.

1.2 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of locker.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work.
 - 1. Show locker fillers, trim, base, and accessories.
 - 2. Include locker-numbering sequence of lockers.
- C. Samples for Verification: For the following products, in manufacturer's standard sizes, showing the full range of color, texture, and pattern variations expected. Prepare Samples from the same material to be used for the Work.
 - 1. Lockers.

1.3 INFORMATIONAL SUBMITTALS

- A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals specified in Division 01.
- B. Qualification Data: For qualified Installer.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain locker units, benches and accessories through one source from a single manufacturer.
- C. Regulatory Requirements: Where metal lockers and benches are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" and ICC/ANSI A117.1

- D. Lockers shall be GREENGUARD Gold Certified by UL Environment through the GREENGUARD Certification Program.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver lockers until spaces to receive them are clean, dry, and ready for locker installation.
- B. Protect lockers from damage during delivery, handling, storage, and installation..

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Faulty operation of latches and other door hardware.
 - 2. Damage from deliberate destruction and vandalism is excluded.
 - 3. Warranty: Lifetime from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturer: Provide Basis of Design lockers by Lyon or equal lockers by one of the following:
 - 1. DeBourgh Manufacturing Co.
 - 2. List Industries, Inc.
 - 3. Penco

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 366/A 366M, matte finish, suitable for exposed applications, and stretcher leveled or roller leveled to stretcher-leveled flatness.
- B. Electrolytic Zinc-Coated Steel Sheet: ASTM A 591/A 591M, commercial quality, coating Class C; mill phosphatized; suitable for exposed applications; and stretcher leveled or roller leveled to stretcher-leveled flatness.
- C. Steel Tube: ASTM A 500, cold rolled
- D. Fasteners: Zinc- or nickel-plated steel, slotless-type exposed bolt heads, and self-locking nuts or lock washers for nuts on moving parts.

- E. Anchors: Material, type, and size required for secure anchorage to each substrate.

1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls, for corrosion resistance.
2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.3 LOCKER ROOM LOCKERS

- A. Reuse and reconfigure existing locker room lockers as indicated on Drawings. Provide miscellaneous parts including filler panels and end panels as required for a complete new configuration as indicated on Drawings.

2.4 WARDROBE LOCKERS

- A. Basis of Design Products: Provide single tier Standard Metal Lockers #C5022 by Lyon.
- B. Body: Locker body components shall be fabricated of 24 gauge cold rolled steel specially formed for added strength and rigidity and to ensure tight joints at fastening points.
- C. Frames: Fabricate from channel shape, not less than 16 gauge steel. Provide vertical door frame members with additional 3/8 inch (9.5 mm) flange as a continuous door strike.
- D. Doors: Fabricate doors from one piece 16 gauge sheet steel with full channel formation of adequate depth to fully conceal lock bar on lock side, channel formation on hinge side, right angle formations across top and bottom, with holes for attaching number plates.
 1. Wardrobe Lockers: Provide louvered doors in manufacturer's standard louver pattern.
- E. Door Jambs: Single tier lockers shall have three door jambs; double tier tier lockers shall have two jambs welded to side of door frames to engage locking device. Design and gauge of jamb shall prevent freeing of locking device by prying. Each jamb shall have easily replaceable soft rubber bumper.
- F. Hinges: Provide two inch high, 0.050" thick steel, five knuckle, double spun, full loop, tight pin hinges, projection welded to door frame and securely fastened to the door with steel rivets. Provide three hinges on single-tier locker doors over 48 inches high and two hinges on all other doors.
- G. Quiet Locking Device: Single tier locking device shall engage frame at three points; double tier at two points. Channel shaped locking device with full length reinforcing ribs shall be a quiet design utilizing nylon guide inserts to reduce metal-to-metal contact. The locking device shall include a latch finger that engages the 12-gauge door jamb. Lock bar shall be enclosed on three sides and operate within the channel formation of the door. Locking device shall be prelocking so mechanism can be locked in open position – door locking automatically when closed. Doors also to be provided with lock hole filler to permit use of a built-in lock.

- H. Die-Cast Handle: Provide recessed chrome-plated zinc alloy die-cast case and handle attached to latch bar concealed inside door and tamperproof. No moving parts are to operate against outside surface of locker. Padlock attachment to be integral part of lift, which shall be attached directly to locking bar and protected by fixed handle housing. Handle to provide built in padlock strike. The recessed handle shall be 4-1/8"w x 6-1/16"h x 1-1/4"d. Multiple tier lockers shall be equipped with a 16-gauge door pull with padlock attachment when not used with built in locks.
- I. Shelves: Single tier lockers shall have one shelf approximately 9" below top. Flanged on all four sides for strength with the front flange turned 45 degrees for safety and attached at no less than two points through each side flange. Only single tier lockers have shelves. Fabricate shelves in the following thicknesses.

- 1. Wardrobe Lockers: 24 gauge

- J. Sizes and Configurations: Single-tier wardrobe lockers 12" w x 18"d x 66"h.

2.5 LOCKS

- A. Fabricate lockers to receive the following locking devices:

- 1. Padlocks.

2.6 LOCKER ACCESSORIES

- A. Interior Equipment: Furnish each locker with the following items, unless otherwise indicated:

- 1. Hooks: Manufacturer's standard zinc-plated, ball-pointed steel. Provide one double-prong ceiling hook, and three single-prong wall hooks for single-, double-, and triple-tier units. Attach hooks with at least two fasteners.

- B. Number Plates: Manufacturer's standard etched, embossed, or stamped, aluminum number plates with numerals at least 3/8 inch (9 mm) high. Number lockers in sequence indicated. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.

- C. Filler Panels: Manufacturer's standard; fabricated from minimum 0.0478-inch- (1.20-mm-) thick steel sheet in an unequal leg angle shape, and finished to match lockers. Provide slip joint filler angle formed to receive filler panel.

- D. Finished End Panels: Finished to match lockers, and designed for concealing exposed ends of nonrecessed lockers.

- E. Legs: 6" high, manufacturer's standard construction. Provide closed front and end bases for legs. Provide foot anchors for lockers with legs.

2.7 FABRICATION

- A. Fabrication shall be on the unit principle, each locker with individual door and frame, individual top, bottom, back, and shelves, with common intermediate divisions separating compartments.
- B. Accessible Lockers: Fabricate as follows:
 - 1. Locate bottom shelf no lower than 15 inches (381 mm) above the floor.
 - 2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches (1219 mm) above the floor.

2.8 FINISHES, GENERAL

- A. Finish all steel surfaces and accessories, except prefinished stainless-steel and chrome-plated surfaces.
- B. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- D. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.9 STEEL SHEET FINISHES

- A. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond. Use manufacturer's standard methods.
- B. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard baked-enamel finish consisting of a thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 1.4 mils (0.036 mm) on doors, frames, and legs, and 1.1 mils (0.028 mm) elsewhere.
 - 1. Color and Gloss: Match existing lockers; Lyons X3 Blue Streak.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrate for suitable conditions where metal lockers are to be installed.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Assemble lockers in accordance with manufacturer's directions.
- B. Install metal lockers and accessories level, plumb, rigid, and flush according to manufacturer's written instructions.
- C. Anchor lockers to floors and walls at intervals recommended by manufacturer, but not more than 36 inches (910 mm) o.c. Install anchors through backup reinforcing plates where necessary to avoid metal distortion, using concealed fasteners.
- D. Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
- E. Attach boxed end panels with concealed fasteners to conceal exposed ends of nonrecessed lockers.
- F. Attach finished end panels with fasteners only at perimeter to conceal exposed ends of nonrecessed lockers.

3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.
- B. Clean interior and exposed exterior surfaces and polish stainless-steel and nonferrous-metal surfaces.
- C. Protect lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit locker use during construction.
- D. Touch up marred finishes, or replace locker units that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 105113

SECTION 105200 - FIRE-PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:

1. Portable fire extinguishers.
2. Fire-protection cabinets for portable fire extinguishers.
3. Fire-protection accessories.

1.2 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire-protection specialties.

1. Fire Extinguishers: Include rating and classification.
2. Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain fire extinguishers and cabinets through one source from a single manufacturer.
- B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Standard for Portable Fire Extinguishers."
- C. NYS Fire Code Compliance: Fabricate and label fire extinguishers to comply with New York State Fire Code.
- D. Fire Extinguishers: FM listed and labeled for type, rating, and classification specified.
- E. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements of ASTM E 814 for fire-resistance rating of walls where they are installed

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. J.L. Industries, Inc.

2. Kidde: Walter Kidde, The Fire Extinguisher Co.
3. Larsen's Manufacturing Company.
4. Potter-Roemer; Div. of Smith Industries, Inc.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: Carbon steel, complying with ASTM A 366/A 366M, commercial quality, stretcher leveled, temper rolled.
- B. Stainless-Steel Sheet: ASTM A 666, Type 304.

2.3 PORTABLE FIRE EXTINGUISHERS

- A. General: Provide fire extinguishers of type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
- B. Multipurpose Dry-Chemical Type: UL-rated 4-A:60-B:C, 10-lb (4.5-kg) nominal capacity, in enameled-steel container.
 1. Available Product: MP 10, Larsen's Manufacturing Company.

2.4 FIRE-PROTECTION CABINETS

- A. Basis-of-Design Product: Occult Series Model SS 2409, as manufactured by Larsen's Manufacturing Co., or an approved equivalent product by one of the following:
 1. JL Industries, Inc.
 2. Kidde Fyrnetics.
 3. Potter Roemer; Div. of Smith Industries, Inc.
- B. Cabinet Construction: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.
 1. Cabinet Material: Enameled-steel sheet.
 2. Recessed Cabinet: Cabinet box fully recessed in walls of depth indicated; with box flange overlapping surrounding wall surface and fully concealed by door when in closed position.
 3. Fire-Rated Cabinets: Listed and labeled to meet requirements of ASTM E 814 for fire-resistance rating of wall where it is installed.
 - a. Construct fire-rated cabinets with double walls fabricated from 0.0478 inch (1.2 mm) thick, cold-rolled steel sheet lined with minimum 5/8 inch (16 mm) thick, fire-barrier material.
 - b. Provide factory-drilled mounting holes.
- C. Cabinet Size: Suitable for specified fire extinguisher.

- D. Cabinet Style: Trimless, with concealed hinge and closed door completely covering cabinet flange.
- E. Door Construction: Fabricate doors according to manufacturer's standards, of materials indicated, and coordinated with cabinet types and trim styles selected.
 - 1. Door Material: Stainless steel sheet
 - 2. Door Style: Flush, solid panel.
 - 3. Door Hardware: Ensure hardware meets ADA requirements. Provide manufacturer's built-in cylinder lock system (*Larsen-Loc™*), or approved equivalent, and door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam-action latch, or exposed or concealed door pull and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 degrees.
 - 4. Lettering: Provide factory applied lettering that reads "IN CASE OF FIRE ONLY - PULL FIRMLY ON HANDLE."

2.5 ACCESSORIES

- A. Mounting Brackets: Manufacturer's standard steel, designed to secure extinguisher, of sizes required for types and capacities of extinguishers indicated, with plated or baked-enamel finish. Provide brackets for extinguishers not located in cabinets.
- B. Identification: Provide lettering to comply with authorities having jurisdiction for letter style, color, size, spacing, and location. Locate as indicated by Architect.
 - 1. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."
 - a. Location: Applied to cabinet door.
 - b. Application Process: Die cut.
 - c. Lettering Color and Style: As selected by Architect.
 - 2. Identify bracket-mounted extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to wall surface.

2.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond using manufacturer's standard methods.
- D. Steel Finishes: Manufacturer's standard baked-enamel paint in color selected by Architect for the interior of cabinet.

- E. Stainless Steel, No. 4 finish for door and frame.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for hose valves, hose racks, and cabinets to verify actual locations of piping connections before cabinet installation.
- B. Examine walls and partitions for suitable framing depth and blocking where recessed and semirecessed cabinets are to be installed.
- C. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged units.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing fire-protection specialties.
- B. Install in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
 - 1. Prepare recesses for cabinets as required by type and size of cabinet and trim style.
 - 2. Fasten mounting brackets to structure, square and plumb.
 - 3. Fasten cabinets to structure, square and plumb.

3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust cabinet doors that do not swing or operate freely.
- B. Refinish or replace cabinets and doors damaged during installation.
- C. Provide final protection and maintain conditions that ensure that cabinets and doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 105200

SECTION 105213 - AUTOMATED EXTERNAL DEFIBRILLATOR (AED) SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:

1. Cabinets for Automated External Defibrillator (AED) unit.

1.2 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for AED specialties.

1. Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain AED cabinets through one source from a single manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cold-Rolled Steel Sheet: Carbon steel, complying with ASTM A 366/A 366M, commercial quality, stretcher leveled, temper rolled.

2.2 AED CABINETS

- A. Basis-of-Design Product: 1400 Series AED Cabinet as manufactured by JL Industries, Inc. or an approved equivalent product by one of the following:

1. Allied Medical Products
2. Phillips Healthcare.
3. Physio-Control
4. ZOLL Medical.

- B. Cabinet Construction: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.

1. Cabinet Size: Suitable for any size AED unit.
2. Cabinet Style: Exposed one-piece trim and door frame.
3. Cabinet Material: Enameled-steel sheet.

4. Semi-Recessed Cabinet: Semi-recessed cabinet partially concealed in walls, with 2-1/2" or 3" rolled edge trim overlapping wall surface.
- C. Door Construction: Fabricate doors according to manufacturer's standards, of materials indicated, and coordinated with cabinet types and trim styles selected.
 1. Door Material: Enameled-steel sheet.
 2. Door Style: Full acrylic or tempered glass glazing with pull handle and AED graphics on door.
- D. Accessories: Provide the following:
 1. Audible alarm 85dba, powered by 9 volt battery. Provide with on/off switch
 2. Strobe light, powered by 9 volt battery, built-in to cabinet or mounted above cabinet as required by field conditions.

2.3 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond using manufacturer's standard methods.
- D. Steel Finishes: Manufacturer's standard baked-enamel paint in color selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where recessed and semirecessed cabinets are to be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing AED specialties.
- B. Install in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
 1. Prepare recesses for cabinets as required by type and size of cabinet and trim style.
 2. Fasten cabinets to structure, square and plumb.

3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust cabinet doors that do not swing or operate freely.
- B. Refinish or replace cabinets and doors damaged during installation.
- C. Provide final protection and maintain conditions that ensure that cabinets and doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 105213

SECTION 105316 - CANOPIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Fixed metal canopies, flat and arched configurations

B. Related Sections include the following:

1. Division 05 Section "Metal Fabrications" for blocking, shims, reinforcing, and supplemental support members for connecting to canopy frame and anchorage.
2. Division 06 Section "Miscellaneous Carpentry" for blocking, nailers, shims, reinforcing, framing, and furring for connecting to canopy frame and anchorage.

1.2 PERFORMANCE REQUIREMENTS

A. General: Design, fabricate, and install canopies to withstand loads from gravity, wind, snow, ponding, drift and structural movement, including thermally induced movement; and to resist, without failure, other conditions of in-service use, including exposure to weather.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal canopies.

C. Structural Performance: Provide canopies capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Wind Loads: Determine loads based on the minimum design wind pressures indicated on drawings.
2. Snow Loads: Determine loads based on the minimum design snow loads indicated on drawings.

D. Thermal Movements: Provide canopies that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, tearing of fabric, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

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

1.3 ACTION SUBMITTALS

- A. Product Data: Include styles, material descriptions, construction details, fabrication details, dimensions of individual components and profiles, mounting accessories, features, and finishes for canopies.
- B. Shop Drawings: Show location and extent of canopies. Include elevations, sections, and details not shown in Product Data. Show materials, fabrication, dimensions, mounting heights, connections, anchorages, installation details, attachments to other work, operational clearances, and relationship to adjoining work.
 - 1. Show locations for blocking, reinforcement, and supplementary structural support to be provided by others.
 - 2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Calculate requirements for supporting canopies. Verify capacity of members and connections to support loads and verify loads, point reactions, and locations for attachment of canopies to structure with those indicated on Drawings.
- C. Samples for Initial Selection: For each colored or finished component of each type of canopy indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Qualification Data: For Installer, fabricator and professional engineer.
- C. Research/Evaluation Reports: For anchors and fasteners.
- D. Maintenance Data: For canopies to include in maintenance manuals.
- E. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 - 1. Fabricator's responsibilities include fabricating and installing canopies and providing professional engineering services needed to assume engineering responsibility.
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of metal canopies that are similar to those indicated for this Project in material, design, and extent.
- C. Source Limitations: Obtain canopies through one source from a single manufacturer.

- D. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code--Steel."
 - 2. AWS D1.2, "Structural Welding Code--Aluminum."
- E. Regulatory Requirements: Provide canopies complying with or exceeding requirements of Building Code of New York State.

1.6 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of canopies in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Where canopy installation is indicated to fit to other work, verify dimensions of other work by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for fenestration operation throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 COORDINATION

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

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer and fabricator agree to repair or replace components of canopies that fail in materials or workmanship within specified warranty period.
 - 1. 20 year warranty.

PART 2 - PRODUCTS

2.1 SOLID METAL CANOPY

- A. Solid Metal Canopy Above New Wisner Avenue Entrance (Area C, existing facade): Fabricate from aluminum decking and frame, and as follows:
 - 1. Framing and fascia shall be extruded aluminum, alloy 6063-T6, in profile and thickness as indicated on drawings and as required for design loading conditions.
 - 2. Decking shall be 0.078" thick square corrugated aluminum decking 2-3/4" deep
 - 3. Supports shall be hanger rods type.
 - 4. Fascia shall be .125" thick, in 8" smooth face style.

5. Finish shall be 2-coat Kynar in color selected by Architect from all available choices.
 6. Size: 3' deep by 8' wide
 7. Basis-of-Design Product: Mapes Super Lumideck by Mapes Industries, Inc., or equal.
- B. Solid Metal Canopy Above Cafeteria Addition (Area B, East facade): Fabricate from aluminum decking and frame, and as follows:
1. Framing and fascia shall be extruded aluminum, alloy 6063-T6, in profile and thickness as indicated on drawings and as required for design loading conditions.
 2. Decking shall be 0.078" thick square corrugated aluminum decking 2-3/4" deep
 3. Supports shall be hanger rods type.
 4. Fascia shall be .125" thick, in 12" smooth face style.
 5. Finish shall be 2-coat Kynar in color selected by Architect from all available choices.
 6. Size: 4' deep by 18' wide
 7. Basis-of-Design Product: Mapes Super Lumideck by Mapes Industries, Inc., or equal.
- C. Solid Metal Canopy Above Classroom Addition Main Entrance (Area A, East facade): Fabricate from aluminum decking and frame, and as follows:
1. Framing and fascia shall be extruded aluminum, alloy 6063-T6, in profile and thickness as indicated on drawings and as required for design loading conditions.
 2. Decking shall be 0.078" thick square corrugated aluminum decking 2-3/4" deep
 3. Supports shall be hanger rods type.
 4. Fascia shall be .125" thick, in 12" smooth face style.
 5. Finish shall be 2-coat Kynar in color selected by Architect from all available choices.
 6. Size: 3' deep by 13'-4" wide
 7. Basis-of-Design Product: Custom Arched Canopy by Mapes Industries, Inc., or equal.
- D. Canopies shall be fabricated in the shop and shipped in a knocked-down condition for field assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for supporting members, blocking, inserts, installation tolerances, and other conditions affecting performance.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Install canopies at locations and in position indicated, securely connected to supports, free of rack, and in proper relation to adjacent construction. Use mounting

methods of types described and in compliance with Shop Drawings and fabricator's written instructions.

B. Site Assembly:

1. All connections shall be mechanically assembled utilizing 3/16 fasteners with a minimum shear stress of 350 lb. Pre-welded or factory-welded connections are not acceptable.
2. Decking shall be designed with interlocking extruded aluminum members with mechanical fasteners field applied to provide structural integrity.
3. Concealed drainage. Water shall drain from covered surfaces into intermediate trough and be directed to downspout from rear gutter

C. Install canopies after other finishing operations, including joint sealing and painting, have been completed.

D. Anchoring to In-Place Construction: Use anchors, fasteners, fittings, hardware, and installation accessories where necessary for securing canopies to structural support and for properly transferring load to in-place construction.

E. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

F. Coordinate canopy installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed exterior wall and roof assemblies.

3.3 CLEANING AND PROTECTION

A. Clean canopy surfaces after installation, according to manufacturer's written instructions.

B. Touchup Painting: Immediately after erection, clean field welds, connections, and abraded areas. Paint uncoated and abraded areas with same or compatible material as used for shop-applied finish painting.

1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that canopies are without damage or deterioration at time of Substantial Completion.

D. Replace damaged canopies that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 105316

SECTION 111300 - LOADING DOCK EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:

1. Dock bumpers.

1.2 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, rated capacities, operating characteristics, furnished specialties, accessories, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, details, and attachments to other work.

1.3 QUALITY ASSURANCE.

- A. Source Limitations: Obtain each type of loading dock equipment through one source from a single manufacturer.

1.4 COORDINATION

- A. Coordinate installation of anchorages for loading dock equipment. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation..

1.5 WARRANTY

- A. Special Warranty: Submit a written warranty executed by the loading dock equipment manufacturer agreeing to repair or replace products that fail in materials or workmanship within the specified warranty period.

1. Warranty Period: 1 year from date of Substantial Completion

PART 2 - PRODUCTS

2.1 DOCK BUMPERS

- A. Laminated-Tread Bumpers: Fabricated from multiple, uniformly thick plies cut from fabric-reinforced rubber tires. Laminate plies under pressure on not less than two 3/4-inch-diameter, steel supporting rods that are welded at one end to 1/4-inch- thick,

structural-steel end angle and secured with a nut and angle at the other end. Fabricate angles with 13/16" predrilled anchor holes for bolting to substrate surface.

1. Size: 24"w x 4-1/2"d x 10"h.
 2. Basis-of-Design Product: Global Industrial Dock Bumper Model #988028 by Global Industries or equal products by one of the following:
 - a. Durable Corporation
 - b. Grainger Industries
- B. Anchorage Devices: Hot-dip galvanized steel anchor bolts, nuts, washers, bolts, sleeves, cast-in-place plates, and other anchorage devices as required to fasten bumpers securely in place and to suit installation type indicated.

2.2 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish loading dock equipment after assembly and testing.
- C. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
1. ASTM A 123/A 123M for iron and steel loading dock equipment.
 2. ASTM A 153/A 153M for iron and steel hardware for loading dock equipment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of loading dock equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate size and location of loading dock equipment indicated to be attached to or recessed into concrete or masonry, and furnish anchoring devices with templates, diagrams, and instructions for their installation.

3.3 INSTALLATION

- A. Dock Bumpers: Attach dock bumpers to face of loading dock in a manner that complies with requirements indicated for spacing, arrangement, and position relative to top of platform and anchorage.

1. Bolted Attachment: Attach dock bumpers to preset anchor bolts embedded in concrete or to cast-in-place inserts or threaded studs welded to embedded-steel plates or angles. If preset anchor bolts, cast-in-place inserts, or threaded studs welded to embedded-steel plates or angles are not provided, attach dock bumpers by drilling and anchoring with expansion anchors and bolts.

B. ADJUSTING AND CLEANING

- C. Restore marred, abraded surfaces to their original condition. .

END OF SECTION 111300

SECTION 113100 - RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Refrigerator
 - 2. Microwave
- B. Refer to attached Appliance Schedule for amounts required and locations.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include operating characteristics, dimensions of individual appliances, and finishes for each appliance.
- B. Appliance Schedule: For appliances; use same designations indicated on Drawings.
- C. Manufacturer Certificates: Signed by manufacturers certifying that products comply with requirements.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for each product.
- E. Research/Evaluation Reports: For each product.
- F. Maintenance Data: For each product to include in maintenance manuals.
- G. Warranties: Special warranties specified in this Section.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain residential appliances through one source.
 - 1. Provide products from same manufacturer for each type of appliance required.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for product's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

D. Regulatory Requirements: Comply with provisions of the following product certifications:

1. NFPA: Provide electrical appliances listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
2. UL and NEMA: Provide electrical components required as part of residential appliances that are listed and labeled by UL and that comply with applicable NEMA standards.
3. ANSI: Provide gas-burning appliances that comply with ANSI Z21 Series standards.
4. NAECA: Provide residential appliances that comply with NAECA standards

E. Regulatory Requirements, Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with ANSI A117.1 - 2017 regulations.

1. Operable Parts: Provide controls with forward reach no higher than 48 inches (1219 mm) above the floor, horizontal front reach no more than 25 inches (635 mm), horizontal side reach no more than 24 inches (610 mm), and that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
2. Refrigerator/Freezer: Provide 50 percent of freezer space within 54 inches (1370 mm) of the floor.

F. Energy Ratings: Provide residential appliances that carry labels indicating energy-cost analysis (estimated annual operating costs) and efficiency information as required by the FTC Appliance Labeling Rule.

1. Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.

G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.

1.4 WARRANTY

A. Special Warranties: Manufacturer's standard form in which manufacturer of each appliance specified agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.

1. Refrigerator: One year parts and labor.
2. Microwave: One year parts and labor; five years magnetron tube.

PART 2 - PRODUCTS

2.1 APPLIANCES

A. Microwave: 1.1 cu. ft. countertop microwave oven 800 watts.

1. Color: Stainless steel
2. Power Levels: 10
3. Control Type: Electronic touch
4. Display: Electronic digital display with clock.
5. Turntable: Glass
6. Turntable Size: 10-5/8 inches
7. Control Features: Sensor cooking controls, inverter defrost technology
8. Unit Dimensions: 12-1/8" h x 12-7/8" d x 24"w
9. Basis of Design Product: GE #PEM31SFSS or equal.
10. Location/Quantity Required: Refer to attached Appliance Schedule.

B. Refrigerators: Energy Star 21.9 cu. ft. capacity, top-freezer refrigerator.

1. Color: White.
2. Configuration: Freestanding, top-freezer refrigerator with textured rounded doors.
3. Defrost Type: Frost free.
4. Temperature Management: Air tower in freezer
5. Control Type: Upfront temperature controls.
6. Dispenser: No dispenser
7. Icemaker: Factory installed icemaker IM4D
8. Refrigerator Shelves and Freezer Floor: Spill proof.
9. Freezer Shelves: One
10. Freezer Door Shelves: Two.
11. Refrigerator Shelves: Three
12. Refrigerator Drawers: Three
13. Case Dimensions: 66-3/8"h x 34-1/2"d x 32-3/4"w
14. Basis of Design Product: GE #GTE22JTNRWW, or equal.
15. Location/Quantity Required: Refer to attached Appliance Schedule

C. Refrigerators: Energy Star 16.6 cu. ft. capacity, top-freezer refrigerator.

1. Color: White.
2. Configuration: Freestanding, top-freezer refrigerator with textured rounded doors.
3. Defrost Type: Frost free.
4. Temperature Management: Air tower in freezer
5. Control Type: Upfront temperature controls.
6. Dispenser: No dispenser
7. Icemaker: Factory installed icemaker IM4D
8. Refrigerator Shelves and Freezer Floor: Spill proof.
9. Freezer Shelves: One
10. Freezer Door Shelves: Two.
11. Refrigerator Shelves: Three
12. Refrigerator Drawers: Three
13. Case Dimensions: 64-3/4"h x 32-5/8"d x 28"w
14. Basis of Design Product: GE #GTS17DTNRWW, or equal
15. Location/Quantity Required: Refer to attached Appliance Schedule.

D. Undercounter Refrigerators: Built-in Type, ADA Compliant.

1. Color: Stainless steel.
2. Defrost Type: Frost free
3. Refrigerator Shelves: Three
4. Refrigerator Door Shelves: Two
5. Case Dimensions: 32"h x 22.63"d x 23.63"w
6. Basis of Design Product: Summit AL54, or equal..
7. Location/Quantity Required: Refer to attached Appliance Schedule.

2.2 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Color-Coated and Stainless-Steel Finish: Provide appliances with manufacturer's standard finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, color, gloss, and minimum dry film thickness for painted finishes or ground and polished stainless-steel surfaces for uniform, directionally textured finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before equipment installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Comply with manufacturer's written instructions.
- B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.
- C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.
- D. Utilities: Refer to Divisions 22 and 26 for plumbing and electrical requirements.

3.3 CLEANING AND PROTECTION

- A. Test each item of residential appliances to verify proper operation. Make necessary adjustments.
- B. Verify that accessories required have been furnished and installed.
- C. Remove packing material from residential appliances and leave units in clean condition, ready for operation.

END OF SECTION 113100

SED No. 44-10-00-01-0-001-041 Additions and Alterations

ITEM	QTY.	DESCRIPTION	LOCATION
Microwave	3	GE PROFILE 1.1 CU. FT. MICROWAVE OVEN#PEM31SFSS	Faculty 107,G70H
	2	GE PROFILE 1.1 CU. FT. MICROWAVE OVEN#PEM31SFSS	Faculty 217,316
Refrigerator			
Full size	2	GE 21.9 CUFT Energy Star,ADA compliant Model #GTE22JTNRWW with icemaker IM4D	Faculty 107,G70H
	4	GE 16.6 CUFT Energy star, ADA Compliant Model # GTS17DTNRWW with icemaker# IM4d	Nurse 109, Faculty -217,316, Science 237.
Undercounter	1	Summit 24" ADA Compliant Refrigerator # AL54	Copy 105C

SECTION 11 40 00 - FOOD SERVICE EQUIPMENT

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this Section shall conform to the requirements of the Contract Documents including drawings and general provisions of the Contract, General and Supplementary Conditions and Division 01 Specification Sections.

1.2 BIDS

- A. Unless otherwise noted, Kitchen Equipment Contractor (KEC) is a sub-contractor to the General Contractor (GC) and is to provide and install all items listed in this section and as detailed on food service drawings.
- B. Any denotation to specific trade responsibility (ie: Kitchen Equipment Contractor (KEC), Electrical Contractor (EC), Plumbing Contractor (PC), etc.) mentioned shall fall under the scope of the General Contractor (GC). The GC is responsible to hire all necessary sub-contractors.
- C. Raymond/ Raymond Associates is herein identified as the Food Service Consultant.
- D. Bids must be based on equipment of manufacturers specified; no substitution will be accepted after award of Contract.
- E. Substitutions: When a product or material is specified by name and or model number, as noted in these specifications, such specifications establishes the standard type and quality considered most satisfactory for the particular purpose in the building. The bid proposal therefore should be based thereon, so that all bidders bid under the same conditions. Another product or material of the same type that meets the requirements may be submitted for consideration as a substitute only under the following conditions:
 - 1. Requests for substitution must be submitted in writing at least ten (10) days before the date set for the receipt of bids for review and approval by the design professional. If the substitution is found to be equivalent, all bidders will be notified prior to the receipt of bids.
 - 2. In providing substitution requests, the bidder must prove equivalence of the substitution and furnish detailed specifications and catalog cuts or drawings. Failure to identify exceptions or deviations from equipment specified must be interpreted to indicate that the product offered complies with the specification in every respect.
- F. Owner, Architect and Food Service Consultant reserves right to waive any informality, or reject any or all bids and any parts thereof, or to accept that bid as a whole or part that in his judgment is for the best interest of Owner. All bids to have

on Contractor's letterhead itemized cost of each item of equipment, otherwise bid will be rejected.

- G. Custom fabrication, millwork, equipment, etc. must be built by a company continually in business for at least a 5-year period.
- H. Contract documents convey a method of construction for custom fabrication; however this may or may not be the appropriate method based on selected fabricators industry knowledge and standards. It will be the responsibility of the selected fabricator to interpret and apply appropriate methods of construction for full functionality of custom fabrication.

1.3 WORK INCLUDED

- A. KEC shall coordinate with other trades or sub-contractors in order that whole installation may result in the highest grade possible.
- B. KEC shall provide and install only such valves, traps, faucets, shut-offs, reducing pressure valves, relief valves and other specialty items required within equipment and as hereinafter specified.
- C. KEC shall make all necessary cut-outs and knock-outs where required on equipment to accommodate electrical receptacles, switches or other electrical outlets and equipment, together with such cut-outs as required for passage of gas or plumbing piping, etc.
- D. KEC shall stack and remove rubbish waste material, crating, etc., resulting from work and keep the premises clean at all times. Upon completion of the installation, thoroughly and finally clean all equipment ready for use.

1.4 POWER AVAILABLE

- A. Electric Voltage: 120/208/480 volt, 60 cycle, 1 & 3 ph.
- B. Water Pressure: Typical Food Service Equipment range 25 to 90 PSI, if required, pressure reducing valves provided by Plumbing Contractor.
- C. Water Temperature(s):
 - 1. 110°-120° Fahrenheit max at hand washing sinks, work sinks and preparation sinks.
 - 2. 120°-140° Fahrenheit max at 3-compartment pot sink, dishwashers and hose reel assembly.
 - 3. 110°-120° Fahrenheit max at cooking equipment with faucet assembly.
- D. Gas Pressure: Typical Food Service Equipment range 5" W.C. to 10" W.C., if required, a gas pressure reducing valve at main feed, prior to equipment connection, to be provided by Plumbing Contractor.

1.5 GENERAL CHARACTERISTICS OF EQUIPMENT

A. Electrically Operated

1. Electrically operated equipment to be listed by Underwriters Labs., Inc.
2. Motors: Up to and including 3/4 horsepower, shall be 120/60/1.
3. Motors: Over 3/4 horsepower, 208/60/3, unless otherwise indicated.
4. Ranges, food warmers, etc., over 2.0 kW, 208/60/1 or 208/60/3, unless otherwise indicated.
5. Electrically heated equipment, etc., 2.0 kW and under, 120/60/1.
6. 1 ph. electrical plug-in units with 3 wire cords; 3 wire cap.
7. 3 ph. electrical plug-in units with 4 wire cords; 4 wire cap.
8. Motor driven equipment: equipped with starting switch.
9. Motors: equipped with overload protection.
10. Wiring on fixtures, including operating switches and pilots, furnished by Kitchen Equipment Contractor.

B. Submit in writing to Architect and Food Service Consultant for approval, schedule showing proposed electrical characteristics of each piece of equipment and disconnect means provided.

C. Punch holes for, and install hood and walk-in cooler/freezer lights and concealed conduits. The interconnection of same, including control switch, wiring, inter-wiring between sections, etc., by Electrical Contractor.

1.6 WORK EXCLUDED FROM THIS DIVISION

A. The following work is to be performed by other trades or sub-contractors and is not the responsibility of the Kitchen Equipment Contractor. The GC is responsible to hire all necessary sub-contractors.

1. Electrical Contractor
 - a. Make connections to all food service equipment as shown.
 - b. Furnish disconnect switches.
 - c. Interconnecting of all exhaust hood lights, switches, control packages, interfaces, etc. including inter-wiring between sections of exhaust hoods.

- d. Interconnecting of control switches as required on equipment shown, and all other components which come as part of any equipment shown on plan.
- e. Interconnecting of any equipment, including, but not limited to, walk-in coolers/ freezers monitoring, exhaust hood monitoring and/ or fire protection monitoring with building management systems.
- f. Review all manufacturer approved installation methods/ diagrams and comply for proper installation of equipment being furnished.

2. Plumbing Contractor

- a. Make hot and cold water, waste and gas connections to all kitchen equipment shown, furnishing all necessary shut-offs, traps, backflow preventers, vacuum breakers, grease traps, drain line runs, etc.
- b. Install all faucets, pot fillers, filters and pressure regulators as furnished by Kitchen Equipment Contractor.
- c. Interconnecting of any and all other components that come as part of any other equipment shown.
- d. Provide floor drains and floor sinks where shown and indirect piping to floor drains and floor sinks as indicated on drawings.
- e. Review all manufacturer approved installation methods/ diagrams and comply for proper installation of equipment being furnished.

3. Ventilation Contractor

- a. Furnish size, shape and location of vent collars for exhaust hood and make connections to these collars.

4. General Contractor

- a. Provide and/or coordinate all work to the floors, walls and ceilings of the space.
- b. Provide wall blocking where required and as indicated on food service drawings.

1.7 SUB-CONTRACTORS TO KITCHEN EQUIPMENT CONTRACTOR

- A. Fire Protection Contractor for the wet chemical protection system within exhaust hood systems only and Refrigeration Contractor for the remote refrigeration packages for walk-in coolers/ freezers, rack systems, etc. are typical sub-contractors to the Kitchen Equipment Contractor.

- B. KEC to provide the name and addresses of all sub-contractors furnished to Architect/Owner and Food Service Consultant at time of submitting shop drawings. Selection of sub-contractors must be approved by them; and if in their judgment any fail to prosecute work in strict accordance with drawings and contract, after due notice from Owner or his agent, shall discharge same, but this in no way releases Kitchen Equipment Contractor from his obligations and responsibility under the contract.
- C. Every sub-contractor bound by terms and provisions of the contract so far as applicable to his work. Nothing contained herein shall create any contractual relations between any sub-contractor and Owner.
- D. Kitchen Equipment Contractor fully responsible to Owner for acts and omissions of his/ her sub-contractors.

1.8 SHOP DRAWINGS, ETC.

- A. Immediately upon award of Contract and within 4 weeks, submit to Architect/Owner and Food Service Consultant, drawings for approval. Submit 1/4" scale rough-in drawings showing locations of plumbing and electrical connections with all requirements indicated at point of connection; use of a legend or numbered connection plan will be cause for drawing rejection. Prior to fabrication, submit to Architect for approval 1/2" scale shop drawings showing plan, elevations and isometric views covering all items of work. Drawings to show dimensions and details of construction, installation and relations to adjoining and related work where same requires cutting or close fitting. Show reinforcement, anchorage, etc., required for complete installation. After correction and approval of above, submit sets for record, then afterwards as many additional copies as required by client.
- B. Submit in same manner as above, drawings showing masonry bases, depressed floors, positions of walls, requirements for ceiling hangers, wall blocking, and any other special conditions necessary for complete and correct correlation of various trades for satisfactory installation of all equipment shown on drawings.
- C. Manufacturer's names, cuts, descriptive data, analysis of tests, rated capacities and other information necessary for approval of standard manufactured articles and equipment furnished to Architect/Owner and Food Service Consultant for approval before ordering or purchasing. This submission made in same manner as above. All cuts marked with item number, mechanical characteristics, accessories furnished and bound in folders.

1.9 GENERAL

- A. No machine or equipment acceptable from any manufacturer not having had equipment of approximately the same type and design as that specified operating successfully for at least 5 years. Machines installed for test purposes shall not come within the category of successful commercial operation.

- B. Architect/Owner and/or Food Service Consultant privileged to inspect material and fabrication at Kitchen Equipment Contractor's or its sub-contractors factory at any time.
- C. Before proceeding with shop work, Kitchen Equipment Contractor to verify all measurements at premises. Where required dimensions are not immediately obtainable and delay in waiting for these dimensions would cause work to be seriously delayed, the matter shall be referred to Architect for a decision. In obtaining measurements, Kitchen Equipment Contractor shall consider work requirements of other trades and equipment designed and fabricated to provide necessary clearance for surrounding and adjoining work.
- D. Kitchen Equipment Contractor responsible for making any and all necessary adjustments to complete his work in a workmanlike manner, as approved by Architect/Owner.
- E. Dimensions as indicated on drawings and specifications are approximate, and are to be adjusted if and where necessary to suit job conditions and field measurements.
- F. Tops of tables, shelves, tops and exterior panels of cabinets, counters, doors, drainboards, etc., to be constructed of a single sheet of metal. Where size of equipment requires more than 1 sheet of metal, sheets butt joined with joints continuously welded full length. No joints less than 18" from an edge or end of a piece of equipment. In addition, all joints shall have battens or stiffeners welded to jointed material, ground smooth and polished.
- G. Appliances of rigid construction free from objectionable vibration and quiet in operation.
- H. Electrical heating elements shall conform to latest standards of National Electrical Manufacturer's Association and Underwriters Labs., Inc., where applicable standards have been set up by such agencies.
- I. Motors of ample power to operate machines for which designated under full load operating conditions without exceeding nameplate ratings. Horsepower requirements on driven equipment determined by manufacturer, based on normal operation of maximum capacity.
- J. Motors drip-proof, splash-proof or totally enclosed type, having two-hour duty cycle and ball bearings (except small timing motors which may have sleeve bearings). All motors shall have windings impregnated to resist moisture. Motors located where adjacent to deposits of dust, lint, etc., totally enclosed type.
- K. It is the responsibility of the Kitchen Equipment Contractor to supply and mount all electrical outlets, switches, controls, etc. within table/counter back splashes, aprons, panels, etc. and to provide stainless steel cover plates as required. Furthermore, it is the responsibility of the Electrical Contractor, in coordination with the Kitchen Equipment Contractor, to make final interconnections within

table/counter interior to junction boxes, outlets, switches, controls, etc. for equipment indicated.

1.10 STAINLESS STEEL (S.S.)

- A. Where S.S. is specified, it shall be Type 304, nickel bearing iron alloy, containing approximately 17.0% to 19% chromium, 8% to 10% nickel, not more than 0.2% carbon, and not more than 2.0% of other alloying elements; designed being austenitic (non-magnetic).
- B. S.S. free from scale with all surfaces polished to a high commercial finish. All welding and exposed welds hereinafter specified, must be ground down and polished smooth to a #4 finish so that no evidence of welding will appear. Unexposed welds on underside of counter or tables ground smooth and treated with an acid solution to remove weld discoloration and oxidization and to arrest corrosion.
- C. Undersides of all counters, work tables, sinks, drain boards, etc., after fabrication, to have one (1) heavy coat of sound deadening material applied as allowed by local codes.
- D. Gauges for sheet iron and sheet metal, U.S. Standard.
- E. Rivets, welds, bolts, screws, nuts and washers to be steel except where brass or S.S. is fastened, in which case they shall be brass or S.S., respectively. Where dissimilar metals are fastened, welds, bolts, rivets, screws, nuts and washers, highest grade metal. Spacing and extent of welds, rivets, bolts and screws such as to insure suitable fastening and prevent bulging of metals fastened.

1.11 SANITATION

- A. All custom built equipment constructed in accordance with standard No. 2, 4 & 7 of National Sanitation Foundation Testing Laboratory, manufactured by a company approved by N.S.F. and carry their stamp of approval. Kitchen Equipment Contractor must have "Registered" numbered seal of N.S.F. approval.

1.12 OPERATING INSTRUCTIONS

- A. Kitchen Equipment Contractor shall leave all items of equipment in good, operating condition and furnish the services of a "qualified" competent manufacturer's representative to instruct Owner's employees in proper use and care of equipment. Representative on call for as long a period as is necessary to assure Owner that such instruction is thoroughly understood.
- B. Kitchen Equipment Contractor shall be responsible for scheduling of equipment demonstrations and/or training and shall provide a detailed list of expected dates, times and manufacturer's representative to be present (in attendance) for each piece of equipment.

- C. Kitchen Equipment Contractor or his qualified manufacturer's representative, thereafter, shall make all necessary calls during warranty period.

1.13 SAMPLES

- A. After Award of Contract, when requested, Kitchen Equipment Contractor shall supply Architect with samples of fabricated equipment, such as corner of table with a rolled or inverted "V" edge, corner of dish table, overshef, drawer assembly, table leg with foot and gusset, or as specifically requested.

1.14 GUARANTEE

- A. Kitchen Equipment Contractor shall guarantee, as part of the bid and/or contract, workmanship, material and equipment for a period of 1 year from date of equipment final install and project turnover to Owner, and shall remedy any defect due to faulty workmanship or materials which may appear within guarantee period.
- B. Manufacturer's operation and maintenance manuals on equipment, etc., turned over to the Owner in duplicate, bound in a folder and marked accordingly.

1.15 EQUIPMENT CONSTRUCTION AND STANDARDS

- A. Where initials S.S. are used, they refer to "stainless steel;" C.P. refers to "chrome plated;" N.I.C. refers to "not in contract;" G.I. refers to "galvanized iron;" F.D. refers to "floor drain", and F.S. refers to "floor sink."

1.16 WASTES AND OVERFLOWS

- A. Sinks to have the following waste and overflow assemblies:
 - 1. For 1-1/2" NPT: Fisher model 74043 or approved alternate. Lever handle waste outlet with overflow assembly, 3-1/2" sink opening, self-centering stainless steel face flange with flat strainer, 12 gpm max flow rate, stainless steel lever handle with ball, overflow head with stainless steel faceplate and chrome plated cast red brass drain body.
 - 2. For 2" NPT: Fisher model 74043 or approved alternate. Lever handle waste outlet with overflow assembly, 3-1/2" sink opening, self-centering stainless steel face flange with flat strainer, 12 gpm max flow rate, stainless steel lever handle with ball, overflow head with stainless steel faceplate and chrome plated cast red brass drain body.

1.17 WATER INLET LOCATION

- A. Located in all cases above the positive water level to prevent siphoning of liquid into water system. Wherever conditions require water inlet below such level, a suitable type of vacuum breaker shall be placed on fixture and form part of same to prevent such siphoning.

- B. All faucets furnished by Kitchen Equipment Contractor as specified. Traps furnished by Plumbing Contractor.

1.18 PITCH AND DRAINAGE

- A. Wherever a fixture is used with waste or drain outlet, surface shall have distinct pitch towards outlet. Drainboards and tables that contain or adjoin sinks shall have a definite pitch towards sinks. Where necessary, surfaces creased and grooved to give a definite pitch.

1.19 SINKS

- A. #14 gauge S.S. interior corners rounded to 1" radius horizontally and vertically, forming a cove in bottom. All joints butt edged. Sink sizes given, inside measurements.
- B. Bottom of each compartment creased to center and fitted with a rotary drain as described in section 1.16, hereinbefore specified. Waste lever not to protrude beyond body of sink. Sinks to have overflows installed by Kitchen Equipment Contractor.
- C. Overflow to consist of 1-1/2" chrome plated brass strainer plate, fitted in back of each compartment at proper level directly connected to waste outlet with 1-1/2" chrome plated brass pipe.
- D. Back of sink extended integrally approximately 12" above working level, back 2-1/4" on 45° angle towards rear and then flanged down 1" and punched to accommodate faucets.
- E. Front and both ends, unless otherwise specified and shown, finished on top edge, 3" above working level, with 1-1/2" diameter, 180° welded integral roll. Exterior corners rounded to a 2-1/2" radius, all integrally welded.
- F. Sinks and drainboards finished on front and back edges only and left with straight edge on ends, so that drainboards may be welded thereto, forming integral units with top edge of rolled rim curbing formed on one horizontal plane across front to unit though surfaces of drainboards pitched to sinks.
- G. Multiple compartment sinks divided with double wall #14 gauge S.S. partitions, all corners rounded same as corners in sinks, continuously welded in place.
- H. Back, bottom and front of one continuous piece with no overlapping joints or open spaces between compartments.

1.20 SINK BOWL BUILT INTO TABLE TOP

- A. Sink constructed integral with table top #14 gauge S.S. having all interior corners coved vertically and horizontally forming a cove in bottom. To have overflow, lever waste outlet, etc..., as hereinbefore specified for sinks in spec section 1.19.

- B. All joints butt edged and welded, ground and polished, so that no evidence of welding will appear. All sink sizes inside measurements. Table top where shown, punched to receive deck type combination faucets, provided by Kitchen Equipment Contractor.

1.21 FAUCET AND BASKET DRAIN ASSEMBLY

- A. Sinks to have the following faucet assemblies:

- 1. 3-Compartment Sink, Potwash:

- a. 1 ea. Fisher model 74306 or approved alternate. Pre-Rinse assembly with 1.3 gpm flow rate or less, splash/ wall mount, 8" centers, add-on faucet 12" stainless steel tubular swing spout with 4" wrist blade handles, 36" flexible gooseneck hose with spray head, stainless steel spring with wall bracket, compression valves, 1/2" NPT female inlets, ADA compliant, NO LEAD and NSF approved. Deck mount assembly model 75485.
- b. 1 ea. Fisher model 60798 or approved alternate. Faucet with 2.2 gpm flow rate or less, splash/ wall mount with 4" wrist blade handles, 8" centers, 12" stainless steel tubular swing spout, compression valves, 1/2" NPT female inlets, ADA compliant, NO LEAD and NSF approved. Deck mount assembly model 57665.

- 2. 2-Compartment Sink, Preparation:

- a. 1 ea. Fisher model 57665 or approved alternate. Faucet with 2.2 gpm flow rate or less, deck mount with 4" wrist blade handles, 8" centers, 12" stainless steel tubular swing spout, compression valves, 1/2" NPT female inlets, ADA compliant, NO LEAD and NSF approved. Splash/ wall mount assembly model 60798.

- 3. Work Sink (Built-in, Welded-In):

- a. 1 ea. Fisher model 57665 or approved alternate. Faucet with 2.2 gpm flow rate or less, deck mount with 4" wrist blade handles, 8" centers, 12" stainless steel tubular swing spout, compression valves, 1/2" NPT female inlets, ADA compliant, NO LEAD and NSF approved. Splash/ wall mount assembly model 60798.

- 4. Hand Sink:

- a. 1 ea. Fisher model 58696 or approved alternate. Faucet with 2.2 gpm flow rate or less, deck mount with 4" wrist blade handles, 4" centers, 6" stainless steel swivel gooseneck spout, compression valves, 1/2" NPT female inlets, ADA compliant, NO LEAD and NSF approved. Splash/ wall mount assembly model 62650.

- B. All plumbing fixtures shall be certified CSA, ASME A112.18.1/CSA B125.1, AB1953/HSC 116875, Vermont Bill S152, NSF/ANSI 61 sec 9, annex F and G, NSF/ANSI 372 low lead content, ASTM F2324.

1.22 DRAINBOARDS

- A. #14 gauge S.S. full width of sink carried up approximately 12" at back and where adjacent to wall and finished same as heretofore described for back of sink, and having 3" high curbing at front and ends not adjacent to walls and finished with integral 1-1/2" diameter 180° roll, unless otherwise specified.
- B. Drainboards continuously welded to sinks.
- C. Drainboards 30" long or less shall have 1-1/2" #16 gauge S.S. tubular braces secured at underside near front and welded to S.S. gusset at leg anchor. All others to have legs and cross bracing with full length and width undershelf as specified for tables.

1.23 TABLES WITH S.S. TOPS

- A. Tops of #14 gauge S.S. 1 piece construction with all edges turned down into 2" integral 180° roll with all corners rounded to 2" radius forming a bullnosed corner. Corner welded and polished smooth.
- B. Table tops thoroughly cross braced with 4" x 1" S.S. channel stiffeners #14 gauge welded to underside. All cross braces spaced not over 24" on center.
- C. Table tops adjoining walls or adjacent equipment carried up approximately 6" and returned 1", down 1" at top and ends. Intersections of table top and raised edge coved to 1" radius. Where backsplash is exposed, it shall have finished S.S. back.
- D. It is the responsibility of the K.E.C. to supply and mount all electrical outlets, switches, controls, etc. within table/counter back splashes, aprons, panels, etc. and to provide S.S. cover plates as required. Furthermore, it is the responsibility of the Electrical Contractor, in coordination with the Kitchen Equipment Contractor, to make final interconnections within table/counter interior to junction boxes, outlets, switches, controls, etc. for equipment indicated, if required.

1.24 LEGS AND CROSSRAILS

- A. 1-5/8" O.D. #14 gauge S.S. tubular-type with S.S. bullet shaped feet having minimum vertical adjustment of 1-1/2" without showing threading or adjusting bolts. Feet fully enclosed on bottom. Adjustment of feet by means of a threaded shank attached to foot and screwed into a properly secured threaded member inside of leg. Construction of leg such that it shall fit over shank of foot so no liquid or other material can work their way into legs or foot.
- B. Tops of legs attached to enclosed conical gussets of heavy gauge S.S. Gussets welded to #14 gauge S.S. 4" x 1" channels to underside on which they appear.

Crossrails 1-1/2" O.D. #14 gauge S.S. coped and welded to legs approximately 10" A.F.F. or as specified.

1.25 OVERSHELF - TABLE TYPE

- A. #16 gauge polished S.S. with all edges turned down and finished in a 1-1/2" diameter 180° roll - corners bullnosed, welded 1 piece construction.
- B. Shelves supported by 1" O.D. #14 gauge S.S. tubular uprights, tapered at top and flared at bottom, secured to table top with concealed inner tie rods, bolts and nuts. Uprights spaced approximately 42" on center not to interfere with table top proper. When uprights are located in other areas in addition to each end of table then they shall be cantilevered.

1.26 OVERSHELF - WALL TYPE

- A. #16 gauge polished S.S. with back edge turned up 2", remaining ends turned down in 1-1/2" diameter 180° roll with corners bullnosed welded, ground and polished.
- B. Shelves supported by #12 gauge S.S. cantilever brackets. Shelf spaced 1" from walls when in place and secured to same with C.P. toggle bolts. Undersides secured to brackets with concealed welded studs, nuts and washers. Brackets spaced approximately 42" on center.

1.27 UNDERSHELVES

- A. #16 gauge polished S.S. full length and width of table with all edges turned down into 2" wide channel. In way of table legs, shelf notched to fit contour of legs and fitted to same in neat, workmanlike manner to eliminate unsanitary crevices, fully welded, ground and polished.
- B. Undershelves reinforced on underside with welded 4" x 1" longitudinal channels of #14 gauge S.S. where applicable. All signs of welding on shelf surface removed.

1.28 DRAWERS

- A. Of #18 gauge S.S. all interior corners coved to a 1" radius both vertically and horizontally. All welds ground and polished to a uniform finish.
- B. Front of #14 gauge polished S.S. and will extend on both sides of drawer body to conceal slides, corners welded, ground and polished. Space between drawer front and body fully enclosed at bottom, back and both sides by means of a #20 gauge S.S. filler, spot welded to drawer front and body, to provide a fully sealed, vermin-proof enclosure. Drawer front provided with a 5" C.H.G. # P46-1010 S.S. pull handle fastened in place by means of a concealed screws.
- C. Drawer slides of #14 gauge S.S. fitted with 4 case hardened ball bearing rollers. Track attached to drawer is to have upper edge channel shaped to fit contour of roller rim to provide a positive drawer guide and prevent jarring. This drawer track

firmly spot-welded to body. Outer track provided with auto stops to lock without the use of tools.

- D. Where specified, drawer provided with removable synthetic carving board. Carving board is to slide into enclosure under drawer made of #14 gauge S.S. and extending across underside of carving board, with both sides turned up and welded to slide assembly. The 2 sides provided with #14 gauge S.S. angles with stops at rear fastened in place 1/8" above top surface of carving board to provide guide and storage compartment when carving board is not in use. Carving board is to measure approximately 21" x 21" x 1" thick.
- E. Tool drawer 20" x 20" x 5" deep, bread drawer 20" x 20" x 10" deep. All drawers to have 4 pin paracentric keyed-alike built-in locks same as sliding and hinged doors. C.P. where exposed.

1.29 POT AND PAN RACKS AND CEILING HANGERS

- A. Unit 24" wide, of length as shown, of 2" x 1/4" S.S. bar throughout. Outer rail to have fully rounded ends of 1 piece all welded construction. Center rail located 12" below outer rail and fastened to same with V-shaped braces of 2" x 1/4" S.S. bar. All joints continuous welds. V-shaped braces spaced not over 60" on center. Racks fitted with removable sliding type S.S. pot hooks spaced 9" on center.
- B. Unit hung from iron structure, ceiling or slab by 1" O.D. #14 gauge S.S. tubing. It shall be flattened, rounded with ends fully welded and fastened to rack by 3/8" round head screws with cap nuts and lock-washers. Top of tubular ceiling hanger welded to #12 gauge S.S. disc approximately 4" diameter that in turn anchors to joists above. Ceiling hangers over 60" in length to have diagonal sway braces of 1" O.D. S.S.
- C. Proper anchorages, etc., installed in iron structure, ceiling joists or slab by Kitchen Equipment Contractor prior to final finish of ceiling. Top rail of unit 90" A.F.F.

1.30 EXHAUST HOOD

- A. Exhaust Hood material, construction, etc. to be in conformance with IMC section 507.
- B. Dimensions approximately as shown on contract drawings and mounted at 80" A.F.F. to underside of hood. Final dimensions to be determined in field by Kitchen Equipment Contractor.
- C. Proper anchorages, etc..., installed in ceiling joists, slab, etc..., by Kitchen Equipment Contractor prior to final finish of ceiling.
- D. Body of #18 gauge stainless steel front, back and sides; straight as indicated on contract drawings. All joints to be flush welded. Where field joints occur, provide a pair of transverse frames, butted together and securely fastened following contour of hood structure.

- E. Bottom rim of hood attached to channel of #14 gauge STAINLESS STEEL with mitered welded corners and butted field joints. Cross section inside of channel to measure approximately 2-1/2" horizontally, flanged upward tightly against interior lining of hood.
- F. Above dishwashing machine, kettles and steamers or non-grease producing equipment, hood provided with sloped baffle at back arranged at 45° angle of #18 gauge stainless steel. Baffles to have sliding dampers of #16 gauge stainless steel mounted in #14 gauge stainless steel channel tracks. Each damper to have stainless steel handle fastened with concealed bolts.
- G. Above ranges, ovens, fryers, griddles, etc. or grease producing equipment, hood provided with built-in filters at back extending full length and arranged at an angle of 45° easily removable without use of tools. Filters to be approximately 20" x 20" x 2" thick, of STAINLESS STEEL and expanded metal construction or as further indicated on contract drawings. Filters set into #14 gauge STAINLESS STEEL filter frame, bottom of which is integrally installed with back of hood and grease gutter for easy cleaning. Quantity and size of openings in plenum chamber as indicated in contract documents.
- H. Hood(s) provided with STAINLESS STEEL hanger brackets, welded to top of hood, spaced not more than 36" on center.
- I. Section of hood below ceiling or soffit, enclosed with vertical facing of #18 gauge STAINLESS STEEL. Panels not to exceed 36" in width, easily removable where required, provided with recessed finger grip or similar. Where panels meet at vertical joints flanged inward 1" to form a hairline joint. Channel extended 2" beyond perimeter of hood and provided with concealed full length angle member of 2" x 2" x 3/16" G.I. with clips for bolting to hanger angles, spaced approximately 36" on center. Hanger angles attached to 2" x 2" x 3/16" angle frame fastened to ceiling slab. Panels held in place at ceiling with 2" x 2" x 1/8" STAINLESS STEEL angle trim all around.
- J. Hood(s) provided with recessed or flush vapor-proof LED light fixtures, approximately 12" X 12" style or 48" strip style, pre-mounted by manufacturer. Light fixture with bulb(s), as provided by specified exhaust hood manufacturer, refer to Part 2 Products. All wiring and interconnections by Electrical Contractor.
- K. All exhaust hood controls, switches, etc... to be mounted @ 48" AFF. This is to be the maximum height allowed.
- L. All wiring and interconnections for controls, switches, fans, solenoid, shunt trips, etc... by Electrical Contractor. This includes any requirements to and from remote panels, switches and control packages.
- M. Must be tested and comply with the most current codes (or per local jurisdiction) UL-710, International Mechanical Code (IMC), and NFPA 96.

1.31 VENT STACKS

- A. Vent Stack of proper size to fit dishwashing machine end cowl, #18 gauge S.S., continuously welded. Both vents over openings of dishwashing machine, sized per manufacturers specifications and provided with a revolving damper of #16 gauge S.S. Damper attached to externally operated "T" handle made of 3/8" diameter S.S. rod and with tension spring to prevent it from rotating freely. Top of each vent shall terminate into duct above. Extend top to approximately 6" above finished ceiling to receive duct connections by others.

1.32 FIRE PROTECTION SYSTEM

- A. The system shall be a pre-engineered cartridge-operated type R-102 system utilizing Liquid Ansul agent, with a Fixed Nozzle distribution network. It shall be furnished and installed in compliance with UL Standard 1254, UL Standard 300, NFPA 96-2008 and any prevailing statutes or codes including automatic shut-down of all cooking appliances per code section 44 of NFPA 17A-27-2002.
- B. System to provide connection to building Fire Alarm System per NFPA 17A; Section 3-2.1.5.
- C. Fire protection remote pull stations mounted @ 48" AFF, located 10 ft. minimum to 20 ft. maximum from exhaust hood(s).
- D. The extinguishing agent shall be a specifically formulated aqueous solution of organic salts contained in a S.S. tank with 3 gallons minimum capacity, and able to withstand test pressure of 330 PSI. A welded S.S. bracket shall be provided for mounting the tank.
- E. The regulator releases mechanism shall be capable of providing sufficient expellant gas to discharge enough agent to meet the minimum nozzle discharge requirements. The mechanism shall have a visual indicator of "fired" condition. This mechanism shall be capable of being operated by fusible link detection, remote manual release and local manual release. The mechanism should be housed in a S.S. enclosure with cover containing identifications thereon.
- F. Each discharge nozzle to be listed with UL approval for placement and size. Each nozzle shall have a rubber blow-off cap to keep the nozzle tip orifice free of cooking grease build-up. All exposed piping to be chrome plated finish, and there shall be no exposed threads.
- G. Kitchen Equipment Contractor to furnish mechanical (electrical) gas valve, up to 3" in size and coordinate the install/provisions to shut-off all fuel supplies to all cooking appliances beneath Type I exhaust hood upon activation of system. If electrical gas valve is to be utilized, Kitchen Equipment Contractor to furnish reset relay push button.

It is the responsibility of the Plumbing Contractor to install, coordinate and make any provisions necessary for complete operation of gas valve.

It is the responsibility of the Electrical Contractor to furnish and install electrical wiring, relays, etc... and make any provisions necessary for complete operation of

gas valve. In addition, Electrical Contractor to furnish and install automatic equipment necessary to shut-off all electric beneath Type I exhaust hood upon activation of system.

- H. Kitchen Equipment Contractor to furnish and install a Class K Fire Extinguisher, dedicated to each room where a Type I exhaust hood is installed.
- I. Upon completion of installation, the installer to perform a wet chemical test or at the time of the test, the authority having jurisdiction may allow the Contractor to use flushing concentrate and water solution. However, whichever is permitted, it must be in compliance with Code. This test shall activate the entire system, except the agent supply tank, which will be substituted by the test tank of like pressure and size. Following a satisfactory test, the original tank shall be replaced. The system shall then be certified to be in working order and all authorities shall be so advised in writing. Provide Owner with copies of all satisfaction/acceptance tests.
- J. The system to be furnished and installed by a factory distributor in accordance with the manufacturer's instructions. This shall include mounting of the system units, manual releases, nozzles, actuating devices, and the running of all pipe and control tubing applicable to the R-102 system. If and when requested, submittal drawings concerning the fire system shall have affixed the seal and signature of a licensed engineer for the State in which they are to be installed. A 1-year service contract and maintenance program to be provided.
- K. Kitchen Equipment Contractor is required to submit a copy of the hood suppression system shop drawing to the local authority having jurisdiction for approval, as well as submission to the Architect. In addition, shop drawings when submitted, must be signed and sealed by an engineer licensed to practice in the State where the system is to be installed.

1.33 DISH TABLES - SOILED AND CLEAN

- A. #14 gauge polished S.S. with exposed edges finished in 3" high curbing with a 1-1/2" diameter, 180° rolled trim at top, corners bullnosed, welded. Where adjacent to wall, top carried up 12" integrally at top and ends. All joints in top welded and free of buckles and weld marks. When applicable, where top (also raised back), adjoins dishwashing machine, same flanged down 1" into machine and secured water tight, backsplash in this area brought forward diagonally to machine to form a baffle. Tops thoroughly cross braced with 4" x 1" channel stiffeners of #14 gauge S.S. and welded to underside. Cross bracing approximately 24" on center, running front to back. All corners in top rounded to 1" radius, vertically and horizontally.

1.34 NOT USED

1.35 NOT USED

1.36 PRE-WASH SINK

- A. Approximately 21" x 21" x 7" deep, of #14 gauge S.S. integrally welded to table top, forming an integral unit with same. Sink bowl identical to that specified for sink built into table top including basket drain assembly with built-in overflow, etc. Sink pitched to a 2" IPS C.P. brass "lever" waste outlet and fitted with a #18 gauge S.S. snug fitting basket approximately 19" x 19" x 6" deep, with continuous perforation and reinforced top edges and 4 sides. Basket of all welded construction mounted on 2" high S.S. feet.
- B. Top of pre-wash sink fitted with S.S. guide for dish racks. Guide of 1-1/2" x 1-1/2" x #12 gauge S.S. angles with ends flared out to facilitate easy movement of racks. Guide welded to cross angles of same material, thus forming a removable frame. Dish table backsplash (unless otherwise specified and shown) in area where pre-wash sink is located, provided with Fisher Mfg. Co. stainless steel pre-rinse unit model #33308 includes wall bracket, shortened riser pipe to 16", add on faucet with 12" swing spout, nipples, elbows, backflow preventer mounted on pre rinse unit, mixing faucet with S.S. seats and check valve stems to prevent cross flow, EPAAct 2005 certified.

1.37 NOT USED

1.38 WALL CABINET

- A. Wall cabinet is to be of length hereinafter specified, 15" front to back and 30" high at front with dust proof top sloped up 6" on 45° angle toward rear. Exterior bottom to be of flush type construction.
- B. Cabinet constructed of #18 gauge polished S.S. with all joints and crevices on cabinet front and sides, welded, ground and polished smooth to a uniform finish. Channel shaped cabinet front is to be fully enclosed inside of cabinet to eliminate openings between shelf and cabinet front. Interior to be provided with fixed in place bottom shelf and 2 removable adjustable intermediate shelves of #16 gauge S.S. shelves will have 1" wide channel edges on all sides with corners welded ground and polished and provided with clips to engage S.S. keyhold strips secured to interior of cabinet.
- C. Cabinet doors previously described in specifications. Door is to be fastened to cabinet by means of fully concealed heavy duty hinges. Each door must be fitted with keyed-alike type locking device.

1.39 SERVING COUNTER

- A. Of size and shape as shown. Top of #14 gauge polished S.S. rolled down in a 2" diameter 180° roll on all exposed edges with corners bullnosed, welded. Top secured to counter base by means of concealed S.S. studs, nuts and washers. Angle frame under top sheathed with sound deadening material.
- B. Base constructed with interior framing of 1-1/2" x 1 1/2" x 1/8" galvanized steel angle with all joints welded.

- C. Angle framework concealed on the interior with #18 gauge polished S.S. sheathing. Exterior facing of base cabinet and ends to have sheathing of Plastic Laminate paneling laminated to 3/4" thick solid core, exterior grade marine plywood, panel length not to exceed 36". Color and style of paneling selected by Architect. Each panel of length as indicated, full height of counter and splined hairline joints. Panels and trim secured to interior framing by means of concealed welded studs, nuts and washers. Or constructed of alternate materials as detailed on drawings.
- D. Interior of all available space provided with bottom and intermediate shelf of #16 gauge S.S. turned up approximately 2" at rear and ends, and down 1-1/2", and in 1/2" channel shape at front.
- E. Mounted on masonry base, height as indicated on drawings or 6" high 14 gauge S.S. legs with S.S. removable toe base, where indicated. All openings in top flanged downward approximately 1" around their entire perimeter. Top cut out for and provided with equipment as hereafter specified.
- F. It is the responsibility of the K.E.C. to supply and mount all electrical outlets, switches, controls, etc. within table/counter back splashes, aprons, panels, etc. and to provide S.S. cover plates as required. Furthermore, it is the responsibility of the Electrical Contractor, in coordination with the Kitchen Equipment Contractor, to make final interconnections within serving counter interior to junction boxes, outlets, switches, controls, etc. for equipment indicated, if required.

1.40 SOLID SURFACE SERVING COUNTER

- A. Of size and shape as shown. Top of minimum 1/2" thick solid surface, silicone mounted to minimum 1/2" thick exterior grade plywood with two year installation warranty. Solid Surface type, fabricated to comply with Solid Surface commercial specifications. Color and style of solid surface as selected by Architect. Top secured to counter base by means of concealed S.S. studs, nuts and washers. Angle frame under top sheathed with sound deadening material.
- B. Constructed identical to that as hereinbefore described in section 1.39.

1.41 NOT USED

1.42 NOT USED

1.43 NOT USED

1.44 TRAY SLIDE

- A. Of size and shape, as hereinafter specified and/or shown on contract drawings. Installed where shown, 12" wide, #14 gauge S.S. construction or in strict accordance to that as detailed on drawings.
- B. In general, unit mounted on #12 gauge S.S. ornamental type brackets secured to front trim of counter in a concealed manner with welded concealed studs. Back

edge of turned up section made to fit tight with turned down front section of counter top and definitely free of voids, cracks and unsanitary joints.

1.45 SOLID SURFACE TRAY SLIDE

- A. Of size and shape, as hereinafter specified and/or shown on contract drawings. Installed where shown, 12" wide with bull nose edge detail, silicone mounted to minimum 1/2" thick exterior grade plywood with two year installation warranty. Solid surface type, fabricated to comply with commercial specifications. Color and style of solid surface as selected by Architect. Constructed in strict accordance to that as detailed on drawings.
- B. In general, unit mounted on #12 gauge S.S. ornamental type brackets secured to front trim of counter in a concealed manner with welded concealed studs. Back edge of turned up section made to fit tight with turned down front section of counter top and definitely free of voids, cracks and unsanitary joints.

1.46 NOT USED

1.47 COUNTER AND CABINETS WITH SEMI-ENCLOSED BASE

- A. Top of #14 gauge polished S.S. finished 1/2" above working level with 2" diameter 180° roll, bullnosed corners on all exposed sides. Where adjacent to wall, top carried up approximately 6" (or as specified hereinafter and shown) and returned 1" at top and ends towards wall with corners welded forming a continuous unit. Top fastened to cabinet by means of welded and concealed studs.
- B. Cabinet below top to have #18 gauge S.S. enclosure. Front stiles of cabinet channel shaped. This channel fully enclosed inside of cabinet. Top reinforced by means of horizontal framework of S.S. 1-1/2" x 1-1/2" x 1/8" angle with cross braces not more than 18" on center. Framework of all welded construction and intermediate shelves in cabinet of #16 gauge S.S. turned up on all sides to eliminate crevices at shelf surface. Front edge of shelf channel shaped. Shelf surface reinforced by means of #16 gauge S.S. channel stiffeners spaced on not more than 24" on center. Mounted on 6" S.S. adjustable legs, or as hereinbefore shown and specified.

1.48 NOT USED

1.49 DOORS

- A. Whether sliding or hinged type, not less than 1/2" thick overall, double paneled having 3/8" sound-deadening material between #16 gauge S.S. front and #18 gauge S.S. back, reinforced between panels by wide channels, running height of door and made of same material. Panels jointed with continuous welding. Doors and vent openings to have back panel boxed around vent opening and welded to front panel. Doors dust proof and entire front face without seams or joints.
- B. Sliding doors mounted on ball bearing type rollers, sliding in dust proof #14 gauge S.S. tracks overhead, fastened so as to eliminate vibration and jarring when doors

are rolled. Doors fitted with limit stops. Bottom guide of #14 gauge S.S. for doors, open and flat, lining up with lower shelf of cabinet - slots so arranged that crumbs or dirt accumulating in the cabinet will drop to the floor when cabinet is cleaned. Recessed handles solid material, not stamped, of S.S. welded to front panel. Finger grips of ample depth to comfortably pull the door. Doors provided with keyed-alike S.S. faced cylinder locks, built-in flush.

- C. Hinged type doors flush fitting, unless otherwise specified, resting tightly against rabbetted frame. Hinged doors provided with Klein Model #Y-48 (or approved equal) keyed-alike S.S. faced cylinder locks with Model #12230-SM (or approved equal) handles. In case of pair of doors, each individually controlled as outlined and is to close against rubber bumpers.
- D. Outer edges smooth, free from burrs, projections and fins. Excess welded metal removed by precision grinding and polishing.

1.50 REFRIGERATORS AND REFRIGERATION UNITS

- A. Reach-in refrigerators, freezers, and refrigerated units, as shown unless otherwise specified, furnished by Kitchen Equipment Contractor. They shall meet all requirements as set forth for individual item number and complete with self-contained or remote compressors and motors. Cooling coils blower type, unless otherwise called for, provided with initial charge of approved CFC free refrigerant. Plumbing Contractor responsible for extending refrigerator drain line, where required, to spill into adjacent floor drain in approved manner. Extended drain line not less than 3/4" I.D. and C.P. or S.S. tubing.
- B. All refrigerated equipment, refrigerators and freezers, whether walk-in or reach-in, started and adjusted to maintain required temperatures, charged with approved refrigerant as required.
- C. All reach-in refrigerators, freezers, hot food warmers, etc., to have keyed-alike locks. Kitchen Equipment Contractor must request this at time of placing order to avoid correction at a later date at Kitchen Equipment Contractor's expense.
- D. Kitchen Equipment Contractor to provide 1 year's free service for all types of refrigerators and refrigeration equipment. Service to include all compressors, unit coolers, controls, etc., to include adjustments and repairs, irrespective of cause, whether mechanical, operational or manufacturing at no additional cost to Owner. Additionally, five (5) year warranty provided on all compressors, parts only or replacement.

1.51 WALK-IN COOLER AND FREEZER

- A. General Description: To be N.S.F. approved units, of size and manufacturer as indicated on contract drawings, 8'-6" high, unless otherwise specified, completely furnished and assembled unit installed in an approved manner. As indicated on drawing, either installed into a 6-1/2" depressed floor area with flush type door sill and floor finish as shown on contract drawings, or installed directly on floor with interior ramp, and pre-fabricated aluminum floor with heavy duty structural

underlayment floor, approximately 5,000 pounds per square feet of load. Where pre-fabricated floor with interior ramp indicated, unit to be finished with "First Choice" vinyl safety flooring provided and installed by Kitchen Equipment Contractor. Where depressed floor indicated, doors, floors, etc. to accommodate concrete-tile finished floors, provided and installed by G.C. after all boxes have been set in place. Walk-in freezers to maintain 0° to "minus" 10° Fahrenheit temperature. Walk-In coolers to maintain 35° to 36° Fahrenheit temperature.

- B. Finishes: Unexposed exterior of each unit to be .040 stucco aluminum finishes. All exposed exterior surfaces to be #20 gauge stucco S.S. finish. Interior, except floor, to be .040 stucco white aluminum finish. Floor as noted hereinbefore in spec section 1.51 A.
- C. Insulation:
 - 1. Insulation shall be 4" thick rigid urethane foam, foamed-in-place to bond to inner surfaces of metal pans. Urethane foam to have a thermal conductivity (K factor) of not more than 0.118 BTU/hr./sq. ft. per degrees Fahrenheit/inch, and an overall coefficient of heat transfer (U factor) of not more than .029. The "R" factor shall be 34.
 - 2. (Optional) Prefabricated urethane foam panels shall be supplied with a Class 1 fire hazard classification according to ASTM-E-84 as tested by Factory Mutual System. Panels shall have a flame spread rating of 25 or less and a smoke density of no greater than 450°. Every panel shall bear a certifying Factory Mutual label.
 - 3. * These ratings are not intended to reflect hazards presented by this or any other material under actual fire conditions.
- D. Doors: Each walk-in shall be equipped with one standard 34"/36" x 78" hinged-type, flush mounted entrance door bearing the UL seal of approval, or of size as indicated on drawing. Each door section consists of a heavy reinforced steel "U" channel frame, foamed-in-place to give extra support and rigidity to the frame and to prevent racking, distortion, warping and twisting. Doors to be #20 gauge S.S. interior and exterior. Door and door panel sections to have 1/8" diamond tread kick plates, 36" high on interior and exterior. Walk-in entrance doors shall be equipped with a one-piece perimeter NSF approved PVC accordion type removable gasket. A magnetic core at top and side shall provide positive seal. An adjustable wiper gasket shall be mounted along the bottom edge of door. Door frames shall be provided with an LED light fixture, pilot light and switch assembly, and concealed wiring. Provide #12 gauge reinforced S.S. threshold and heater wire around the full perimeter (freezer door only). All doors hinged as shown, each with heated 14" x 14" "vision" panel.
- E. Standard Hardware: Shall be break-a-way type with cylinder lock and inside safety release handle so door can be opened from the inside even if locked. All latches designed for locking with keyed-alike locks. A positive action hydraulic door closer shall be included to insure gentle closing action of door and insure a positive seal. Hinges shall be cam-lift, self-closing, spring assist with door lift-off

capability. Hinges shall be high-pressure zinc die cast with highly polished chrome finish, three per door.

- F. Filler Panels: The "exposed" open area of unit at left, right and top at front and sides neatly trimmed with #20 gauge stucco S.S. filler panels to close space between wall and ceiling. Filler panels between top of walk-in box and finished ceiling not to exceed 12" in height. Filler panels equal to exterior of unit. Top panels to be equipped with louvered sections not less than 40% of total square footage of panel (when compressor units are top-mounted).
- G. Wall Protection: Two rows of #16 gauge S.S. hat shaped rub rails with concealed fasteners; to be provided and installed at all exposed exterior walls. Top of rub rail to align with top of diamond tread kick plate on door and bottom rub rail to be 10" A.F.F. When corners are exposed, provide 6" x 6" x 60" #12 gauge S.S. corner guard.
- H. Lights: Walk-In boxes to be provided with 48" LED light fixtures, Kason model #1810, quantity as shown on plan. The walk-in cooler and freezer to have LED type vapor-proof light, Kason model #1806, with concealed wiring, etc., and toggle switch with pilot light mounted on exterior. Kitchen Equipment Contractor to provide bulbs. It is the responsibility of the Kitchen Equipment Contractor to install light fixtures, provide penetrations in ceiling panels, and seal the penetrations after Electrical Contractor has completed wiring.
- I. Sealants: Kitchen Equipment Contractor shall seal all lines, conduits, tubing, wiring, etc., passing through walls and ceiling of walk-in units with high grade caulking compound, then install S.S. escutcheons where required.
- J. Alarm System: Each compartment shall be protected by Modularm 75LC system with recessed in panel controls. System provided with wireless communicator, mounted at walk-in units, for connection to building network. System shall provide digital readout of ambient compartment temperature(s). The system shall be located in an area as indicated on the contract documents. It shall require 120/60/1 electrical connection through suitable 1/2" conduit. CAT5 cable connection for activation of remote notification equipment will be provided as part of the alarm system. CAT5 cabling provided and installed by General Contractor. Furnish and install identification labels for operating temperatures as required.
- K. Ceiling Support: When split ceilings are required due to ceiling panel span, these ceilings are to be supported by a self-support ceiling structure. The walk-in manufacturer is to provide the ceiling hanger brackets, the steel channels and the bearing steel channels. A detail must be provided on the manufacturer's submittal drawing. Note: When longer spans are required that exceed self-support capability then suspended ceilings are to be provided with manufacturer's detail.
- L. Flat Membrane Weather-Proof Roof: Shall be supplied for field installation on top of each walk-in that is located outdoors. Membranes to be fabricated from low-shrink polyester fabric coated with a permanent thermoplastic alloy and have a minimum thickness of 35 mil. Membrane shall be fire retardant, resistant to ultra-violet rays and micro-organisms. Membrane to be white in color to reflect

maximum heat load from the sun. Fasteners and trim shall be provided to secure the membrane to the ceiling panels and in cases where walk-in is installed against a building; the membrane roof material will be flashed up the building walls by the equipment installation contractor. The manufacturer's detail must be provided on the submittal drawing.

- M. Compressors and Evaporators: Cooler unit, model as indicated on drawings; room air drawn through coil and discharged parallel to ceiling. The coil casing is to be aluminum with a removable drain pan. Drain line from evaporator coil to floor drain as indicated on contract drawings, attached to interior of box with clamps and installed in good, approved, workmanlike manner by Plumbing Contractor. Compressor of the hermetic and/or scroll type, with suction gas cooled motor, designed for operation with approved refrigerant. Unit complete with liquid line drier, shut-off valves, vibration isolators, heat exchanger, dual pressure control and water regulating valve (for water-cooled systems), electrical panel with circuit breaker and magnetic starter. All components and accessories in control box that pertains to the compressor unit only should be factory wired and piped.

For outdoor systems a weather-proof housing, thermostatically controlled crank case heater and low ambient controls for -20°F conditions shall be provided.

Note: Electrical Contractor to provide and install fused disconnect switch where required, as well as conduit and wiring from same to terminals in compressor unit control panel. Also, interconnect conduit and wiring from compressor unit control panel to unit cooler junction box inside walk-in units.

Freezer Unit, model as indicated on drawing, to be electric defrost. The coil casing is to be aluminum with a removable drain pan. Electric heating elements and drain pan heaters. Unit shall include control kit for time initiated temperature terminated defrost plus automatic fan delay. Heat interchanger included. Drain line from evaporator coil to floor drain as indicated on contract drawings, attached to interior of box with clamps and painted to match interior finish; and installed in good, approved, workmanlike manner by Plumbing Contractor. Kitchen Equipment Contractor to install adequate amount of wrap-around, electric heater tape to assure defrosting of drain line, cable lapped not over 1" spacing. Provide Raychem Winter Guard Plus electrical heat tracing model H611050 (type 3), self regulating in temperature, run in parallel, to be designed with a maximum temperature that cannot be surpassed, certified by the manufacturer's representative that the heat trace has been installed and tested in accordance to the manufacturer's specifications. Heater tape connected to electric by Electrical Contractor. After installation and before and after installing the thermal insulation, subject heat to testing using a 2500 VDC megger. Minimum insulation resistance should be 20 megohms regardless of length. The installer shall test for both heating cable bus wires to verify the connection of any splices or tees.

Equipment shall have BTU/hr capacity as indicated on drawing and maintain room temperature of 35° to 36° Fahrenheit, where refrigerator is specified, and 0° to "minus" 10° Fahrenheit, where freezer is specified.

Refrigerant piping to be hard seamless copper tubing, by KEC. Refrigerant lines installed and covered with not less than 1" thick flexible foam plastic insulation applied in accordance with the manufacturer's recommendations. Refrigeration lines to run from compressor location where shown, above the walk-in units. All lines to be tested free from leaks prior to finish of insulated lines. Condensates drain lines outside of walk-in boxes, similarly insulated with 1/2" insulation, by KEC. Each system shall have suction line filters and vibration eliminators field installed.

Thermostatic expansion valves properly sized to handle evaporator loads. Liquid lines shall have moisture indicating sight glass, drier, and shut-off valve field installed.

The temperature in each walk-in box controlled by means of a thermostat wired to actuate a solenoid valve in the liquid lines with the compressor operation controlled by the low pressure cut-out switch. Thermostats and low pressure controls adjusted to maintain room temperatures specified. Each system cleaned and dehydrated by maintaining a vacuum of 500 microns or lower for a minimum period of 5 hours. The vacuum pump used capable of developing a vacuum of 50 microns with its valve in a closed position. The required operating charge of refrigerant and oil shall then be added and each system tested for performance. All refrigerant lines sized for 1 lb. maximum pressure drop.

It is the purpose of the specification to provide a satisfactory refrigeration cycle, therefore, Kitchen Equipment Contractor must include the competent labor and qualified material to provide the owner with an efficient system.

- N. Mounting Methods: Compressors, when mounted on building roof, to be provided with adequate dunnage/ curbing by Kitchen Equipment Contractor. Dunnage/ curbing installed by G.C. or roofing contractor. Architect to specify dunnage/ curbing details.

Compressors, when mounted on ceiling of walk-in, to be provided with adequate air circulation, service, access, and vibration isolation.

1.52 MILLWORK EQUIPMENT

- A. General Description: Woodwork to be minimum 3/4" marine grade plywood throughout. Woodwork counters shall be constructed to support the full weight of operating appliances without any deflection of the counter top. Where cut-outs are required in counter tops, appropriate framing needs to be provided around the cut-out to fully support the top in level position.

All miter joints shall be tight with no gaps or open spaces. Filling of miter joints with crack filler prior to finishing is not acceptable. Loose joints shall be hairline, flat, in single plane, with no exposed screws, nails or other fasteners. All dimensions, reveals and joints shall be held exact.

All fixtures shall be assembled in single and complete units as the dimensions will permit shipment to and installation at the building. Large pieces requiring sections

construction shall have their parts accurately fitted and aligned with each other, and provided with ample screws, glue and bolt blocks, tongues, grooves and splines, dowels, mortises and tenons, screws, bolts or suitable means of concealed fastening, as required to render the work of substantial, rigid and permanently secured in proper position.

Sufficient additional material shall be allowed to permit accurate scribing to walls, floors and related work, and due allowance made wherever possible for such shrinkage as may develop after installation. Single and sectional units shall be provided with adequate cleating, blocking, crating and other forms of protection as required to prevent damage, soiling and deterioration during transit, delivery, storage and handling.

Framing and blocking members shall be assembled with bolted and screwed connection and should be secured to the structural backing with cinch, expansion screws or toggle bolts, as required; spaced and installed to ensure ample strength and rigidity. Rails and stiles shall be mortised and tenoned, work neatly mitered and membered, all butt joints made flush and smooth, and all permanent joints made up with water resistant glue. All fixtures shall be assembled without face screws or nails, except where it may be necessary to attach trim items. All face screws or nails that are necessary shall be countersunk and plastic wood or wood plugs used to cover head and the plug neatly touched up. The heads of all screws used in any assembly shall be countersunk below the surface.

- B. Joints: Mortise and tenon, spline, dowel and/or pin block and glue work to avoid use of nails wherever practical. Make butt joints with an approved device of prevention of separation of members. Blind nail and conceal.
- C. Plastic Laminate (HDPL): Plastic laminate shall be bonded to all exposed surfaces with contact cement fast bond #30, as manufactured by 3-M Products Company, or equal, to minimum 3/4" fir faced plywood applied under high pressure. Reject plastic laminate or plastic backing shall be used to prevent warping, unless otherwise specified. All edges shall be carefully sanded to smooth finish, removing burns, nicks and cut marks.
 - 1. Plastic laminate joints shall be finished without wavy and unsightly joints. Joints need not be mitered except if specified. Hand sand edges to a slight chamfer.
- D. Doors, Hinged: Hinged doors shall be fabricated of 3/4" thick plywood with plywood full perimeter edging with plastic laminate on face and self-edging on exposed sides. Door hinges, pulls and catches shall be supplied and installed as detailed. All doors to have minimum of 3 concealed, heavy duty, European hinges per section.
 - 1. Provide S.S. channel trim on the perimeter of the door to guard plastic laminate from chipping.
- E. Doors, Sliding: Sliding doors shall be fabricated of solid core plywood with hardwood edges and constructed similar to hinged doors. Doors shall be mounted

on E-Z Glides track. Doors shall be removable without the use of tools. Rubber stops shall be provided concealed in end stile or mullion.

- F. Doors, Tambour Sliding: Tambour sliding doors shall be fabricated of individual hardwood slats, 3/8" by 3/4" round on 2 edges and glued to 20 ounce duck canvas or reject elastic vinyl plastic or equal and shall be provided with hardwood end stile with integral door pull. Track shall be lined with laminated plastic or equally smooth surface and guides at top and bottom shall be fabricated hardwood. Provide lock-pin for sliding doors.

G. Access Panels/Louver Panels:

1. Access Panels: Shall be fabricated of 3/4" thick marine grade plywood and shall be fabricated to be removable for access. Each access panel shall be provided with 2 magnetic catches at top and (2) 3/16" positioning pins at bottom (unless otherwise specified or detailed on drawings).
2. Louvered Panels: Are required in woodwork at all locations where proper ventilation is necessary for the efficient performance and operation (exhaust and/or supply) of the food service equipment compressor.

Types (when specified):

- a. Louvered panel spaced to conceal equipment yet provide adequate ventilation.
 - b. Kitchen Equipment Contractor to coordinate size, quantity and location of louvered opening for sufficient ventilation of food service equipment. Refer to drawing details for cut-outs and spacing.
 3. Unless otherwise directed, panels shall be powder coated to match laminate selection.
- H. Louvered Doors: Must have concealed hardware to resemble access panels. Doors to have nylon roller friction type heavy duty catch and heavy duty concealed S.S. adjustable hinge.
1. Plastic laminate fronts: provide kiln dried pine shutter type slats. Wood to be free of knots with smooth grain, epoxy painted to match laminate selection. No raw wood surfaces will be acceptable. Paint or laminate as needed between slats.
 2. Slats to be fixed, positioned to conceal equipment from sight.
 3. Provide black color screening/mesh on rear of door with protective edges to prevent tearing.
- I. Drawers: Drawers shall have dovetail construction, well glued and blocked. Fronts shall be not less than 3/4" thick marine grade plywood. Sides and back shall be 1/2" thick fabricated of Birch, Maple or Sycamore except where extension

slides are used, in which case the side shall be 5/8" thick. Bottom shall be milled into fronts and sides. Drawers shall be provided with suitable stops. Provide pulls as detailed or specified.

1. The inside surfaces of all drawers shall receive one coat of Penetrating Primer and one coat of glass lacquer.
- J. Painted Finishes: Painted finishes shall have exposed surfaces free from defects and blemishes that would show after being finished, regardless of grade specific. All surfaces specified to receive paint or enamel finish shall receive one crosscoat of lacquer type undercoat. The undercoat shall be of appreciable different color than that of the finish coat, and of proper ground color with relation to the finish coat. After the undercoat has been thoroughly dried, surfaces shall be sanded smooth and two coats of enamel shall be applied. Back painting shall be provided for all cabinet and woodwork prior to installation.
- K. Interior and Wall Shelves: Cabinet interiors and wall shelves shall be laminated as specified under Section C, Plastic Laminate.
- L. Granite Tops:
1. Size, shape and installed where shown on drawings. These are fabricated items and are to be constructed as per manufacturer's requirements and as further detailed on contract drawings.
 2. Color and finish shall be selected by the Architect, and physical properties shall confirm to manufacturer's standard specifications for foodservice application. The material shall be homogenous; and not of a composite construction.
 3. Granite shall be 3/4" thick with 1-1/4" face for counter tops unless otherwise specified.
 4. Angle frame under top sheathed with sound deadening material.
 5. General installed to conform to manufacturers standard details in order to maintain product warranty, i.e. cut outs for drop-in equipment.
- M. Solid Surface:
1. Size, shape and installed where shown on drawings. These are fabricated items and are to be constructed as per manufacturer's requirements and as further detailed on contract drawings.
 2. Color and finish shall be selected by the Architect, and physical properties shall confirm to manufacturer's standard specifications for foodservice application. The material shall be homogenous; and not of a composite construction.

3. Solid Surface to be minimum 1/2" thick silicone mounted to 3/4" thick grade plywood if required as per manufacturer's recommendations.
4. Top secured to counter construction by means of concealed S.S. studs, nuts and washers.
5. Angle frame under top sheathed with sound deadening material.
6. General installed to conform to manufacturers standard details in order to maintain product warranty, i.e. cut outs for drop-in equipment.

PART 2 – PRODUCTS

CENTRAL PREP KITCHEN

ALA CARTE / TEACHING AREA

ITEM #A1 REFRIGERATOR, REACH-IN – QTY. AS PER PLAN & SCHEDULE

Continental Refrigerator Model 2RNSS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Verify door hinging
- Exterior Finish: Stainless Steel
- Interior Finish: Stainless Steel
- 1 ea. Self-contained refrigeration
- 2 ea. Full doors with locks
- 3 ea. Shelves per compartment, top section
- 1 ea. Digital temperature control system
- Energy Star® Certified
- Adjustable universal pan slides 1-1/2" O.C. to hold 18" x 26" or 12" x 20" pans, bottom section
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Utility Refrigerator or Traulsen.

ITEM #A2 FREEZER, REACH-IN – QTY. AS PER PLAN & SCHEDULE

Continental Refrigerator Model 1FNSS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Verify door hinging
- Exterior Finish: Stainless Steel
- Interior Finish: Stainless Steel
- 1 ea. Self-contained refrigeration

- 1 ea. Full doors with locks
- 3 ea. Shelves per compartment, top section
- 1 ea. Digital temperature control system
- Energy Star® Certified
- Adjustable universal pan slides 1-1/2" O.C. to hold 18" x 26" or 12" x 20" pans, bottom section
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Utility Refrigerator or Traulsen.

ITEM #A3 HAND SINK, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WS-1D. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Manual faucet, gooseneck
- 1 ea. Soap dispenser
- 1 ea. Towel dispenser
- 1 ea. Left and right splash guards
- Wall backing by General Contractor

Or as manufactured by Eagle Group/Metal Masters or John Boos.

ITEM #A4 HOSE REEL WITH GUN – QTY. AS PER PLAN & SCHEDULE

T&S Model B-7132-05. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. 35' hose length
- 1 ea. Spray gun assembly
- 1 ea. Exposed reel
- 1 ea. Hose reel connector kit
- All necessary components for full operation

Or as manufactured by Fisher or Component Hardware.

ITEM #A5 FIRE EXTINGUISHER, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

Ansul Model K-CLASS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Wet chemical type, Ansullex low pH agent
- 1 ea. 2.5 Gallon tank
- 1 ea. Wall bracket
- 1 ea. Rechargeable
- Wall backing by General Contractor

Or as manufactured by Kidde or RangeGuard.

ITEM #A6 2-COMPARTMENT SINK, PREP. TABLE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 2 ea. Built-in work sinks, 20" L x 16" W x 12" D
- 2 ea. S.S. Removable sink bowl covers
- 2 ea. Waste valve with lever
- 2 ea. Tail piece
- 2 ea. Waste overflow
- 1 ea. Stainless steel faucet with 12" swing spout and wrist action handles, 1/2" connections
- 1 ea. Stainless steel common bowl skirt
- Stainless steel undershelf, removable
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #A7 SPARE NUMBER

ITEM #A8 STORAGE SYSTEM, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model WAL-STOR. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting Height: 50" above finished floor
- 2 ea. Wall grid/mat, WM1854-E, stacked
- 1 ea. Wall uprights, vertical, PR45VU-E
- 2 ea. Shelf, 1448-E
- 2 ea. Shelf Brackets, PR14B-E
- 1 ea. Grid Shelf, 1436WGS-E
- 2 ea. Baskets, WB-E
- 12 ea. Utility Hooks, UH-E
- 1 ea. Epoxy coated finish, entire wall system
- Wall backing by General Contractor

Or as manufactured by Focus or Metro.

ITEM #A9 WORK TABLE, PORTABLE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-3060. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #A10 WORK TABLE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-30120. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- 2 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #A11 WORK TABLE W/ SINK – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-30120. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- 1 ea. Built-in work sink, 20" L x 16" W x 12" D each
- 1 ea. S.S. Removable sink bowl cover
 - Stainless steel, 14 Gauge
 - Finger holes, lift-off
 - Flush inlay with work sink/top
 - Integral bracket, under counter, to hold when not in use
- 1 ea. Waste valve with lever
- 1 ea. Tail piece
- 1 ea. Waste overflow
- 1 ea. Stainless steel faucet with 12" swing spout and wrist action handles, 1/2" connections
- 2 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #A12 POT RACK, TABLE MNTD. W/ SHELF – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model PRT-3-24108. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting Height: 80" above table top, pot rack
- Mounting Height: 20" above table top, overshelf
- 1 ea. Middle shelf, 16" wide
- 50 ea. Stainless steel pot-hooks
- Secured thru splash/table top, anchor to structure

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #A13 SMOKER OVEN – QTY. AS PER PLAN & SCHEDULE

Nu-Vu Food Service Equipment Model SMOKE13. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired
- Verify door hinging
- 1 ea. Humidity system
- 1 ea. Internal smoke box
- Cold water connection piped from RO Filter System, Item #24

Or as manufactured by Cres Cor or Alto-Shaam.

ITEM #A14 SPARE NUMBER

ITEM #A15 FRYER, GAS W/ FILTER – QTY. AS PER PLAN & SCHEDULE

Frymaster Model FPPH255. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: (2)120/1, NEMA 5-15P
- Gas: 1" Rear Connection, 160 MBtuh
- High Efficiency Burners
- 1 ea. Pressure regulator
- 1 ea. Manifold gas line for double fryer
- 2 ea. Fryers, full pot
- 1 ea. Drain cabinet

- 4 ea. Half size baskets
- 2 ea. Full size baskets
- 2 ea. Stainless steel frypot covers
- 2 ea. Sediment trays
- 1 ea. Standard controls
- 1 ea. Built-in filtration system
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- 1 ea. Energy Star® Certified
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Vulcan or Pitco.

ITEM #A16 GRIDDLE, HEAVY DUTY, GAS – QTY. AS PER PLAN & SCHEDULE

Garland Model M48S. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Gas: 3/4" Rear Connection, 99 MBtuh
- 1 ea. Pressure regulator
- 1 ea. Electronic spark ignition
- 1 ea. Thermostatic controls
- 1 ea. Storage base
- 1 ea. Flame fail system
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Southbend or Vulcan.

ITEM #A17 CHARBROILER, HEAVY DUTY, GAS – QTY. AS PER PLAN & SCHEDULE

Garland Model MST34BE. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Gas: 3/4" Rear Connection, 90 MBtuh
- 1 ea. Pressure regulator
- 1 ea. Electronic spark ignition
- 1 ea. Storage base
- 1 ea. Flame fail system
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Southbend or Vulcan.

ITEM #A18 RANGE, HEAVY DUTY, GAS – QTY. AS PER PLAN & SCHEDULE

Garland Model MST43R-E. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Gas: 3/4" Rear Connection, 184 MBtuh
- 1 ea. Pressure regulator
- 1 ea. Electronic spark ignition
- 1 ea. Standard oven base
- 1 ea. Flame fail system
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Southbend or Vulcan.

ITEM #A19 RANGE, HEAVY DUTY, GAS – QTY. AS PER PLAN & SCHEDULE

Garland Model MST43R-E. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Gas: 3/4" Rear Connection, 184 MBtuh
- 1 ea. Pressure regulator
- 1 ea. Electronic spark ignition
- 1 ea. Standard oven base
- 1 ea. Flame fail system
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Southbend or Vulcan.

ITEM #A20 SALAMANDER BROILER, RANGE MNTD. – QTY. AS PER PLAN & SCHEDULE

Garland Model MSTSRCM. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Gas: 3/4" Rear Connection, 35 MBtuh
- 1 ea. Inter-piped with Item #A19, Heavy Duty Range
- 1 ea. Range mount kit
- 1 ea. Stainless steel main back
- 1 ea. 48" Quick disconnect with flexible hose

- 1 ea. Restraint cable

Or as manufactured by Southbend or Vulcan.

ITEM #A21 SPARE NUMBER

ITEM #A22 OVEN, CONVECTION, GAS – QTY. AS PER PLAN & SCHEDULE

Garland Model MCO-GS-20-ESS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: (2)120/1, NEMA 5-15P
- Gas: 3/4" Rear Connection, 120 MBtuh
- Manifold gas line for double unit
- 1 ea. Pressure regulator
- 1 ea. Electronic ignition
- 1 ea. Solid state controls
- 1 ea. Stainless steel exterior bottom
- 1 ea. Stainless steel back enclosure, top/bottom
- 1 ea. Extra oven racks
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- Energy Star® Certified
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Southbend or Vulcan.

ITEM #A23 OVEN-STEAMER, COMBI, GAS – QTY. AS PER PLAN & SCHEDULE

Convotherm Model C4ET 10.20 GB-N. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Gas: 3/4" Connection, 109 MBtuh
- Verify door hinging
- 1 ea. iCookingControl with 4 modes
- 1 ea. (10) 18" x 26" or (20) 12" x 20" pan capacity
- 1 ea. Core temperature probe, multipoint measurement
- 1 ea. Hand shower with automatic retracting system
- 1 ea. Ethernet interface
- 1 ea. Chemical Storage Shelf, Wall Mntd.
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- 1 ea. Installation Kit for gas units
- 1 ea. Stacking Kit with item #A24
- 1 ea. K-12 School package/ warranty

- 1 ea. Certified Manufacturer Installation/ Start-Up
- Cold water connection piped from RO Filter System, Item #A33

Or as manufactured by Alto-Shaam or Electrolux.

ITEM #A24 OVEN-STEAMER, COMBI, GAS – QTY. AS PER PLAN & SCHEDULE

Convotherm Model C4ET 6.20 GB-N. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Gas: 1/2" Connection, 68 MBtuh
- Verify door hinging
- 1 ea. iCookingControl with 4 modes
- 1 ea. (6) 18" x 26" or (12) 12" x 20" pan capacity
- 1 ea. Core temperature probe, multipoint measurement
- 1 ea. Hand shower with automatic retracting system
- 1 ea. Ethernet interface
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- 1 ea. Installation Kit for gas units
- 1 ea. K-12 School package/ warranty
- 1 ea. Certified Manufacturer Installation/ Start-Up
- Cold water connection piped from RO Filter System, Item #A33

Or as manufactured by Alto-Shaam or Electrolux.

ITEM #A25 S.S. WALL PANEL(S), 674"L – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Stainless steel panels, evenly sized, 20 Gauge
- Installed from top of coved base to underside of hood, entire length
- Hairline joints sealed with S.S. trim strips
- Secured to wall with heat resistant mastic

It is the responsibility of the Kitchen Equipment Contractor to coordinate and make all appropriate cut-outs in paneling based on utility requirements in this location and apply appropriate stainless steel trim strips, caps, gussets, etc...

Or as manufactured by Caddy or Accurex.

ITEM #A26 EXHAUST HOOD, TYPE I – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Construction: 100% 430 stainless steel
- Filters: Stainless steel captrate solo with hook
- Insulation: Integral air/ insulation barriers at perimeter and top, 0" clearance to combustibles
- Structural front panel, insulated
- Wall / Island canopy hood, length/ size as per contract documents
- 2 ea. Front perforated supply plenum (PSP) with built-in 3" back standoff
- Insulation for PSP housing, as required
- 4 ea. LED lights with bulbs
- Stainless steel field wrap, approximately 18" high on all exposed sides
- Adjustable exhaust air volume control damper
- Hood Control Panel Package:
 - EMSplus11 modulating energy management system with smart controls
 - Built-in VFDs
 - Duct Temperature Sensors in all risers
 - Room Temperature Sensor
 - Configurable through Touch Screen Interface
 - EMS Duct Thermostat
 - INVERTER DUTY THREE PHASE MOTORS REQUIRED

Or as manufactured by Caddy or Accurex.

ITEM #A27 SUPPLY PLENUM, MAKE-UP AIR – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #A26, Exhaust Hood

Or as manufactured by Caddy or Accurex.

ITEM #A28 SPARE NUMBER

ITEM #A29 FLAT BAR RACK, HOOD MNTD., 317"L – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting height: 96" above finished floor to underside
- Welded/ secured at front face of exhaust hood

- 50 ea. Stainless steel pot-hooks

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #A30 EXHAUST HOOD, CONTROL PANEL – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #A26, Exhaust Hood

Or as manufactured by Caddy or Accurex.

ITEM #A31 FIRE PROTECTION SYSTEM – QTY. AS PER PLAN & SCHEDULE

Ansul Model UL-300 (R-102). Unit to be installed where shown on drawing in strict accordance to that described in General Specifications. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Provide connection to building Fire Alarm System
- 1 ea. Gas valve, up to 3", size to be verified
- 1 ea. Reset Relay Push Button
- For the protection of equipment beneath Exhaust Hood, Item #A26

Or as manufactured by Caddy or Accurex.

ITEM #A32 EYE WASH STATION, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

Guardian Model G1750P. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Thermostatic mixing valve, TMVG3600LF
- 1 ea. ANSI Compliant identification sign
- Wall backing by General Contractor

Or as manufactured by T&S Brass or Component Hardware.

ITEM #A33 RESERVE OSMOSIS FILTER SYSTEM – QTY. AS PER PLAN & SCHEDULE

Antunes Model AQ-RO-600. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- For use with Item #A23, Combi Oven
- For use with Item #A24, Combi Oven
- For use with Item #P1, Combi Oven

- For use with Item #P5, Convection Steamer
- 1 ea. Certified factory install

Or as manufactured by Everpure or Optipure.

ITEM #A34 SURGE TANK, 44-GALLON – QTY. AS PER PLAN & SCHEDULE

Antunes Model 7000829. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- For use with Item #A33, RO Filter System

Or as manufactured by Everpure or Optipure.

BAKERY AREA

ITEM #B1 DOUGH SHEETER – QTY. AS PER PLAN & SCHEDULE

Gemini Model SSO6405. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 220/3, Hardwired
- 1 ea. 25¼"W Conveyor belt
- 1 ea. Foot pedal switch
- 1 ea. Fold-up design

Or as manufactured by Empire Bakery or Doyon.

ITEM #B2 MIXER, FLOOR – QTY. AS PER PLAN & SCHEDULE

Hobart Model HL600. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, NEMA L15-20P
- 1 ea. 60-Quart capacity
- 1 ea. Deluxe accessory package
- 1 ea. Bowl truck

Or as manufactured by Globe or Univex.

ITEM #B3 MIXER, SPIRAL – QTY. AS PER PLAN & SCHEDULE

Gemini Model GBE-M130. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired
- Dough Capacity: 286 lbs.
- 1 ea. Programmable digital control

- 1 ea. Jog / reverse mode
- 1 ea. Paddle
- 1 ea. Bowl scraper
- 1 ea. Mixing tools

Or as manufactured by Empire Bakery or Doyon.

ITEM #B4 WATER METER – QTY. AS PER PLAN & SCHEDULE

Empire Bakery Equipment Model DOMIX-45. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Dosing Capacity: 265 Gallons
- 1 ea. Keypad control
- 1 ea. External temperature probe
- 1 ea. Temperature regulation knob
- Cold water connection piped from Central Filtration System, Item #D19

Or as manufactured by Doyon or BakeMax.

ITEM #B5 FIRE EXTINGUISHER, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

Ansul Model K-CLASS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Wet chemical type, Ansulex low pH agent
- 1 ea. 2.5 Gallon tank
- 1 ea. Wall bracket
- 1 ea. Rechargeable
- Wall backing by General Contractor

Or as manufactured by Kidde or RangeGuard.

ITEM #B6 HAND SINK, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WS-1D. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Manual faucet, gooseneck
- 1 ea. Soap dispenser
- 1 ea. Towel dispenser
- 1 ea. Left and right splash guards
- Wall backing by General Contractor

Or as manufactured by Eagle Group/Metal Masters or John Boos.

ITEM #B7 SPARE NUMBER

ITEM #B8 HOSE REEL WITH GUN – QTY. AS PER PLAN & SCHEDULE

T&S Brass Model B-7132-05. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. 35' hose length
- 1 ea. Spray gun assembly
- 1 ea. Exposed reel
- 1 ea. Hose reel connector kit
- All necessary components for full operation

Or as manufactured by Fisher or Component Hardware.

ITEM #B9 PROOFER/RETARDER, SELF-CONTAINED – QTY. AS PER PLAN & SCHEDULE

Baxter Mfg. Model RPW1S-40.5D-FL. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, Hardwired
- Verify door hinging
- 1 ea. Self-contained refrigeration
- 1 ea. Automatic humidity
- 1 ea. Programmable digital controls
- Cold water connection piped from Central Filtration System, Item #D19

Or as manufactured by Gemini or Revent.

ITEM #B10 OVEN, REVOLVING TRAY – QTY. AS PER PLAN & SCHEDULE

Baxter Mfg. Model OV500G1EE. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, Hardwired
- Electrical: 120/1, Hardwired
- Gas: 1" Rear Connection, 180 MBtuh
- Capacity: 1-Single rack
- 1 ea. Auto rack lift
- 4 ea. Roll-in rack units, compatible with item #B9
- 1 ea. Self-contained steam system
- 1 ea. Programmable digital controls
- 1 ea. Stainless steel full exterior
- 1 ea. Stainless steel floor, 14 Gauge
- 1 ea. Oven body shipped split, ASYFLD

- 1 ea. Hood with plenum, Type II
- 1 ea. Single point vent connection
- Cold water connection piped from Central Filtration System, Item #D19

Or as manufactured by Gemini or Revent.

ITEM #B11 UL103 CHIMNEY FLUE, DOUBLE WALL – QTY. AS PER PLAN & SCHEDULE

By Mechanical Contractor. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- No additional features, options or accessories required

ITEM #B12 IN-LINE EXHAUST FAN – QTY. AS PER PLAN & SCHEDULE

By Mechanical Contractor. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- No additional features, options or accessories required

ITEM #B13 WORK TABLE, PORTABLE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-3060. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #B14 SPARE NUMBER

ITEM #B15 WORK TABLE W/ SINK – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-30120. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- 1 ea. Built-in work sink, 20" L x 16" W x 12" D each

- 1 ea. S.S. Removable sink bowl cover
 - Stainless steel, 14 Gauge
 - Finger holes, lift-off
 - Flush inlay with work sink/top
 - Integral bracket, under counter, to hold when not in use
- 1 ea. Waste valve with lever
- 1 ea. Tail piece
- 1 ea. Waste overflow
- 1 ea. Stainless steel faucet with 12" swing spout and wrist action handles, 1/2" connections
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #B16 REFRIGERATOR, PASS-THRU – QTY. AS PER PLAN & SCHEDULE

Continental Refrigerator Model 1RNSSPTHD. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Verify door hinging
- 1 ea. Self-contained refrigeration
- 4 ea. Half doors with locks, pass-thru model
- 3 ea. Stainless steel shelves per compartment, top section
- 1 ea. Digital temperature control system
- 1 ea. Energy Star® Certified
- Adjustable universal pan slides 1-1/2" O.C. to hold 18" x 26" or 12" x 20" pans, bottom section
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Utility Refrigerator or Traulsen.

ITEM #B17 WORK TABLE W/ SINK – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-30120. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- 1 ea. Built-in work sink, 20" L x 16" W x 12" D each
- 1 ea. S.S. Removable sink bowl cover
 - Stainless steel, 14 Gauge
 - Finger holes, lift-off

- Flush inlay with work sink/top
- Integral bracket, under counter, to hold when not in use
- 1 ea. Waste valve with lever
- 1 ea. Tail piece
- 1 ea. Waste overflow
- 1 ea. Stainless steel faucet with 12" swing spout and wrist action handles, 1/2" connections
- Stainless steel tubular crossrails, side / rear
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #B18 WORK TABLE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-30120. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- Stainless steel tubular crossrails, side / rear
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #B19 POT RACK, TABLE MNTD. W/ SHELF – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model PRT-3-24108. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting Height: 80" above table top, pot rack
- Mounting Height: 20" above table top, overshelf
- 1 ea. Middle shelf, 16" wide
- 50 ea. Stainless steel pot-hooks
- Secured thru splash/table top, anchor to structure

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #B20 BIN, INGREDIENT – QTY. AS PER PLAN & SCHEDULE

Cambro Model IBS20-148. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Capacity: 21 Gallons
- 1 ea. CamWear scoop, 24 oz.

- 1 ea. Sliding cover

Or as manufactured by Rubbermaid or Carlisle.

ITEM #B21 SPARE NUMBER

ITEM #B22 BAGEL DIVIDER/ FORMER – QTY. AS PER PLAN & SCHEDULE

Gemini Model KSD-100/ KSF-300S. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired
- Production: 4,000 pieces per hour
- 1 ea. Divider system with adjustable speed control
- 1 ea. Former system
- 1 ea. Magnetic safety switches, front and back
- 1 ea. Regular 9" setup with 1-5/8" mandrel
- 1 ea. Stainless steel side guard w/ magnetic safety switch
- 1 ea. Stainless steel discharge guard w/ magnetic safety switch
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Empire Bakery or Doyon.

ITEM #B23 FRYER, GAS W/ FILTER – QTY. AS PER PLAN & SCHEDULE

Frymaster Model FPPH255. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: (2)120/1, NEMA 5-15P
- Gas: 1" Rear Connection, 160 MBtuh
- High Efficiency Burners
- 1 ea. Pressure regulator
- 1 ea. Manifold gas line for double fryer
- 2 ea. Fryers, full pot
- 4 ea. Half size baskets
- 2 ea. Full size baskets
- 2 ea. Stainless steel frypot covers
- 2 ea. Sediment trays
- 1 ea. Standard controls
- 1 ea. Built-in filtration system
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- 1 ea. Energy Star® Certified
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Vulcan or Pitco.

ITEM #B24 RANGE, 8-BURNER, GAS – QTY. AS PER PLAN & SCHEDULE

Garland Model G48-8RS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Gas: 1" Rear Connection, 302 MBtuh
- 1 ea. Pressure regulator
- 1 ea. 8 Open burners
- 1 ea. Standard oven base
- 1 ea. Storage base
- 1 ea. Stainless steel backguard with shelf
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- Mounted on heavy duty adjustable casters, front two with brakes

Or as manufactured by Southbend or Vulcan.

ITEM #B25 OVEN, CONVECTION, GAS – QTY. AS PER PLAN & SCHEDULE

Garland Model MCO-GS-20-ESS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: (2)120/1, NEMA 5-15P
- Gas: 3/4" Rear Connection, 120 MBtuh
- Manifold gas line for double unit
- 1 ea. Pressure regulator
- 1 ea. Electronic ignition
- 1 ea. Solid state controls
- 1 ea. Stainless steel exterior bottom
- 1 ea. Stainless steel back enclosure, top/bottom
- 1 ea. Extra oven racks
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- Energy Star® Certified
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Southbend or Vulcan.

ITEM #B26 S.S. WALL PANEL(S), 669"L – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Stainless steel panels, evenly sized, 20 Gauge

- Installed from top of coved base to underside of hood, entire length
- Hairline joints sealed with S.S. trim strips
- Secured to wall with heat resistant mastic

It is the responsibility of the Kitchen Equipment Contractor to coordinate and make all appropriate cut-outs in paneling based on utility requirements in this location and apply appropriate stainless steel trim strips, caps, gussets, etc...

Or as manufactured by Caddy or Accurex.

ITEM #B27 EXHAUST HOOD, TYPE I – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Construction: 100% 403 stainless steel
- Filters: Stainless steel captrate solo with hook
- Insulation: Integral air/ insulation barriers at perimeter and top, 0" clearance to combustibles
- Structural front panel, insulated
- Wall / Island canopy hood, length/ size as per contract documents
- 1 ea. Front perforated supply plenum (PSP) with built-in 3" back standoff
- Insulation for PSP housing, as required
- 4 ea. LED lights with bulbs
- Stainless steel field wrap, approximately 18" high on all exposed sides
- Adjustable exhaust air volume control damper
- Hood Control Panel Package:
 - EMSplus11 modulating energy management system with smart controls
 - Built-in VFDs
 - Duct Temperature Sensors in all risers
 - Room Temperature Sensor
 - Configurable through Touch Screen Interface
 - EMS Duct Thermostat
 - INVERTER DUTY THREE PHASE MOTORS REQUIRED

Or as manufactured by Caddy or Accurex.

ITEM #B28 SPARE NUMBER

ITEM #B29 SUPPLY PLENUM, MAKE-UP AIR – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #B27, Exhaust Hood

Or as manufactured by Caddy or Accurex.

ITEM #B30 FLAT BAR RACK, HOOD MNTD., 192"L – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting height: 96" above finished floor to underside
- Welded/ secured at front face of exhaust hood
- 50 ea. Stainless steel pot-hooks

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #B31 EXHAUST HOOD, CONTROL PANEL – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #B27, Exhaust Hood

Or as manufactured by Caddy or Accurex.

ITEM #B32 FIRE PROTECTION SYSTEM – QTY. AS PER PLAN & SCHEDULE

Ansul Model UL-300 (R-102). Unit to be installed where shown on drawing in strict accordance to that described in General Specifications. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Provide connection to building Fire Alarm System
- 1 ea. Gas valve, up to 3", size to be verified
- 1 ea. Reset Relay Push Button
- For the protection of equipment beneath Exhaust Hood, Item #B27

Or as manufactured by Caddy or Accurex.

ITEM #B33 WALK-IN COOLER – QTY. AS PER PLAN & SCHEDULE

Thermal-Rite Model Custom with Omni-Temp Model KLP214MA-S1D (evaporator coils). Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired, Controls/ lighting

- Electrical: 120/1, Hardwired, Evaporator Coil(s)
- Walk-in Cooler Height: 8'-6" AFF
- Exterior Finish:
 - Stucco Stainless Steel, Exposed Panel(s)
 - Smooth Galvalume, Unexposed Panel(s)
- Interior Finish:
 - White Smooth Galvalume, Walls/ Ceiling Panel(s)
 - Smooth Galvalume, Floor Panel(s)
- Pre-formed panels: 4" Thick, polyurethane insulation
- Pre-formed floor panel: 4" Thick, polyurethane insulation depressed in slab, 6 ½" depression
- Interior floor finish: Continuation of kitchen flooring material, as selected by Architect
- Interior / Exterior diamond tread kick plate at door section, foamed in place
- 1 ea. 36" x 78" Door with vision panel
- 1 ea. Flush mount audible temperature/monitoring system alarm
- 1 ea. Evaporator coil limit switch, mounted in interior door frame
- 1 ea. Removable louvered trim panels to ceiling, accessible

Or as manufactured by TAFCO or Norlake.

ITEM #B34 STORAGE SHELVING, 22"W – QTY. AS PER PLAN & SCHEDULE

Fermod Model 6611/R1. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Shelving to be sized to fit
- 4 ea. Shelves with removable, vented inserts
- 4 ea. 71" High uprights
- 1 ea. Tool free shelf adjustment
- Clear corner assemblies where required

Or as manufactured by Metro or Cambro.

ITEM #B35 SPARE NUMBER

ITEM #B36 DUNNAGE RACK(S), 22"W – QTY. AS PER PLAN & SCHEDULE

Fermod Model 1R38C12. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- No additional features, options or accessories are required

Or as manufactured by Metro or Cambro.

ITEM #B37 STORAGE SHELVING, 22"W – QTY. AS PER PLAN & SCHEDULE

Fermod Model 6611/R1. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Shelving to be sized to fit
- 5 ea. Shelves with removable, vented inserts
- 4 ea. 84" High uprights
- 1 ea. Tool free shelf adjustment
- Clear corner assemblies where required

Or as manufactured by Metro or Cambro.

COOK CHILL AREA

ITEM #C1 HAND SINK, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WS-1D. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Manual faucet, gooseneck
- 1 ea. Soap dispenser
- 1 ea. Towel dispenser
- 1 ea. Left and right splash guards
- Wall backing by General Contractor

Or as manufactured by Eagle Group/Metal Masters or John Boos.

ITEM #C2 HOSE REEL WITH GUN – QTY. AS PER PLAN & SCHEDULE

T&S Brass Model B-7132-05. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. 35' hose length
- 1 ea. Spray gun assembly
- 1 ea. Exposed reel
- 1 ea. Hose reel connector kit
- All necessary components for full operation

Or as manufactured by Fisher or Component Hardware.

ITEM #C3 FREEZER, REACH-IN – QTY. AS PER PLAN & SCHEDULE

Continental Refrigerator Model 2FNSS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Exterior Finish: Stainless Steel
- Interior Finish: Stainless Steel
- Verify door hinging

- 1 ea. Self-contained refrigeration
- 2 ea. Full doors with locks
- 3 ea. Stainless steel shelves per compartment, top section
- 1 ea. Digital temperature control system
- Adjustable universal pan slides 1-1/2" O.C. to hold 18" x 26" or 12" x 20" pans, bottom section
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Utility Refrigerator or Traulsen.

ITEM #C4 ICE CREAM MACHINE – QTY. AS PER PLAN & SCHEDULE

Carpigiani Model PASTOMASTER PKT60 RTX/A. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired
- Cylinder Capacity: 16 Gallons
- 1 ea. Self-contained refrigeration, air-cooled
- 1 ea. Electronic control
- 1 ea. Faucet sprayer

Or as manufactured by Stoetling or Taylor.

ITEM #C5 OVEN, PIZZA DECK, GAS – QTY. AS PER PLAN & SCHEDULE

Blodgett Model 961P DOUBLE. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Gas: 3/4" Rear Connection, 100 MBtuh
- 1 ea. Manifold gas line for double unit
- 1 ea. Pressure regulator
- 1 ea. Mechanical thermostat
- 1 ea. 48" Quick disconnect with flexible hose
- 2 ea. Restraint cable
- Mounted on heavy duty adjustable casters, front two with brakes

Or as manufactured by American Range or Bakers Pride.

ITEM #C6 EXHAUST HOOD, TYPE I – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Construction: 100% 403 stainless steel
- Filters: Stainless steel captrate solo with hook

- Insulation: Integral air/ insulation barriers at perimeter and top, 0" clearance to combustibles
- Structural front panel, insulated
- Wall / Island canopy hood, length/ size as per contract documents
- 1 ea. Front perforated supply plenum (PSP) with built-in 3" back standoff
- Insulation for PSP housing, as required
- 4 ea. LED lights with bulbs
- Stainless steel field wrap, approximately 18" high on all exposed sides
- Adjustable exhaust air volume control damper
- Hood Control Panel Package:
 - EMSplus11 modulating energy management system with smart controls
 - Built-in VFDs
 - Duct Temperature Sensors in all risers
 - Room Temperature Sensor
 - Configurable through Touch Screen Interface
 - EMS Duct Thermostat
 - INVERTER DUTY THREE PHASE MOTORS REQUIRED

Or as manufactured by Caddy or Accurex.

ITEM #C7 BATCH FREEZER – QTY. AS PER PLAN & SCHEDULE

Carpigiani Model LB502 G RTX/A. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired
- Capacity: 20-qt.
- 1 ea. Self-contained refrigeration, air-cooled
- 1 ea. Electronic Control
- 1 ea. Built-in Faucet with hose

Or as manufactured by Stoetling or Taylor.

ITEM #C8 SUPPLY PLENUM, MAKE-UP AIR – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #C6, Exhaust Hood

Or as manufactured by Caddy or Accurex.

ITEM #C9 FLAT BAR RACK, HOOD MNTD., 317"L – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General

Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting height: 96" above finished floor to underside
- Welded/ secured at front face of exhaust hood
- 50 ea. Stainless steel pot-hooks

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #C10 SPARE NUMBER

ITEM #C11 EXHAUST HOOD, CONTROL PANEL – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #C6, Exhaust Hood

Or as manufactured by Caddy or Accurex.

ITEM #C12 FIRE PROTECTION SYSTEM – QTY. AS PER PLAN & SCHEDULE

Ansul Model UL-300 (R-102). Unit to be installed where shown on drawing in strict accordance to that described in General Specifications. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Provide connection to building Fire Alarm System
- 1 ea. Gas valve, up to 3", size to be verified
- 1 ea. Reset Relay Push Button
- For the protection of equipment beneath Exhaust Hood, Item #C6

Or as manufactured by Caddy or Accurex.

ITEM #C13 WORK TABLE, PORTABLE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-3060. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #C14 SPARE NUMBER

ITEM #C15 REFRIGERATOR, PASS-THRU – QTY. AS PER PLAN & SCHEDULE

Continental Refrigerator Model 1RNSSPTH. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Exterior Finish: Stainless Steel
- Interior Finish: Stainless Steel
- Verify door hinging
- 1 ea. Self-contained refrigeration
- 4 ea. Half solid doors with locks, pass-thru model
- 3 ea. Stainless steel shelves per compartment, top section
- 1 ea. Digital temperature control system
- 1 ea. Energy Star® Certified
- Adjustable universal pan slides 1-1/2" O.C. to hold 18" x 26" or 12" x 20" pans, bottom section
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Utility Refrigerator or Traulsen.

ITEM #C16 WORK TABLE W/ SINK – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-30120. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- 1 ea. Built-in work sink, 20" L x 16" W x 12" D each
- 1 ea. S.S. Removable sink bowl cover
 - Stainless steel, 14 Gauge
 - Finger holes, lift-off
 - Flush inlay with work sink/top
 - Integral bracket, under counter, to hold when not in use
- 1 ea. Waste valve with lever
- 1 ea. Tail piece
- 1 ea. Waste overflow
- 1 ea. Stainless steel faucet with 12" swing spout and wrist action handles, 1/2" connections
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #C17 WORK TABLE W/ SINK – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-30120. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- 1 ea. Built-in work sink, 20" L x 16" W x 12" D each
- 1 ea. S.S. Removable sink bowl cover
 - Stainless steel, 14 Gauge
 - Finger holes, lift-off
 - Flush inlay with work sink/top
 - Integral bracket, under counter, to hold when not in use
- 1 ea. Waste valve with lever
- 1 ea. Tail piece
- 1 ea. Waste overflow
- 1 ea. Stainless steel faucet with 12" swing spout and wrist action handles, 1/2" connections
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #C18 POT RACK, TABLE MNTD. W/ SHELF – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model PRT-3-24108. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting Height: 80" above table top, pot rack
- Mounting Height: 20" above table top, overshelf
- 1 ea. Middle shelf, 16" wide
- 50 ea. Stainless steel pot-hooks
- Secured thru splash/table top, anchor to structure

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #C19 SOILED DISH TABLE W/ PRE-RINSE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model SSDT-60. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Stainless steel tubular crossrails, side / rear
- 1 ea. Built-in pre-wash sink, 21" L x 21" W x 7" D
- 1 ea. Waste valve
- 1 ea. Stainless steel pre-rinse assembly with 12" swing spout add-on faucet and wrist action handles, 1/2" connections
- 1 ea. Removable perforated basket, 19" L x 19" W x 6" D, Stainless Steel, 18 Gauge
- 1 ea. Removable rack guide to fit over sink, Stainless Steel, 12 Gauge

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #C20 RACK SHELF, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

New Age Model 53082. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting height: 56" above finished floor
- Capacity: (6) 20" x 20" Racks
- 1 ea. Vertical storage, 4-1/2" centers
- Wall backing by General Contractor

Or as manufactured by Lockwood or Channel Mfg.

ITEM #C21 FILTER SYSTEM FOR ITEM #C22 – QTY. AS PER PLAN & SCHEDULE

Antunes Model 9700963. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- For use with Item #C22, Warewasher
- 6 ea. Replacement cartridges

Or as manufactured by Everpure or Optipure.

ITEM #C22 WAREWASHER, DOOR TYPE – QTY. AS PER PLAN & SCHEDULE

Meiko Model DV 80.2. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 460/3, Hardwired
- Electrical: 120/1, Hardwired
- Verify direction of operation
- 1 ea. Single point electrical connection
- 1 ea. Straight-thru design application
- 3 ea. Peg racks
- 3 ea. All purpose racks
- 1 ea. Built-in hot water booster, 70° rise
- 1 ea. Detergent/rinse aid pumps

- 1 ea. Drain tempering kit
- 1 ea. Start-up/ Performance and Installation Program
- H.W. connection piped through filter, item #C21
- Flanged feet bolted to floor

Or as manufactured by Champion or Hobart.

ITEM #C23 CLEAN DISH TABLE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model SCDT-MOD. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Stainless steel tubular crossrails, side/ rear

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #C24 STORAGE SYSTEM, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model WAL-STOR. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting Height: 50" above finished floor
- 2 ea. Wall grid/mat, WM1860-E, stacked
- 1 ea. Wall uprights, vertical, PR45VU-E
- 2 ea. Shelf, 1448-E
- 2 ea. Shelf Brackets, PR14B-E
- 1 ea. Grid Shelf, 1436WGS-E
- 2 ea. Baskets, WB-E
- 12 ea. Utility Hooks, UH-E
- 1 ea. Epoxy coated finish, entire wall system
- Wall backing by General Contractor

Or as manufactured by Focus or Metro.

ITEM #C25 HAND SINK, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model CSW9-1S-SS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Manual faucet, gooseneck
- 1 ea. Soap dispenser
- 1 ea. Towel dispenser
- 1 ea. Left and right splash guards
- 1 ea. Emergency Eye Wash Unit

- 1 ea. Thermostatic mixing valve
- Wall backing by General Contractor

Or as manufactured by Eagle Group/Metal Masters or John Boos.

ITEM #C26 HOSE WASH TANK, COOK/ CHILL – QTY. AS PER PLAN & SCHEDULE

Tucs Equipment Model TEHWT. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 460/3, Hardwired
- 1 ea. Rinse hose/ nozzle assembly
- 1 ea. Integral backsplash with hose hangers
- 1 ea. Control panel with temperature monitoring

Or as manufactured by CapKold or Cleveland.

ITEM #C27 S.S. WALL PANEL(S) 200"L – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Stainless steel panels, evenly sized, 20 Gauge
- Installed from top of coved base to underside of hood, entire length
- Hairline joints sealed with S.S. trim strips
- Secured to wall with heat resistant mastic

It is the responsibility of the Kitchen Equipment Contractor to coordinate and make all appropriate cut-outs in paneling based on utility requirements in this location and apply appropriate stainless steel trim strips, caps, gussets, etc...

Or as manufactured by Capive Aire or Accurex.

ITEM #C28 AIR COMPRESSOR WITH DRYER – QTY. AS PER PLAN & SCHEDULE

Tucs Equipment Model TEAC-10HP. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 460/3, Hardwired
- Electrical: 120/1, Hardwired
- 1 ea. Air dryer, single
- 2 ea. 10-HP compressor(s)
- 2 ea. 120 Gallon tanks, vertical
- 1 ea. High/slash low pressure shutdown

Or as manufactured by CapKold or Cleveland.

ITEM #C29 S.S. WALL PANEL(S) 88"L – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Stainless steel panels, evenly sized, 20 Gauge
- Installed from top of coved base to underside of hood, entire length
- Hairline joints sealed with S.S. trim strips
- Secured to wall with heat resistant mastic

It is the responsibility of the Kitchen Equipment Contractor to coordinate and make all appropriate cut-outs in paneling based on utility requirements in this location and apply appropriate stainless steel trim strips, caps, gussets, etc...

Or as manufactured by Capive Aire or Accurex.

ITEM #C30 TILTING KETTLE, 150-GAL., GAS – QTY. AS PER PLAN & SCHEDULE

Tucs Equipment Model TECV-150T-G-RH. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired
- Gas: 3/4" Rear Connection, 375 MBtuh
- Capacity: 150 Gallons
- 1 ea. Pressure regulator
- 1 ea. Gallon markings
- 1 ea. Digital control panel
- 1 ea. Variable frequency motor speed drive
- 1 ea. Reversible direction
- 1 ea. Power tilt with manual override
- 1 ea. Mixing scraper agitator, horizontal
- 1 ea. Air compressor connection
- 1 ea. Safety grate/ lid, pneumatic
- 1 ea. Slide-out operator step
- 1 ea. Agitator removal cart
- 1 ea. Agitator storage cart
- 1 ea. Pasta basket with storage dolly
- 1 ea. Pasta basket lift, mobile
- 1 ea. Water meter/ fill hose
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable

Or as manufactured by CapKold or Cleveland.

ITEM #C31 FLOOR TROUGH – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model FT-2430-SG. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. NSF Approved
- 1 ea. Standard 4" depth
- 1 ea. Fibergrate style Micromesh, removable grate, ADA type, gridded fiberglass

Or as manufactured by Eagle Group/Metal Masters or John Boos.

ITEM #C32 TILTING KETTLE, 150-GAL., GAS – QTY. AS PER PLAN & SCHEDULE

Tucs Equipment Model TECV-150T-G-RH. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired
- Gas: 3/4" Rear Connection, 375 MBtuh
- Capacity: 150 Gallons
- 1 ea. Pressure regulator
- 1 ea. Gallon markings
- 1 ea. Digital control panel
- 1 ea. Variable frequency motor speed drive
- 1 ea. Reversible direction
- 1 ea. Power tilt with manual override
- 1 ea. Mixing scraper agitator, horizontal
- 1 ea. Air compressor connection
- 1 ea. Safety grate/ lid, pneumatic
- 1 ea. Slide-out operator step
- 1 ea. Agitator removal cart
- 1 ea. Agitator storage cart
- 1 ea. Pasta basket with storage dolly
- 1 ea. Pasta basket lift, mobile
- 1 ea. Water meter/ fill hose
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable

Or as manufactured by CapKold or Cleveland.

ITEM #C33 EXHAUST HOOD, TYPE I – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Construction: 100% 430 stainless steel
- Filters: Stainless steel captrate solo with hook
- Insulation: Integral air/ insulation barriers at perimeter and top, 0" clearance to combustibles
- Structural front panel, insulated
- Wall / Island canopy hood, length/ size as per contract documents
- 2 ea. Front perforated supply plenum (PSP) with built-in 3" back standoff
- Insulation for PSP housing, as required
- 4 ea. LED lights with bulbs
- Stainless steel field wrap, approximately 18" high on all exposed sides
- Adjustable exhaust air volume control damper
- Hood Control Panel Package:
 - EMSplus11 modulating energy management system with smart controls
 - Built-in VFDs
 - Duct Temperature Sensors in all risers
 - Room Temperature Sensor
 - Configurable through Touch Screen Interface
 - EMS Duct Thermostat
 - INVERTER DUTY THREE PHASE MOTORS REQUIRED

Or as manufactured by Caddy or Accurex.

ITEM #C34 SUPPLY PLENUM, MAKE-UP AIR – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #C33, Exhaust Hood

Or as manufactured by Caddy or Accurex.

ITEM #C35 EXHAUST HOOD, TYPE II – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Construction: 100% 430 Stainless steel
- Structural front panel
- Length/ size as per contract documents, wall/ island canopy hood
- Stainless steel field wrap, approximately 18" high on all exposed sides
- Baffles shall be fully removable
- Full perimeter gutter with 1/2" stainless steel drain coupling

Or as manufactured by Caddy or Accurex.

ITEM #C36 EXHAUST HOOD, CONTROL PANEL – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #C33, Exhaust Hood

Or as manufactured by Caddy or Accurex.

ITEM #C37 FIRE PROTECTION SYSTEM – QTY. AS PER PLAN & SCHEDULE

Ansul Model UL-300 (R-102). Unit to be installed where shown on drawing in strict accordance to that described in General Specifications. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Provide connection to building Fire Alarm System
- 1 ea. Gas valve, up to 3", size to be verified
- 1 ea. Reset Relay Push Button
- For the protection of equipment beneath Exhaust Hood, Item #C33

Or as manufactured by Caddy or Accurex.

ITEM #C38 VERTICAL FORM FILLER BAGGER – QTY. AS PER PLAN & SCHEDULE

Tucs Equipment Model TEVFF-10S. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired
- 1 ea. Programmable controls
- 1 ea. Pouch forming, automatic
- 1 ea. Integrated pouch printer
- 1 ea. Mobile film cart
- 1 ea. Mobile bagger accessory cart
- 1 ea. Fill nozzle
- 1 ea. Exit conveyor
- 1 ea. Cleaning brush
- 1 ea. Air compressor connection
- 2 ea. Heat seal, horizontal
- 1 ea. Volumetric piston pump/ fill
- 1 ea. Single bar lap seal, vertical
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by CapKold or Cleveland.

ITEM #C39 LIFT CONVEYOR, SHORT NOSE – QTY. AS PER PLAN & SCHEDULE

Tucs Equipment Model TECONV-L75-SN. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Variable frequency drive
- 1 ea. Infeed extension
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by CapKold or Cleveland.

ITEM #C40 BATCH CHILLER, 200-GAL. – QTY. AS PER PLAN & SCHEDULE

Tucs Equipment Model TEBC-200. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired
- Capacity: 200 Gallons
- 1 ea. Remote refrigeration
- 1 ea. Flexible dividers
- 1 ea. Insulated tank
- 1 ea. Air agitated system
- 1 ea. UV Water treatment system
- 1 ea. Lift floor, switch activated
- 1 ea. Air pump, low pressure

Or as manufactured by CapKold or Cleveland.

ITEM #C41 FIRE EXTINGUISHER, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

Ansul Model K-CLASS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Wet chemical type, Ansulex low pH agent
- 1 ea. 2.5 Gallon tank
- 1 ea. Wall bracket
- 1 ea. Rechargeable
- Wall backing by General Contractor

Or as manufactured by Kidde or RangeGuard.

ITEM #C42 SPARE NUMBER

ITEM #C43 WALK-IN COOLER – QTY. AS PER PLAN & SCHEDULE

Thermal-Rite Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General

Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired, Controls/ lighting
- Electrical: 208/1, Hardwired, Evaporator Coil(s)
- Walk-in Cooler Height: 8'-6" AFF
- Exterior Finish:
 - Stucco Stainless Steel, Exposed Panel(s)
 - Smooth Galvalume, Unexposed Panel(s)
- Interior Finish:
 - White Smooth Galvalume, Walls/ Ceiling Panel(s)
 - Smooth Galvalume, Floor Panel(s)
- Pre-formed panels: 4" Thick, polyurethane insulation
- Pre-formed floor panel: 4" Thick, polyurethane insulation depressed in slab, 6 ½" depression
- Interior floor finish: Continuation of kitchen flooring material, as selected by Architect
- Interior / Exterior diamond tread kick plate at door section, foamed in place
- 2 ea. 36" x 78" Door with vision panel
- 1 ea. Flush mount audible temperature/monitoring system alarm
- 1 ea. Evaporator coil limit switch, mounted in interior door frame
- 1 ea. Removable louvered trim panels to ceiling, accessible

Or as manufactured by TAFCO or Norlake.

ITEM #C44 BASKET DOLLY – QTY. AS PER PLAN & SCHEDULE

Tucs Equipment Model TESBD-2024. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Aluminum construction
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by CapKold or Cleveland.

ITEM #C45 STORAGE BASKET(S), 24"L x 20"W – QTY. AS PER PLAN & SCHEDULE

Tucs Equipment Model TESB-13. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Polyethylene construction
- 1 ea. 13" Height

Or as manufactured by CapKold or Cleveland.

DISHWASH / POTWASH AREA

ITEM #D1 CART, BUSSING – QTY. AS PER PLAN & SCHEDULE

New Age Model 97942. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Lockwood or Channel Mfg.

ITEM #D2 SOILED DISH TABLE W/ PRE-RINSE – QTY. AS PER PLAN & SCHEDULE

Caddy Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Built-in pre-wash sink, 21" L x 21" W x 7" D
- 1 ea. Waste valve
- 1 ea. Stainless steel pre-rinse assembly with 12" swing spout add-on faucet and wrist action handles, 1/2" connections
- 1 ea. Removable perforated basket, 19" L x 19" W x 6" D, Stainless Steel, 18 Gauge
- 1 ea. Removable rack guide to fit over sink, Stainless Steel, 12 Gauge
- Stainless steel tubular crossrails, side / rear

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #D3 WAREWASHER, POT/ PAN, DOOR TYPE – QTY. AS PER PLAN & SCHEDULE

Meiko Model DV 270.2 Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 460/3, Hardwired
- Electrical: 120/1, Hardwired
- Verify direction of operation
- 1 ea. Single point electrical connection
- 1 ea. Straight-thru design application
- 2 ea. Wheeled basket
- 2 ea. Sheet pan insert
- 1 ea. Built-in hot water booster, 70° rise
- 1 ea. Detergent/rinse aid pumps
- 1 ea. Drain tempering kit
- 1 ea. Start-up / Performance and Installation Program
- H.W. connection piped through filter, item #D7
- Flanged feet bolted to floor

Or as manufactured by Champion or Hobart.

ITEM #D4 EXHAUST HOOD, TYPE II – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Construction: 100% 430 Stainless steel
- Structural front panel
- Length/ size as per contract documents, wall/ island canopy hood
- Stainless steel field wrap, approximately 18" high on all exposed sides
- Baffles shall be fully removable
- Full perimeter gutter with 1/2" stainless steel drain coupling

Or as manufactured by Caddy or Accurex.

ITEM #D5 ROLLER TABLE, GRAVITY FED – QTY. AS PER PLAN & SCHEDULE

Caddy Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Stainless steel tubular crossrails, side / rear
- 2" PVC rollers, 4" on center, removable sections

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #D6 RACK SHELF, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

New Age Model 52924. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Capacity: (13) 20" x 20" Racks
- Mounting height: 56" above finished floor
- 1 ea. Vertical storage, 4-1/2" centers
- Wall backing by General Contractor

Or as manufactured by Lockwood or Channel Mfg.

ITEM #D7 FILTER SYSTEM FOR ITEM #D3 – QTY. AS PER PLAN & SCHEDULE

Antunes Model 9700963. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- For use with Item #D3, Warewasher
- 6 ea. Replacement cartridges

Or as manufactured by Everpure or Optipure.

ITEM #D8 DISH RACK CART – QTY. AS PER PLAN & SCHEDULE

Channel Mfg. Model GRR-8. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Capacity: (8) 20" X 20" Racks
- 1 ea. Corner bumpers
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Lockwood or New Age.

ITEM #D9 3-COMPARTMENT SINK, POWER WASH – QTY. AS PER PLAN & SCHEDULE

Power Soak Model PSA-144L-42-S. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired
- 3 ea. Built-in work sinks, refer to plan for sizes
- 3 ea. Rotary ball valve drain
- 1 ea. Splash mounted pre-rinse faucet with 12" swing spout assembly, 1/2" connections
- 1 ea. Splash mounted faucet with 12" swing spout assembly, 1/2" connections
- 1 ea. Backsplash extension
- 1 ea. Chemical shelf
- 1 ea. Chemical dispenser
- 1 ea. Sheet pan racking system, removable
- 1 ea. Sheet pan drying rack
- 1 ea. Stainless steel common bowl skirt
- Flanged feet bolted to floor

Or as manufactured by Champion or Hobart.

ITEM #D10 STORAGE SYSTEM, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model WAL-STOR. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting Height: 50" above finished floor
- 2 ea. Wall grid/mat, WM1860-E, stacked
- 1 ea. Wall uprights, vertical, PR45VU-E
- 2 ea. Shelf, 1448-E
- 2 ea. Shelf Brackets, PR14B-E

- 1 ea. Grid Shelf, 1436WGS-E
- 2 ea. Baskets, WB-E
- 12 ea. Utility Hooks, UH-E
- 1 ea. Epoxy coated finish, entire wall system
- Wall backing by General Contractor

Or as manufactured by Focus or Metro.

ITEM #D11 POT RACK, WALL MOUNT W/ SHELF – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model PRW-2-1284. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting Height: 30" above table top, top bar
- 25 ea. Stainless steel pot-hooks
- 1 ea. Double bar design

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #D12 HAND SINK, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WS-1D. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Manual faucet, gooseneck
- 1 ea. Soap dispenser
- 1 ea. Towel dispenser
- 1 ea. Left and right splash guards
- Wall backing by General Contractor

Or as manufactured by Eagle Group/Metal Masters or John Boos.

ITEM #D13 HOSE REEL WITH GUN – QTY. AS PER PLAN & SCHEDULE

T&S Model B-7132-05. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. 35' hose length
- 1 ea. Spray gun assembly
- 1 ea. Exposed reel
- 1 ea. Hose reel connector kit
- All necessary components for full operation

Or as manufactured by Fisher or Component Hardware.

ITEM #D14 SPARE NUMBER

ITEM #D15 RACKS, DRYING – QTY. AS PER PLAN & SCHEDULE

Metro Model PR48VX4-XDR. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Shelving to be sized to fit
- 4 ea. 24" x 48" Shelves with removable, vented inserts
- 4 ea. 74" High uprights
- 1 ea. Cutting board/tray drying rack, MTR2448XEA
- 2 ea. Drop-in Rack, DR48S
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Eagle Group/Metal Masters or Cambro.

ITEM #D16 EYE WASH STATION, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

Guardian Model G1750P. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Thermostatic mixing valve, TMVG3600LF
- 1 ea. ANSI Compliant identification sign
- Wall backing by General Contractor

Or as manufactured by T&S Brass or Component Hardware.

ITEM #D17 DRYER, ADA COMPLIANT – QTY. AS PER PLAN & SCHEDULE

LG Platinum Model GDL1329LES2. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, NEMA 6-50P
- ADA Compliant
- 1 ea. Cord/plug assembly
- 1 ea. Front loading
- 1 ea. Front mounted controls
- Venting to exterior by G.C.
- All necessary components for proper installation and operation

Or as manufactured by Maytag or GE.

ITEM #D18 WASHER, ADA COMPLIANT – QTY. AS PER PLAN & SCHEDULE

LG Platinum Model GCWL1069LS2. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P

- ADA Compliant
- 1 ea. Cord/plug assembly
- 1 ea. Front loading
- 1 ea. Front mounted controls
- All necessary components for proper installation and operation

Or as manufactured by Maytag or GE.

ITEM #D19 CENTRAL FILTRATION SYSTEM – QTY. AS PER PLAN & SCHEDULE

Antunes Model VZN-541V. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- For use with Item #A13, Smoker Oven
- For use with Item #B4, Water Meter
- For use with Item #B9, Proofer/Retarder
- For use with Item #B10, Oven
- For use with Item #C30, Kettle
- For use with Item #C32, Kettle
- For use with Item #P3, Kettle
- For use with Item #P23, Produce Sink/Wash System
- 1 ea. Vertical 15 gallon, ultra filtration with carbon element
- 1 ea. TAC-5 cartridge for lime scale reduction, self-cleaning
- 1 ea. Strainer kit, 7000519
- 1 ea. Certified factory install

Or as manufactured by Everpure or Optipure.

ITEM #D20 SURGE TANK, 44-GALLON – QTY. AS PER PLAN & SCHEDULE

Antunes Model 7000829. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- For use with Item #D19, Central Filtration System

Or as manufactured by Everpure or Optipure.

PRODUCTION COOKING AREA

ITEM #P1 OVEN-STEAMER, COMBI, GAS – QTY. AS PER PLAN & SCHEDULE

Convotherm Model C4ET 20.20 GB-N. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Gas: 3/4" Connection, 218.4 MBtuh

- Verify door hinging
- 1 ea. iCookingControl with 4 modes
- 1 ea. (20) 18" x 26" or (40) 12" x 20" pan capacity
- 1 ea. Core temperature probe, multipoint measurement
- 1 ea. Hand shower with automatic retracting system
- 1 ea. Ethernet interface
- 1 ea. Installation Kit for gas units
- 1 ea. Chemical Shelf, Wall Mntd.
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- 2 ea. Roll-in trolley, CSRT2020-4
- 1 ea. K-12 School package/ warranty
- Cold water connection piped from RO Filter System, Item #A33

Or as manufactured by Alto-Shaam or Electrolux.

ITEM #P2 KETTLE, STEAM JACKETED – QTY. AS PER PLAN & SCHEDULE

Cleveland Range Model KGL-40-T. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Gas: 3/4" Rear Connection, 140 MBtuh
- 1 ea. Pressure regulator
- 1 ea. Electronic spark ignition
- 1 ea. Tilting kettle accessory kit
- 1 ea. Tangent draw-off assembly, TD2A45
- 1 ea. Power lift
- 1 ea. Double pantry faucet, DPKT
- 1 ea. Kettle markings, 5 gallon increments
- 1 ea. 316 Stainless steel liner
- 1 ea. Lift off cover, CL40
- 1 ea. Descaling solution
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- Cold water connection piped from Central Filtration System, Item #D19

Or as manufactured by Crown or Groen.

ITEM #P3 FLOOR TROUGH – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model FT-2430-SG. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. NSF Approved
- 1 ea. Standard 4" depth

- 1 ea. Fibergrate style Micromesh, removable grate, ADA type, gridded fiberglass

Or as manufactured by Eagle Group/Metal Master or John Boos.

ITEM #P4 TILT SKILLET, GAS – QTY. AS PER PLAN & SCHEDULE

Existing to be reused. Market Forge Model 30P-STGM. Unit to be installed where shown on drawings. This is an existing item and is to be handled as described in General Specifications. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Gas: 3/4" Rear Connection, 93 MBtuh
- **ADD** 1 ea. 48" Quick disconnect with flexible hose
- **ADD** 1 ea. Restraint cable
- All utility requirements to be verified by K.E.C.

ITEM #P5 STEAMER, CONVECTION – QTY. AS PER PLAN & SCHEDULE

Cleveland Range Model 24-CGP-10. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Gas: 3/4" Rear Connection, 240 MBtuh
- 1 ea. Pressure regulator
- 1 ea. Electronic Timer, ETC2
- 1 ea. Insulated gas flue, 24SSF
- 1 ea. Descaling Solution, DISSOLVE
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- Cold water connection piped from RO Filter System, Item #A33

Or as manufactured by Crown or Groen.

ITEM #P6 EXHAUST HOOD, TYPE I – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Construction: 100% 430 stainless steel
- Filters: Stainless steel captrate solo with hook
- Insulation: Integral air/ insulation barriers at perimeter and top, 0" clearance to combustibles
- Structural front panel, insulated
- Wall / Island canopy hood, length/ size as per contract documents
- 2 ea. Front perforated supply plenum (PSP) with built-in 3" back standoff

- Insulation for PSP housing, as required
- 8 ea. LED lights with bulbs
- Stainless steel field wrap, approximately 18" high on all exposed sides
- Adjustable exhaust air volume control damper
- Hood Control Panel Package:
 - EMSplus11 modulating energy management system with smart controls
 - Built-in VFDs
 - Duct Temperature Sensors in all risers
 - Room Temperature Sensor
 - Configurable through Touch Screen Interface
 - EMS Duct Thermostat
 - INVERTER DUTY THREE PHASE MOTORS REQUIRED

Or as manufactured by Caddy or Accurex.

ITEM #P7 SPARE NUMBER

ITEM #P8 SUPPLY PLENUM, MAKE-UP AIR – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #P6, Exhaust Hood

Or as manufactured by Caddy or Accurex.

ITEM #P9 FLAT BAR RACK, HOOD MNTD., 317"L – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting height: 96" above finished floor to underside
- Welded/ secured at front face of exhaust hood
- 50 ea. Stainless steel pot-hooks

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #P10 EXHAUST HOOD, CONTROL PANEL – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #P6, Exhaust Hood

Or as manufactured by Caddy or Accurex.

ITEM #P11 FIRE PROTECTION SYSTEM – QTY. AS PER PLAN & SCHEDULE

Ansul Model UL-300 (R-102). Unit to be installed where shown on drawing in strict accordance to that described in General Specifications. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Provide connection to building Fire Alarm System
- 1 ea. Gas valve, up to 3", size to be verified
- 1 ea. Reset Relay Push Button
- For the protection of equipment beneath Exhaust Hood, Item #P6

Or as manufactured by Caddy or Accurex.

ITEM #P12 WORK TABLE, PORTABLE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-3060. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #P13 HAND SINK, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model CSW9-1S-SS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Manual faucet, gooseneck
- 1 ea. Soap dispenser
- 1 ea. Towel dispenser
- 1 ea. Left and right splash guards
- Wall backing by General Contractor

Or as manufactured by Eagle Group or John Boos.

ITEM #P14 SPARE NUMBER

ITEM #P15 REFRIGERATOR, PASS-THRU – QTY. AS PER PLAN & SCHEDULE

Continental Refrigerator Model 1RNSSPTHD. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Exterior Finish: Stainless Steel
- Interior Finish: Stainless Steel
- Verify door hinging
- 1 ea. Self-contained refrigeration
- 4 ea. Half solid doors with locks, pass-thru model
- 3 ea. Stainless steel shelves per compartment, top section
- 1 ea. Digital temperature control system
- 1 ea. Energy Star® Certified
- Adjustable universal pan slides 1-1/2" O.C. to hold 18" x 26" or 12" x 20" pans, bottom section
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Utility Refrigerator or Traulsen.

ITEM #P16 WORK TABLE W/ SINK – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-30120. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- 1 ea. Built-in work sink, 20" L x 16" W x 12" D each
- 1 ea. S.S. Removable sink bowl cover
 - Stainless steel, 14 Gauge
 - Finger holes, lift-off
 - Flush inlay with work sink/top
 - Integral bracket, under counter, to hold when not in use
- 1 ea. Waste valve with lever
- 1 ea. Tail piece
- 1 ea. Waste overflow
- 1 ea. Stainless steel faucet with 12" swing spout and wrist action handles, 1/2" connections
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #P17 WORK TABLE W/ SINK – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-30120. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- 1 ea. Built-in work sink, 20" L x 16" W x 12" D each
- 1 ea. S.S. Removable sink bowl cover
 - Stainless steel, 14 Gauge
 - Finger holes, lift-off
 - Flush inlay with work sink/top
 - Integral bracket, under counter, to hold when not in use
- 1 ea. Waste valve with lever
- 1 ea. Tail piece
- 1 ea. Waste overflow
- 1 ea. Stainless steel faucet with 12" swing spout and wrist action handles, 1/2" connections
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #P18 POT RACK, TABLE MNTD. W/ SHELF – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model PRT-3-24108. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting Height: 80" above table top, pot rack
- Mounting Height: 20" above table top, overshelf
- 1 ea. Middle shelf, 16" wide
- 50 ea. Stainless steel pot-hooks
- Secured thru splash/table top, anchor to structure

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #P19 FIRE EXTINGUISHER, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

Ansul Model K-CLASS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Wet chemical type, Ansulex low pH agent
- 1 ea. 2.5 Gallon tank
- 1 ea. Wall bracket
- 1 ea. Rechargeable
- Wall backing by General Contractor

Or as manufactured by Kidde or RangeGuard.

ITEM #P20 WORK TABLE, PORTABLE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-3060. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #P21 SPARE NUMBER

ITEM #P22 VEGETABLE/ FRUIT PREPARATION – QTY. AS PER PLAN & SCHEDULE

Robot Coupe Model CL50E. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Disc Package, LP5DISC

Or as manufactured by Piper Products or Electrolux.

ITEM #P23 PRODUCE SOAK/ WASH SYSTEM – QTY. AS PER PLAN & SCHEDULE

Power Soak Model PP14B-84L-208-1. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, Hardwired
- 3 ea. Tank dividers
- 4 ea. Removable baskets
- 2 ea. Filter assembly

Or as manufactured by Champion or Hobart.

ITEM #P24 RACK, PRODUCE CRISPING – QTY. AS PER PLAN & SCHEDULE

Channel Mfg. Model PCR7M. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Corner bumpers, 024
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Lockwood or New Age Industrial.

ITEM #P25 WALK-IN COOLER – QTY. AS PER PLAN & SCHEDULE

Thermal-Rite Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired, Controls/ lighting
- Electrical: 120/1, Hardwired, Evaporator Coil(s)
- Walk-in Cooler Height: 8'-6" AFF
- Exterior Finish:
 - Stucco Stainless Steel, Exposed Panel(s)
 - Smooth Galvalume, Unexposed Panel(s)
- Interior Finish:
 - White Smooth Galvalume, Walls/ Ceiling Panel(s)
 - Smooth Galvalume, Floor Panel(s)
- Pre-formed panels: 4" Thick, polyurethane insulation
- Pre-formed floor panel: 1-1/2" Vinyl screed application, appropriate floor finish by General Contractor
- Interior floor finish: Continuation of kitchen flooring material, as selected by Architect
- Interior / Exterior diamond tread kick plate at door section, foamed in place
- 1 ea. 36" x 78" Door with vision panel
- 1 ea. Flush mount audible temperature/monitoring system alarm
- 1 ea. Evaporator coil limit switch, mounted in interior door frame
- 1 ea. Removable louvered trim panels to ceiling, accessible

Or as manufactured by TAFCO or Norlake.

ITEM #P26 WORK TABLE, PORTABLE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-3060. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #P27 SLICER, FOOD – QTY. AS PER PLAN & SCHEDULE

Berkel Model X13AE-PLUS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Automatic type
- 1 ea. Lift device

Or as manufactured by Hobart or Globe.

ITEM #P28 SPARE NUMBER

ITEM #P29 RACK, PAN – QTY. AS PER PLAN & SCHEDULE

New Age Industrial Model 1331. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Capacity: (20) 18" x 26" Pans
- 1 ea. Pan rack slide base, 3" on center
- 1 ea. Aluminum pan stops
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Lockwood or Channel Mfg.

ITEM #P30 STORAGE SHELVING, 22"W – QTY. AS PER PLAN & SCHEDULE

Fermod Model 6611/R1. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Shelving to be sized to fit
- 4 ea. Shelves with removable, vented inserts
- 4 ea. 71" High uprights
- 1 ea. Tool free shelf adjustment
- Clear corner assemblies where required

Or as manufactured by Metro or Cambro.

ITEM #P31 2-COMPARTMEN SINK, PREP. TABLE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 2 ea. Built-in work sinks, 20" L x 16" W x 12" D
- 2 ea. S.S. Removable sink bowl covers

- 2 ea. Waste valve with lever
- 2 ea. Tail piece
- 2 ea. Waste overflow
- 1 ea. Stainless steel faucet with 12" swing spout and wrist action handles, 1/2" connections
- 1 ea. Stainless steel common bowl skirt
- Stainless steel undershelf, removable
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #P32 STORAGE SYSTEM, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model WAL-STOR. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting Height: 50" above finished floor
- 2 ea. Wall grid/mat, WM1854-E, stacked
- 1 ea. Wall uprights, vertical, PR45VU-E
- 2 ea. Shelf, 1448-E
- 2 ea. Shelf Brackets, PR14B-E
- 1 ea. Grid Shelf, 1436WGS-E
- 2 ea. Baskets, WB-E
- 12 ea. Utility Hooks, UH-E
- 1 ea. Epoxy coated finish, entire wall system
- Wall backing by General Contractor

Or as manufactured by Focus or Metro.

ITEM #P33 HAND SINK, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WS-1D. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Manual faucet, gooseneck
- 1 ea. Soap dispenser
- 1 ea. Towel dispenser
- 1 ea. Left and right splash guards
- Wall backing by General Contractor

Or as manufactured by Eagle Group/Metal Masters or John Boos.

ITEM #P34 EYE WASH STATION, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

Guardian Model G1750P. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Thermostatic mixing valve, TMVG3600LF
- 1 ea. ANSI Compliant identification sign
- Wall backing by General Contractor

Or as manufactured by T&S Brass or Component Hardware.

RECEIVING – STORAGE AREA

ITEM #R1 RECEIVING SCALE, BENCH 500-LB. – QTY. AS PER PLAN & SCHEDULE

Penn Scale Model D52P250RTV3. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Capacity: 500 lbs
- 1 ea. Removable platform, stainless steel
- 1 ea. Digital controls

Or as manufactured by Kilotech or Yamato.

ITEM #R2 WORK TABLE, PORTABLE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-3060. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Stainless steel undershelf, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #R3 BIN, ICE – QTY. AS PER PLAN & SCHEDULE

Hoshizaki Model B-1650SS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Storage Capacity: 1605 lbs.(approximately)
- 1 ea. Ice scoop holder, stainless steel
- 1 ea. Ice shovel/scoop, stainless steel
- 1 ea. Top kit, as required
- Stainless steel legs, 6" adjustable

Or as manufactured by Scotsman or Manitowoc.

ITEM #R4 ICE MAKER, NUGGET STYLE – QTY. AS PER PLAN & SCHEDULE

Hoshizaki Model F-1501MAJ-C. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, Hardwired
- Ice Production: 1327 lbs. per 24 hours (approximately)
- 1 ea. Self-contained refrigeration, air-cooled
- 1 ea. Cubelet style
- 1 ea. Adapter plate for top mount application
- Mounted on top of Ice Bin, Item #R3
- Cold water connection piped from Filter System, Item #R7

Or as manufactured by Scotsman or Manitowoc.

ITEM #R5 WALK-IN COOLER – QTY. AS PER PLAN & SCHEDULE

Thermal-Rite Model Custom with Omni-Temp Model KLP211MA-S1D (evaporator coils). Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired, Controls/ lighting
- Electrical: 120/1, Hardwired, Evaporator Coil(s)
- Electrical: 120/1, Hardwired, Evaporator Coil(s)
- Walk-in Cooler Height: 8'-6" AFF
- Exterior Finish:
 - Stucco Stainless Steel, Exposed Panel(s)
 - Smooth Galvalume, Unexposed Panel(s)
- Interior Finish:
 - White Smooth Galvalume, Walls/ Ceiling Panel(s)
 - Smooth Galvalume, Floor Panel(s)
- Pre-formed panels: 4" Thick, polyurethane insulation
- Pre-formed floor panel: 4" Thick, polyurethane insulation depressed in slab, 6 ½" depression
- Interior floor finish: Continuation of kitchen flooring material, as selected by Architect
- Interior / Exterior diamond tread kick plate at door section, foamed in place
- 1 ea. 48" x 78" Sliding door with vision panel
- 1 ea. Flush mount audible temperature/monitoring system alarm
- 1 ea. Evaporator coil limit switch, mounted in interior door frame
- 1 ea. Removable louvered trim panels to ceiling, accessible

Or as manufactured by TAFCO or Norlake.

ITEM #R6 REFRIGERATION RACK SYSTEM – QTY. AS PER PLAN & SCHEDULE

Omni-Temp Model OTD12AC-V-10-0-3-4. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- **Refer to Contract Dwgs. FS118 thru FS122 for further details.**
- Refrigeration to Items #B33, #C40, #C43, #P25, #R5, #R9, #R12, #R13 & #R15
- Electrical: 120/208/3, Hardwired
- Refrigeration: R-448A
- Refrigerant line maximum run distance, 100 feet
- Scroll type compressor units
- 12 ea. Evaporator Coil(s), locations per Refrigeration Rack Design
- 1 ea. Multi-compressor, outdoor, air-cooled
 - Mounted on Building Roof
 - Roof Pad/ Curb, 6" High Minimum, by G.C.
- 1 ea. Pre-engineered and factory-assembled unit
- 1 ea. Weather-protected compact structural steel frame
- 1 ea. Housing, 304 stainless steel
- 1 ea. Aluminum fin copper tube condenser, 15 degrees TD
- 1 ea. Control panel, factory-mounted and prewired

Or as manufactured by RDT or ColdZone.

ITEM #R7 FILTER SYSTEM FOR #R4 – QTY. AS PER PLAN & SCHEDULE

Antunes Model SI-XL (9700901). Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- For use with Item #R4, Ice Maker
- 6 ea. Replacement cartridges

Or as manufactured by Everpure or Optipure.

ITEM #R8 STORAGE SHELVING, 22"W – QTY. AS PER PLAN & SCHEDULE

Fermod Model 6611/R1. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Shelving to be sized to fit
- 4 ea. Shelves with removable, vented inserts
- 4 ea. 71" High uprights
- 1 ea. Tool free shelf adjustment
- Clear corner assemblies where required

Or as manufactured by Metro or Cambro.

ITEM #R9 WALK-IN COOLER – QTY. AS PER PLAN & SCHEDULE

Thermal-Rite Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired, Controls/ lighting
- Electrical: 120/1, Hardwired, Evaporator Coil(s)
- Electrical: 120/1, Hardwired, Evaporator Coil(s)
- Walk-in Cooler Height: 8'-6" AFF
- 2 ea. Blast chiller section panels/ doors, built-in:
 - Sized per refrigeration manufacturer requirements
 - 2 ea. Roll-in rack capacity
- Exterior Finish:
 - Stucco Stainless Steel, Exposed Panel(s)
 - Smooth Galvalume, Unexposed Panel(s)
- Interior Finish:
 - White Smooth Galvalume, Walls/ Ceiling Panel(s)
 - Smooth Galvalume, Floor Panel(s)
- Pre-formed panels: 4" Thick, polyurethane insulation
- Pre-formed floor panel: 4" Thick, polyurethane depressed in slab, 6 ½" depression
- Interior floor finish: Continuation of kitchen flooring material, as selected by Architect
- Interior / Exterior diamond tread kick plate at door section(s), foamed in place
- 5 ea. 36" x 78" Door with vision panel
- 1 ea. 48" x 78" Sliding door with vision panel
- 1 ea. Flush mount audible temperature/monitoring system alarm
- 1 ea. Evaporator coil limit switch, mounted in interior door frame
- 1 ea. Removable louvered trim panels to ceiling, accessible

Or as manufactured by TAFCO or Norlake.

ITEM #R10 STORAGE SHELVING, 22"W – QTY. AS PER PLAN & SCHEDULE

Fermod Model 6611/R1. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Shelving to be sized to fit
- 4 ea. Shelves with removable, vented inserts
- 4 ea. 71" High uprights
- 1 ea. Tool free shelf adjustment
- Clear corner assemblies where required

Or as manufactured by Metro or Cambro.

ITEM #R11 RACK, PAN – QTY. AS PER PLAN & SCHEDULE

New Age Industrial Model 1331. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Capacity: (20) 18" x 26" Pans
- 1 ea. Pan rack slide base, 3" on center
- 1 ea. Aluminum pan stops
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Lockwood or Channel Mfg.

ITEM #R12 BLAST CHILLER SECTION, 2-RACK – QTY. AS PER PLAN & SCHEDULE

Omni-Temp Model Custom with OTBC-20-2. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Built-Into Walk-In Cooler, item #R9
- Electrical: 208/3, Hardwired, control system
- Refrigeration: R-448A
- Refrigerant line maximum run distance, 100 feet
- 1 ea. Integral Cross-Cool System
- 1 ea. Evaporator coils mounted within walk-in box
 - 1 ea. Copper drain lines, extended to floor drain, insulated/ heated

Or as manufactured by RDT or ColdZone.

ITEM #R13 SHOCK FREEZER SECTION, 2-RACK – QTY. AS PER PLAN & SCHEDULE

Omni-Temp Model Custom with OTBF-20-2. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Built-Into Walk-In Freezer, item #R15
- Electrical: 208/3, Hardwired, control system
- Refrigeration: R-448A
- Refrigerant line maximum run distance, 100 feet
- 1 ea. Integral Cross-Cool System
- 1 ea. Evaporator coils mounted within walk-in box
 - 1 ea. Copper drain lines, extended to floor drain, insulated/ heated

Or as manufactured by RDT or ColdZone.

ITEM #R14 SPARE NUMBER

ITEM #R15 WALK-IN FREEZER – QTY. AS PER PLAN & SCHEDULE

Thermal-Rite Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired, Controls/ lighting
- Electrical: 208/1, Hardwired, Evaporator Coil(s)
- Electrical: 208/1, Hardwired, Evaporator Coil(s)
- Walk-in Cooler Height: 8'-6" AFF
- 1 ea. Shock freezer section panels/ doors, built-in:
 - Sized per refrigeration manufacturer requirements
 - 2 ea. Roll-in rack capacity
- Exterior Finish:
 - Stucco Stainless Steel, Exposed Panel(s)
 - Smooth Galvalume, Unexposed Panel(s)
- Interior Finish:
 - White Smooth Galvalume, Walls/ Ceiling Panel(s)
 - Smooth Galvalume, Floor Panel(s)
- Pre-formed panels: 4" Thick, polyurethane insulation
- Pre-formed floor panel: 4" Thick, polyurethane insulation depressed in slab, 6 ½" depression
- Interior floor finish: Continuation of kitchen flooring material, as selected by Architect
- Interior / Exterior diamond tread kick plate at door section(s), foamed in place
- 3 ea. 36" x 78" Door with vision panel
- 1 ea. 48" x 78" Door with vision panel
- 1 ea. Flush mount audible temperature/monitoring system alarm
- 1 ea. Evaporator coil limit switch, mounted in interior door frame
- 1 ea. Removable louvered trim panels to ceiling, accessible

Or as manufactured by TAFCO or Norlake.

ITEM #R16 RACK, CAN – QTY. AS PER PLAN & SCHEDULE

New Age Industrial Model 1256CK. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Capacity: 216 ea. #10 Cans
- Capacity: 297 ea. #5 Cans
- 1 ea. Premium series rack
- 1 ea. First in-first out type
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Lockwood or Channel Mfg.

ITEM #R17 STORAGE SHELVING, PORTABLE – QTY. AS PER PLAN & SCHEDULE

Fermod Model 6611/R1. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Shelving to be sized to fit
- 5 ea. Shelves with removable, vented inserts
- 4 ea. 84" High uprights
- 1 ea. Tool free shelf adjustment
- Clear corner assemblies where required

Or as manufactured by Metro or Cambro.

ITEM #R18 DUNNAGE RACK(S), 22"W – QTY. AS PER PLAN & SCHEDULE

Fermod Model 1R38C12. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- No additional features, options or accessories required

Or as manufactured by Metro or Cambro.

ITEM #R19 DUNNAGE RACK(S), 22"W – QTY. AS PER PLAN & SCHEDULE

Fermod Model 1R38C12. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- No additional features, options or accessories required

Or as manufactured by Metro or Cambro.

ITEM #R20 DELIVERY CART(S), UNSULATED – QTY. AS PER PLAN & SCHEDULE

Cambro Model 1826DTC615. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Double cavity, insulated
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by CAC or Winco.

TWIN TOWERS MIDDLE SCHOOL

ITEM #1 WALK-IN FREEZER – QTY. AS PER PLAN & SCHEDULE

Thermal-Rite Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Walk-in Cooler Height: 8'-6" AFF
- Exterior Finish:
 - Stucco Stainless Steel, Exposed Panel(s)
 - Smooth Galvalume, Unexposed Panel(s)
- Interior Finish:
 - White Smooth Galvalume, Walls/ Ceiling Panel(s)
 - Smooth Galvalume, Floor Panel(s)
- Pre-formed panels: 4" Thick, polyurethane insulation
- Pre-formed floor panel: 4" Thick, polyurethane insulation depressed in slab, 6 ½" depression
- Interior floor finish: Continuation of kitchen flooring material, as selected by Architect
- Interior / Exterior diamond tread kick plate at door section, foamed in place
- 1 ea. 36" x 78" Door with vision panel
- 1 ea. Flush mount audible temperature/monitoring system alarm
- 1 ea. Evaporator coil limit switch, mounted in interior door frame
- 1 ea. Removable louvered trim panels to ceiling, accessible

Or as manufactured by TAFCO or Norlake.

ITEM #2 REFRIGERATION TO ITEM #1 – QTY. AS PER PLAN & SCHEDULE

Omni-Temp Model OTJ1-AC-H-1-0-3-4 with KLP211VE-S2D. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired, compressor unit
- Electrical: 208/1, Hardwired, evaporator coil
- Refrigeration: R-448A
- Refrigerant line maximum run distance, 100 feet
- 1 ea. Smart Controller, no wiring between compressor/ evaporator
- 1 ea. Evaporator coils mounted within walk-in box, suspended from ceiling
 - 1 ea. Copper drain lines, extended to floor drain, insulated/ heated
- 1 ea. Compressor units mounted on building roof
- 1 ea. Dunnage rack, rails or curb for compressor unit
- 1 ea. Weatherproof cowl
- 1 ea. Winterized controls

Or as manufactured by RDT or ColdZone.

ITEM #3 STORAGE SHELVING, 22"W – QTY. AS PER PLAN & SCHEDULE

Fermod Model 6611/R1. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Shelving to be sized to fit
- 4 ea. Shelves with removable, vented inserts
- 4 ea. 71" High uprights
- 1 ea. Tool free shelf adjustment
- Clear corner assemblies where required

Or as manufactured by Metro or Cambro.

ITEM #4 WALK-IN COOLER – QTY. AS PER PLAN & SCHEDULE

Thermal-Rite Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Walk-in Cooler Height: 8'-6" AFF
- Exterior Finish:
 - Stucco Stainless Steel, Exposed Panel(s)
 - Smooth Galvalume, Unexposed Panel(s)
- Interior Finish:
 - White Smooth Galvalume, Walls/ Ceiling Panel(s)
 - Smooth Galvalume, Floor Panel(s)
- Pre-formed panels: 4" Thick, polyurethane insulation
- Pre-formed floor panel: 4" Thick, polyurethane insulation depressed in slab, 6 ½" depression
- Interior floor finish: Continuation of kitchen flooring material, as selected by Architect
- Interior / Exterior diamond tread kick plate at door section, foamed in place
- 1 ea. 36" x 78" Door with vision panel
- 1 ea. Flush mount audible temperature/monitoring system alarm
- 1 ea. Evaporator coil limit switch, mounted in interior door frame
- 1 ea. Removable louvered trim panels to ceiling, accessible

Or as manufactured by TAFCO or Norlake.

ITEM #5 REFRIGERATION TO ITEM #1 – QTY. AS PER PLAN & SCHEDULE

Omni-Temp Model OTJ1-AC-H-1-0-1-4 with KLP-211MA-S1D. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired, compressor unit
- Electrical: 120/1, Hardwired, evaporator coil
- Refrigeration: R-448A
- Refrigerant line maximum run distance, 100 feet
- 1 ea. Smart Controller, no wiring between compressor/ evaporator

- 1 ea. Evaporator coils mounted within walk-in box, suspended from ceiling
 - 1 ea. Copper drain lines, extended to floor drain, insulated/ heated
- 1 ea. Compressor units mounted on building roof
- 1 ea. Dunnage rack, rails or curb for compressor unit
- 1 ea. Weatherproof cowl
- 1 ea. Winterized controls

Or as manufactured by RDT or ColdZone.

ITEM #6 RACK, CAN – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model CRC4. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Capacity: (128) #10 Cans
- 1 ea. 4-Tier rack, 24" x 36" shelves
- 1 ea. First in-first out type

Or as manufactured by Metro or Cambro.

ITEM #7 REFRIGERATION MONITORING SYSTEM – QTY. AS PER PLAN & SCHEDULE

Modularm Model 75LC. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Wireless communicator
- For communication with Item #1, Walk-in Freezer
- For communication with Item #4, Walk-in Cooler

Or as manufactured by SensoScientific or AKCP.

ITEM #8 STORAGE SHELVING, 22"W – QTY. AS PER PLAN & SCHEDULE

Fermod Model 6611/R1. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Shelving to be sized to fit
- 5 ea. Shelves with removable, vented inserts
- 4 ea. 84" High uprights
- 1 ea. Tool free shelf adjustment
- Clear corner assemblies where required

Or as manufactured by Metro or Cambro.

ITEM #9 2-COMPARTMENT SINK, PREP. TABLE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- 2 ea. Built-in work sinks, 20" L x 16" W x 12" D
- 2 ea. S.S. Removable sink bowl covers
- 2 ea. Waste valve with lever
- 2 ea. Tail piece
- 2 ea. Waste overflow
- 1 ea. Stainless steel faucet with 12" swing spout and wrist action handles, 1/2" connections
- 1 ea. Stainless steel common bowl skirt
- Stainless steel undershelf, removable
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #10 WORK TABLE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-30120. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- 2 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #11 POT RACK, TABLE MNTD. W/ SHELF – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model PRT-3-24108. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting Height: 80" above table top, pot rack
- Mounting Height: 20" above table top, overshelf
- 1 ea. Middle shelf, 16" wide
- 50 ea. Stainless steel pot-hooks
- Secured thru splash/table top, anchor to structure

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #12 VEGETABLE/ FRUIT PREPARATION – QTY. AS PER PLAN & SCHEDULE

Robot Coupe Model CL50EULTRA. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Disc Package, SP5DISC

Or as manufactured by Piper Products or Electrolux.

ITEM #13 SLICER, FOOD, AUTOMATIC – QTY. AS PER PLAN & SCHEDULE

Globe Model SG13A. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Automatic type

Or as manufactured by Bizerba or Hobart.

ITEM #14 SPARE NUMBER

ITEM #15 REFRIGERATOR, PASS-THRU – QTY. AS PER PLAN & SCHEDULE

Continental Refrigerator Model 1RNSSPTHD. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Verify door hinging
- 1 ea. Self-contained refrigeration
- 4 ea. Half doors with locks, pass-thru model
- 3 ea. Stainless steel shelves per compartment, top section
- 1 ea. Digital temperature control system
- 1 ea. Energy Star® Certified
- Adjustable universal pan slides 1-1/2" O.C. to hold 18" x 26" or 12" x 20" pans, bottom section
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Utility Refrigerator or Traulsen.

ITEM #16 CLEAN DISH TABLE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model SCDT-60. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Stainless steel tubular crossrails, side/ rear

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #17 WAREWASHER, DOOR TYPE – QTY. AS PER PLAN & SCHEDULE

Hobart Model AM16VLT-ADV-2. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired
- 1 ea. Single point electrical connection
- 1 ea. Corner design application
- 3 ea. Sets of peg racks
- 3 ea. Sets of combination racks
- 3 ea. Sets of sheet pan racks
- 1 ea. Tall chamber
- 1 ea. Built-in hot water booster, 70° rise
- 1 ea. Detergent/rinse aid pumps
- 1 ea. Water hammer arrestor kit
- 1 ea. Automatic soil removal
- 1 ea. Energy Star® Certified
- Flanged feet bolted to floor

Or as manufactured by Champion or Meiko.

ITEM #18 3-COMPARTMENT SINK, POTWASH – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model SCS-34-2028-MOD. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Modification to accept Item #17, Warewasher
- Counter Top Material: Stainless Steel, 14 Gauge
- 3 ea. Built-in work sinks, 28" L x 20" W x 14" D
- 3 ea. Waste valve with lever
- 3 ea. Tail piece
- 3 ea. Waste overflow
- 1 ea. Stainless steel pre-rinse assembly with 12" swing spout add-on faucet and wrist action handles, 1/2" connections
- 1 ea. Stainless steel faucet with 12" swing spout and wrist action handles, 1/2" connections
- 1 ea. Stainless steel common bowl skirt
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #19 S.S. CHEMICAL CABINET – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- To fit below drainboard of Item #18, 3-Compartment Potwash Sink
- Cabinet/ Door to be flush frame design
- Stainless steel integrated handles, horizontal orientation
- Cylinder locks, keyed alike, as required
- Intermediate stainless steel solid shelves, adjustable

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #20 S.S. REMOV. RACK GUIDE – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Removable rack guide to fit over sink, Stainless Steel, 12 Gauge
- 1 ea. Integral bracket, undercounter, to hold when not in use

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #21 SPARE NUMBER

ITEM #22 RACK SHELF, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

New Age Model 53082. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting height: 56" above finished floor
- Capacity: (6) 20" x 20" Racks
- 1 ea. Vertical storage, 4-1/2" centers
- Wall backing by General Contractor

Or as manufactured by Lockwood or Channel Mfg.

ITEM #23 STORAGE SYSTEM, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model WAL-STOR. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting Height: 50" above finished floor
- 2 ea. Wall grid/mat, WM1860-E, stacked
- 1 ea. Wall uprights, vertical, PR45VU-E
- 2 ea. Shelf, 1448-E
- 2 ea. Shelf Brackets, PR14B-E
- 1 ea. Grid Shelf, 1436WGS-E
- 2 ea. Baskets, WB-E
- 12 ea. Utility Hooks, UH-E
- 1 ea. Epoxy coated finish, entire wall system
- Wall backing by General Contractor

Or as manufactured by Focus or Metro.

ITEM #24 RACK, PORTABLE – QTY. AS PER PLAN & SCHEDULE

Metro Model PR48VX3-XDR. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 4 ea. 24" x 48" shelves with removable, vented inserts
- 4 ea. 74" high uprights
- 1 ea. Cutting board/tray drying rack, MTR2448XEA
- 2 ea. Drop-in Rack, DR48S
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Eagle Group/Metal Masters or Cambro.

ITEM #25 HAND SINK, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WS-1D. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Manual faucet, gooseneck
- 1 ea. Soap dispenser
- 1 ea. Towel dispenser
- 1 ea. Left and right splash guards
- Wall backing by General Contractor

Or as manufactured by Eagle Group/Metal Masters or John Boos.

ITEM #26 HOSE REEL WITH GUN – QTY. AS PER PLAN & SCHEDULE

T&S Brass Model B-7132-05. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. 35' hose length
- 1 ea. Spray gun assembly

- 1 ea. Exposed reel
- 1 ea. Hose reel connector kit
- All necessary components for full operation

Or as manufactured by Fisher or Component Hardware.

ITEM #27 S.S. WALL PANEL(S), 330"L – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Stainless steel panels, evenly sized, 20 Gauge
- Installed from top of coved base to underside of hood, entire length
- Hairline joints sealed with S.S. trim strips
- Secured to wall with heat resistant mastic

It is the responsibility of the Kitchen Equipment Contractor to coordinate and make all appropriate cut-outs in paneling based on utility requirements in this location and apply appropriate stainless steel trim strips, caps, gussets, etc...

Or as manufactured by Caddy or Accurex.

ITEM #28 SPARE NUMBER

ITEM #29 GRIDDLE, GAS W/ STAND – QTY. AS PER PLAN & SCHEDULE

Accutemp Model GGF1201A2450-S2. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Gas: 1" Rear Connection, 42 MBtuh
- 1 ea. Pressure regulator
- 1 ea. Uniform surface temperature
- 1 ea. Digital thermostat/ controls
- 1 ea. Manager mode
- 1 ea. Heavy duty stainless steel stand
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- Energy Star® Certified

Or as manufactured by Keating or MagiKitchen

ITEM #30 RANGE, HEAVY DUTY, GAS – QTY. AS PER PLAN & SCHEDULE

Garland Model MST4S-E. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Gas: 1" Rear Connection, 70 MBtuh
- 1 ea. Pressure regulator
- 1 ea. Electronic spark ignition
- 1 ea. Flame failure device
- 1 ea. 10" High stainless steel riser
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Southbend or Vulcan.

ITEM #31 OVEN, CONVECTION, GAS – QTY. AS PER PLAN & SCHEDULE

Garland Model MCO-GS-20-ESS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: (2)120/1, NEMA 5-15P
- Gas: 3/4" Rear Connection, 120 MBtuh
- Manifold gas line for double unit
- 1 ea. Pressure regulator
- 1 ea. Electronic ignition
- 1 ea. Solid state controls
- 1 ea. Stainless steel exterior bottom
- 1 ea. Stainless steel back enclosure, top/bottom
- 1 ea. Extra oven racks
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- 1 ea. Energy Star® Certified
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Southbend or Vulcan.

ITEM #32 OVEN-STEAMER, COMBI, GAS – QTY. AS PER PLAN & SCHEDULE

Convotherm Model C4 ET 10.20GS-N. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Gas: 3/4" Connection, 109 MBtuh
- Verify door hinging
- 1 ea. iCookingControl with 4 modes
- 1 ea. (10) 18" x 26" or (20) 12" x 20" pan capacity
- 1 ea. Core temperature probe, multipoint measurement
- 1 ea. Hand shower with automatic retracting system

- 1 ea. Ethernet interface
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- 1 ea. Installation Kit for gas units
- 1 ea. K-12 School package/ warranty
- 1 ea. Certified Manufacturer Installation/ Start-Up
- Cold water connection piped from RO Filter System, Item #34

Or as manufactured by Alto-Shaam or Electrolux.

ITEM #33 CHEMICAL STORAGE SHELF, LOW – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model HDFCM1436VG. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 2 ea. 14" x 36" Shelves, wire
- 4 ea. 14" High uprights
- 1 ea. Epoxy finish

Or as manufactured by Fermod or Cambro.

ITEM #34 FILTER SYSTEM FOR ITEM #32 – QTY. AS PER PLAN & SCHEDULE

Antunes Model AQ-RO-600. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- For use with Item #32, Combi Oven-Steamer
- 1 ea. 44-Gal. Surge Tank, 7000829
- 1 ea. Certified factory install

Or as manufactured by Everpure or OptiPure.

ITEM #35 SPARE NUMBER

ITEM #36 STEAMER, ATMOSPHERIC, CONNECTED – QTY. AS PER PLAN & SCHEDULE

Accutemp Model N61201E DBL. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: (2)120/1, NEMA 5-15P
- Gas: (2)1/2" Rear Connection, 60 MBtuh
- Capacity: (6) 12" x 20" Pans per compartment
- Verify door hinging
- 1 ea. Pressure regulator
- 1 ea. Double unit, stacked

- 1 ea. Digital controls
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- 1 ea. Stainless steel stand with casters, SNH-21-01
- No filtration system required per manufacturer

Or as manufactured by Groen or Cleveland.

ITEM #37 KETTLE, STEAM JACKETED – QTY. AS PER PLAN & SCHEDULE

Cleveland Range Model 36GMK1010300. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Gas: 1" Rear Connection, 300 MBtuh
- 1 ea. Twin 10 gallon
- 1 ea. Pressure regulator
- 1 ea. Hot / cold swing faucet
- 1 ea. Tilting kettle accessory kit
- 2 ea. Lift-off covers with splash guard
- 1 ea. Boiler descaling pump kit
- 1 ea. Descaling solution
- 1 ea. 316 Stainless steel liner
- 1 ea. Stainless steel base frame, FSS
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable

Or as manufactured by Groen or Crown.

ITEM #38 EXHAUST HOOD, TYPE I – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Construction: 100% 430 stainless steel
- Filters: Stainless steel captrate solo with hook
- Insulation: Integral air/ insulation barriers at perimeter and top, 0" clearance to combustibles
- Structural front panel, insulated
- Wall / Island canopy hood, length/ size as per contract documents
- 3 ea. Front perforated supply plenum (PSP) with built-in 3" back standoff
- Insulation for PSP housing, as required
- 9 ea. LED lights with bulbs
- Stainless steel field wrap, approximately 18" high on all exposed sides
- Adjustable exhaust air volume control damper

- Hood Control Panel Package:
 - EMSplus11 modulating energy management system with smart controls
 - Built-in VFDs
 - Duct Temperature Sensors in all risers
 - Room Temperature Sensor
 - Configurable through Touch Screen Interface
 - EMS Duct Thermostat
 - INVERTER DUTY THREE PHASE MOTORS REQUIRED

Or as manufactured by Caddy or Accurex.

ITEM #39 SUPPLY PLENUM, MAKE-UP AIR – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #38, Exhaust Hood

Or as manufactured by Caddy or Accurex.

ITEM #40 EXHAUST HOOD, CONTROL PANEL – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #38, Exhaust Hood

Or as manufactured by Caddy or Accurex.

ITEM #41 FIRE PROTECTION SYSTEM – QTY. AS PER PLAN & SCHEDULE

Ansul Model UL-300 (R-102). Unit to be installed where shown on drawing in strict accordance to that described in General Specifications. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Provide connection to building Fire Alarm System
- 1 ea. Gas valve, up to 3", size to be verified
- 1 ea. Reset Relay Push Button
- For the protection of equipment beneath Exhaust Hood, Items #38 and #79

Or as manufactured by Caddy or Accurex.

ITEM #42 REFRIGERATOR, ROLL-IN – QTY. AS PER PLAN & SCHEDULE

Continental Refrigerator Model D1RINSS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Exterior Finish: Stainless Steel
- Interior Finish: Stainless Steel
- Verify door hinging
- 1 ea. Self-contained refrigeration
- 1 ea. Full solid door with lock
- 1 ea. Digital temperature control system
- 1 ea. Energy Star® Certified

Or as manufactured by Utility Refrigerator or Traulsen.

ITEM #43 ADA HAND SINK, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model ADA-WS-1D. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- ADA Compliant
- 1 ea. Manual faucet, gooseneck
- 1 ea. Soap dispenser, deck mounted
- 1 ea. Towel dispenser, integral C-fold
- 1 ea. Left and right splash guards
- Wall backing by General Contractor

Or as manufactured by Eagle Group/Metal Masters or John Boos.

ITEM #44 ICE MAKER W/ BIN – QTY. AS PER PLAN & SCHEDULE

Hoshizaki Model KM-301BAJ. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Ice Production: 290 lbs. per 24 hours (approximately)
- Bin Capacity: 100 lbs.
- 1 ea. Set of stainless steel bullet feet
- Cold water connection piped from Filter System, Item #45

Or as manufactured by Manitowoc or Scotsman.

ITEM #45 FILTER SYSTEM FOR ITEM #44 – QTY. AS PER PLAN & SCHEDULE

Hoshizaki Model H9320-51. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- For use with Item #44, Ice Maker
- 6 ea. Replacement cartridges

Or as manufactured by Manitowoc or Scotsman.

ITEM #46 ADA WORK TABLE W/ SINK – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-3096. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- ADA Compliant clearance 30" L x 19" W x 27" H
- 1 ea. Built-in work sink, tapered, 20" L x 16" W x 6" D each
- 1 ea. S.S. Removable sink bowl cover
 - Stainless steel, 14 Gauge
 - Finger holes, lift-off
 - Flush inlay with work sink/top
 - Integral bracket, under counter, to hold when not in use
- 1 ea. Rear / off-set drain connection
- 1 ea. Waste valve with lever
- 1 ea. Stainless steel faucet with 12" swing spout and wrist action handles, 1/2" connections
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #47 STORAGE SYSTEM, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model WAL-STOR. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting Height: 50" above finished floor
- 2 ea. Wall grid/mat, WM1848-E, stacked
- 1 ea. Wall uprights, vertical, PR45VU-E
- 2 ea. Shelf, 1448-E
- 2 ea. Shelf Brackets, PR14B-E
- 1 ea. Grid Shelf, 1436WGS-E
- 2 ea. Baskets, WB-E
- 12 ea. Utility Hooks, UH-E
- 1 ea. Epoxy coated finish, entire wall system
- Wall backing by General Contractor

Or as manufactured by Focus or Metro.

ITEM #48 RACK, PAN – QTY. AS PER PLAN & SCHEDULE

New Age Industrial Model 1331. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Capacity: (20) 18" x 26" Pans
- 1 ea. Pan rack slide base, 3" on center
- 1 ea. Aluminum pan stops
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Lockwood or Channel Mfg.

ITEM #49 SPARE NUMBER

ITEM #50 CABINET, MOBILE, WARM/ HOLD – QTY. AS PER PLAN & SCHEDULE

Cres Cor Model H-138-PS-1834D. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-20P
- Capacity: (32) 18" x 26" Pans
- Verify door hinging
- 1 ea. Pass-thru model
- 1 ea. Dutch doors
- 1 ea. Recessed push/pull handle
- 1 ea. Perimeter bumper
- 1 ea. Digital thermometer
- 1 ea. Cord wrap
- 1 e. Energy Star Certified
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by F.W.E. or Metro.

ITEM #51 WORK TABLE W/ SINK – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WT-30108. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- 1 ea. Built-in work sink, 20" L x 16" W x 12" D each
- 1 ea. S.S. Removable sink bowl cover
 - Stainless steel, 14 Gauge

- Finger holes, lift-off
- Flush inlay with work sink/top
- Integral bracket, under counter, to hold when not in use
- 1 ea. Waste valve with lever
- 1 ea. Tail piece
- 1 ea. Waste overflow
- 1 ea. Stainless steel faucet with 12" swing spout and wrist action handles, 1/2" connections
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #52 WORK COUNTER W/ SINK – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- 1 ea. Built-in work sink, 20" L x 16" W x 12" D
- 1 ea. S.S. Removable sink bowl cover
 - Stainless steel, 14 Gauge
 - Finger holes, lift-off
 - Flush inlay with work sink/top
 - Integral bracket, under counter, to hold when not in use
- 1 ea. Waste valve with lever
- 1 ea. Tail piece
- 1 ea. Waste overflow
- 1 ea. Stainless steel faucet with 12" swing spout and wrist action handles, 1/2" connections
- Cabinet/Door to be flush frame design
- Stainless steel integrated handles, horizontal orientation
- Cylinder locks, keyed alike, as required
- Intermediate stainless steel solid shelves, adjustable
- Stainless steel legs, 6" adjustable
- Flanged feet bolted to floor

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #53 POT RACK, TABLE MNTD. W/ SHELF – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model PRT-3-24108. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting Height: 80" above table top, pot rack
- Mounting Height: 20" above table top, overshelf
- 1 ea. Middle shelf, 16" wide
- 50 ea. Stainless steel pot-hooks
- Secured thru splash/table top, anchor to structure

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #54 EYE WASH STATION, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

Guardian Model G1750P. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Thermostatic mixing valve, TMVG3600LF
- 1 ea. ANSI Compliant identification sign
- Wall backing by General Contractor

Or as manufactured by T&S Brass or Component Hardware.

ITEM #55 FIRE EXTINGUISHER, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

Ansul Model K-CLASS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Wet chemical type, Ansulex low pH agent
- 1 ea. 2.5 Gallon tank
- 1 ea. Wall bracket
- 1 ea. Rechargeable
- Wall backing by General Contractor

Or as manufactured by Kidde or RangeGuard.

ITEM #56 SPARE NUMBER

ITEM #57 HAND SINK, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WS-1D. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Manual faucet, gooseneck
- 1 ea. Soap dispenser
- 1 ea. Towel dispenser
- 1 ea. Left and right splash guards
- Wall backing by General Contractor

Or as manufactured by Eagle Group/Metal Masters or John Boos.

ITEM #58 SERVING COUNTER – QTY. AS PER PLAN & SCHEDULE

LTI Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Components: Outlets/Junction boxes for drop-in or built-in equipment mounted in counter by K.E.C., wired by E.C.
- Counter Construction: 1" Stainless steel square tubing fully welded with integral chase wall
- Counter Top Material: Corian Surface, Premium Collection, as selected by Architect
- Front Panels: WilsonArt, Premium Collection, as selected by Architect
- End Panels: WilsonArt, Premium Collection, as selected by Architect
- Working Side:
 - Stainless steel interior/exterior
 - Counter/Door to be flush frame design
 - Stainless steel integrated handles, horizontal orientation
 - Cylinder locks, keyed alike, as required
 - Intermediate stainless steel solid shelves, adjustable
 - Stainless steel apron to mount switches, controls, etc.
- Counter Heights: 34" Counter Top
- Counter Base: Stainless steel legs, 6" adjustable with 16 GA removable kick plate, tapered cove

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #59 SOLID SURFACE TOP – QTY. AS PER PLAN & SCHEDULE

LTI Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #S58, Serving Counter
- Counter Top Material: Corian Surface, Premium Collection, as selected by Architect
- 1 ea. Insulated protector flange

Or as manufacture by EMI New Jersey or South Jersey Metal.

ITEM #60 DROP-IN, HOT/ COLD UNIT – QTY. AS PER PLAN & SCHEDULE

LTI Model DI-QSCHP-3. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/208/1, NEMA 14-20P
- Verify compressor air flow orientation
- 1 ea. Self-contained refrigeration

- 1 ea. Individually controlled wells for hot, cold or freeze
- 1 ea. Controls remote mounted in apron
- 1 ea. Flange style, hugged edge
- 1 ea. Flush food pan presentation
- 1 ea. Manifoldd drain lines to gate/shut-off valve
- Adaptor bars to hold combination of 1/1, 1/2, 1/3 and 1/6 sized pans

Or as manufactured by GA Systems or Delfield.

ITEM #61 FOOD PROTECTOR(S), ADJUSTABLE– QTY. AS PER PLAN & SCHEDULE

Premier Metal & Glass Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Gearless adjustment brackets
- LED Strip lights mounted to posts, concealed wiring
- LED Light mounting clips for extended lengths, as required
- 1" Tubular stainless steel posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 3/8" Tempered glass, horizontal/vertical surfaces

Or as manufactured by Versa-Gard or Vollrath Velocity.

ITEM #62 DROP-IN, HOT/ COLD UNIT – QTY. AS PER PLAN & SCHEDULE

LTI Model DI-QSCHP-2. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-20P
- Verify compressor air flow orientation
- 1 ea. Self-contained refrigeration
- 1 ea. Individually controlled wells for hot or cold
- 1 ea. Controls remote mounted in apron
- 1 ea. Flange style, hugged edge
- 1 ea. Flush food pan presentation
- 1 ea. Manifoldd drain lines to gate/shut-off valve
- Adaptor bars to hold combination of 1/1, 1/2, 1/3 and 1/6 sized pans

Or as manufactured by GA Systems or Delfield.

ITEM #63 SPARE NUMBER

ITEM #64 FOOD PROTECTOR(S), ADJUSTABLE– QTY. AS PER PLAN & SCHEDULE

Premier Metal & Glass Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Gearless adjustment brackets
- LED Strip lights mounted to posts, concealed wiring
- LED Light mounting clips for extended lengths, as required
- 1" Tubular stainless steel posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 3/8" Tempered glass, horizontal/vertical surfaces

Or as manufactured by Versa-Gard or Vollrath Velocity.

ITEM #65 HOT/ COLD SHELF, DROP-IN – QTY. AS PER PLAN & SCHEDULE

LTI Model QSGT-28. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Ceramic glass shelf
- 1 ea. Digital controls
- 1 ea. On/Off rocker switch

Or as manufactured by GA Systems or Delfield.

ITEM #66 FOOD PROTECTOR(S), ADJUSTABLE– QTY. AS PER PLAN & SCHEDULE

Premier Metal & Glass Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Gearless adjustment brackets
- LED Strip lights mounted to posts, concealed wiring
- LED Light mounting clips for extended lengths, as required
- 1" Tubular stainless steel posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 3/8" Tempered glass, horizontal/vertical surfaces

Or as manufactured by Versa-Gard or Vollrath Velocity.

ITEM #67 WARMER/ LED, PROTECTOR MNTD. – QTY. AS PER PLAN & SCHEDULE

Hatco Model GRAHL-30. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Mounting option: Stainless steel hanger tabs
- Mounted in Item #66, Food Protector
- Concealed wiring thru food protector posts
- 1 ea. Built-in toggle/pilot switch
- 1 ea. Stainless steel housing color

Or as manufactured by Premier or Versa-Gard.

ITEM #68 SERVING COUNTER – QTY. AS PER PLAN & SCHEDULE

LTI Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Components: Outlets/Junction boxes for drop-in or built-in equipment mounted in counter by K.E.C., wired by E.C.
- Counter Construction: 1" Stainless steel square tubing fully welded with integral chase wall
- Counter Top Material: Corian Surface, Premium Collection, as selected by Architect
- Front Panels: WilsonArt, Premium Collection, as selected by Architect
- End Panels: WilsonArt, Premium Collection, as selected by Architect
- Working Side:
 - Stainless steel interior/exterior
 - Counter/Door to be flush frame design
 - Stainless steel integrated handles, horizontal orientation
 - Cylinder locks, keyed alike, as required
 - Intermediate stainless steel solid shelves, adjustable
 - Stainless steel apron to mount switches, controls, etc.
- Counter Heights: 34" Counter Top
- Counter Base: Stainless steel legs, 6" adjustable with 16 GA removable kick plate, tapered cove

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #69 SOLID SURFACE TOP – QTY. AS PER PLAN & SCHEDULE

LTI Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #68, Serving Counter

- Counter Top Material: Corian Surface, Premium Collection, as selected by Architect
- 1 ea. Insulated protector flange

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #70 SPARE NUMBER

ITEM #71 HOT/ COLD SHELF, DROP-IN – QTY. AS PER PLAN & SCHEDULE

LTI Model QSGT-28. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Ceramic glass shelf
- 1 ea. Digital controls
- 1 ea. On/Off rocker switch

Or as manufactured by GA Systems or Delfield.

ITEM #72 FOOD PROTECTOR(S), ADJUSTABLE– QTY. AS PER PLAN & SCHEDULE

Premier Metal & Glass Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Gearless adjustment brackets
- LED Strip lights mounted to posts, concealed wiring
- LED Light mounting clips for extended lengths, as required
- 1" Tubular stainless steel posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 3/8" Tempered glass, horizontal/vertical surfaces

Or as manufactured by Versa-Gard or Vollrath Velocity.

ITEM #73 WARMER/ LED, PROTECTOR MNTD. – QTY. AS PER PLAN & SCHEDULE

Hatco Model GRAHL-30. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Mounting option: Stainless steel hanger tabs
- Mounted in Item #72, Food Protector
- Concealed wiring thru food protector posts
- 1 ea. Built-in toggle/pilot switch

- 1 ea. Stainless steel housing color

Or as manufactured by Premier or Versa-Gard.

ITEM #74 DROP-IN, HEATED SHELF – QTY. AS PER PLAN & SCHEDULE

Hatco Model GRSBF-72-O. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, NEMA 6-15P
- 1 ea. Control thermostat
- 1 ea. Stainless steel surface, GRSBF-SS

Or as manufactured by BSI, LLC or LTI.

ITEM #75 FOOD PROTECTOR(S), ADJUSTABLE– QTY. AS PER PLAN & SCHEDULE

Premier Metal & Glass Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Gearless adjustment brackets
- LED Strip lights mounted to posts, concealed wiring
- LED Light mounting clips for extended lengths, as required
- 1" Tubular stainless steel posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 3/8" Tempered glass, horizontal/vertical surfaces

Or as manufactured by Versa-Gard or Vollrath Velocity.

ITEM #76 HEAT LAMP, PROTECTOR MNTD. – QTY. AS PER PLAN & SCHEDULE

Hatco Model GR5AHL-72. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Concealed wiring thru food protector posts
- 1 ea. Built-in toggle/pilot switch
- 1 ea. Stainless steel housing color
- Mounted in Item #75, Food Protectors
- Mounting option: Stainless steel hanger tabs

Or as manufactured by Premier or Versa-Gard.

ITEM #77 SPARE NUMBER

ITEM #78 OVEN, STONE HEARTH, GAS – QTY. AS PER PLAN & SCHEDULE

Earthstone Model 110-PAG. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Gas: 3/4" Rear Connection, 110 MBtuh
- 1 ea. Tool set with wall mounting bracket
- 1 ea. Stainless steel hood cover/apron
- 1 ea. Stainless steel curved air intake panel, perforated (verify radius)
- 1 ea. Base skirt surround
- 1 ea. Stainless steel exterior finish
- 1 ea. Stainless steel mantle

Or as manufactured by Woodstone or Fiero.

ITEM #79 EXHAUST HOOD, TYPE I – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Construction: 100% 430 stainless steel
- Filters: Stainless steel captrate solo with hook
- Insulation: Integral air/ insulation barriers at perimeter and top, 0" clearance to combustibles
- Structural front panel, insulated
- Wall / Island canopy hood, length/ size as per contract documents
- 2 ea. LED lights with bulbs
- Stainless steel field wrap, approximately 18" high on all exposed sides
- Adjustable exhaust air volume control damper
- Hood Control Panel Package: Included as part of Item #38

Or as manufactured by Caddy or Accurex.

ITEM #80 REFRIGERATOR, PIZZA PREP – QTY. AS PER PLAN & SCHEDULE

Continental Refrigerator Model PA60N-D. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Exterior Finish: Stainless Steel
- Interior Finish: Stainless Steel

- 1 ea. Self-contained refrigeration, air-cooled
- 1 ea. Digital Thermometer, external
- 1 ea. Stainless steel finished back
- 1 ea. Expansion valve
- Cylinder locks, keyed alike, as required
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Utility Refrigerator or Traulsen.

ITEM #81 STORAGE SHELVING, 18"W – QTY. AS PER PLAN & SCHEDULE

Fermod Model 4R35B71M. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Shelving to be sized to fit
- 4 ea. Shelves with removable, vented inserts
- 4 ea. 71" High uprights
- 1 ea. Tool free shelf adjustment
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Metro or Cambro.

ITEM #82 HAND SINK, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model WS-1D. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Manual faucet, gooseneck
- 1 ea. Soap dispenser
- 1 ea. Towel dispenser
- 1 ea. Left and right splash guards
- Wall backing by General Contractor

Or as manufactured by Eagle Group/Metal Masters or John Boos.

ITEM #83 SERVING COUNTER – QTY. AS PER PLAN & SCHEDULE

LTI Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Components: Outlets/Junction boxes for drop-in or built-in equipment mounted in counter by K.E.C., wired by E.C.
- Counter Construction: 1" Stainless steel square tubing fully welded with integral chase wall

- Counter Top Material: Corian Surface, Premium Collection, as selected by Architect
- Front Panels: WilsonArt, Premium Collection, as selected by Architect
- End Panels: WilsonArt, Premium Collection, as selected by Architect
- Working Side:
 - Stainless steel interior/exterior
 - Counter/Door to be flush frame design
 - Stainless steel integrated handles, horizontal orientation
 - Cylinder locks, keyed alike, as required
 - Intermediate stainless steel solid shelves, adjustable
 - Stainless steel apron to mount switches, controls, etc.
- Counter Heights: 34" Counter Top
- Counter Base: Stainless steel legs, 6" adjustable with 16 GA removable kick plate, tapered cove

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #84 SPARE NUMBER

ITEM #85 SOLID SURFACE TOP – QTY. AS PER PLAN & SCHEDULE

LTI Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #83, Serving Counter
- Counter Top Material: Corian Surface, Premium Collection, as selected by Architect
- 1 ea. Insulated protector flange

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #86 HOT/ COLD SHELF, DROP-IN – QTY. AS PER PLAN & SCHEDULE

LTI Model QSGT-28. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Ceramic glass shelf
- 1 ea. Digital controls
- 1 ea. On/Off rocker switch

Or as manufactured by GA Systems or Delfield.

ITEM #87 FOOD PROTECTOR(S), ADJUSTABLE– QTY. AS PER PLAN & SCHEDULE

Premier Metal & Glass Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General

Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Gearless adjustment brackets
- LED Strip lights mounted to posts, concealed wiring
- LED Light mounting clips for extended lengths, as required
- 1" Tubular stainless steel posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 3/8" Tempered glass, horizontal/vertical surfaces

Or as manufactured by Versa-Gard or Vollrath Velocity.

ITEM #88 WARMER/ LED, PROTECTOR MNTD. – QTY. AS PER PLAN & SCHEDULE

Hatco Model GRAHL-30. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Mounting option: Stainless steel hanger tabs
- Mounted in Item #87, Food Protector
- Concealed wiring thru food protector posts
- 1 ea. Built-in toggle/pilot switch
- 1 ea. Stainless steel housing color

Or as manufactured by Premier or Versa-Gard.

ITEM #89 DISPLAY CASE, HEATED – QTY. AS PER PLAN & SCHEDULE

Hatco Model GR3SDS-39D. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/208/1, NEMA L14-20P
- 1 ea. Stainless steel body, base and end panels, GR3-SS
- 1 ea. Additional divider rods, 3SD-DIV
- 1 ea. 4" Adjustable legs, 4"LEGS

Or as manufactured by Nemco or F.W.E.

ITEM #90 HOLDING CABINET, HEATED – QTY. AS PER PLAN & SCHEDULE

F.W.E. Model HLC-14. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Verify door hinging

- 1 ea. Electronic controls
- 1 ea. Adjustable thermostat
- 1 ea. Humidity pan
- 1 ea. Adjustable tray slide uprights
- 1 ea. Set of 3-1/2" casters

Or as manufactured by Cres Cor or Metro.

ITEM #91 SPARE NUMBER

ITEM #92 SERVING COUNTER – QTY. AS PER PLAN & SCHEDULE

LTI Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Components: Outlets/Junction boxes for drop-in or built-in equipment mounted in counter by K.E.C., wired by E.C.
- Counter Construction: 1" Stainless steel square tubing fully welded with integral chase wall
- Counter Top Material: Corian Surface, Premium Collection, as selected by Architect
- Front Panels: WilsonArt, Premium Collection, as selected by Architect
- End Panels: WilsonArt, Premium Collection, as selected by Architect
- Working Side:
 - Stainless steel interior/exterior
 - Counter/Door to be flush frame design
 - Stainless steel integrated handles, horizontal orientation
 - Cylinder locks, keyed alike, as required
 - Intermediate stainless steel solid shelves, adjustable
 - Stainless steel apron to mount switches, controls, etc.
- Counter Heights: 34" Counter Top
- Counter Base: Stainless steel legs, 6" adjustable with 16 GA removable kick plate, tapered cove

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #93 SOLID SURFACE TOP – QTY. AS PER PLAN & SCHEDULE

LTI Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #92, Serving Counter
- Counter Top Material: Corian Surface, Premium Collection, as selected by Architect
- 1 ea. Insulated protector flange

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #94 REFRIGERATOR, SAND/ SALAD PREP – QTY. AS PER PLAN & SCHEDULE

Continental Refrigerator Model SW60N24M-FB. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Exterior Finish: Stainless Steel
- Interior Finish: Stainless Steel
- 1 ea. Self-contained refrigeration, front breathing
- 1 ea. Composite cutting board, 2-section
- 1 ea. Stainless steel flat cover, removable
- 1 ea. Stainless steel finished back
- 1 ea. Digital thermometer, external
- Cylinder locks, keyed alike, as required
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Utility Refrigerator or Traulsen.

ITEM #95 FOOD PROTECTOR(S), ADJUSTABLE– QTY. AS PER PLAN & SCHEDULE

Premier Metal & Glass Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Gearless adjustment brackets
- LED Strip lights mounted to posts, concealed wiring
- LED Light mounting clips for extended lengths, as required
- 1" Tubular stainless steel posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 3/8" Tempered glass, horizontal/vertical surfaces

Or as manufactured by Versa-Gard or Vollrath Velocity.

ITEM #96 DROP-IN, HOT/ COLD UNIT – QTY. AS PER PLAN & SCHEDULE

LTI Model DI-QSCHP-2. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-20P
- Verify compressor air flow orientation
- 1 ea. Self-contained refrigeration

- 1 ea. Individually controlled wells for hot or cold
- 1 ea. Controls remote mounted in apron
- 1 ea. Flange style, hugged edge
- 1 ea. Flush food pan presentation
- 1 ea. Manifoldded drain lines to gate/shut-off valve
- Adaptor bars to hold combination of 1/1, 1/2, 1/3 and 1/6 sized pans

Or as manufactured by GA Systems or Delfield.

ITEM #97 FOOD PROTECTOR(S), ADJUSTABLE– QTY. AS PER PLAN & SCHEDULE

Premier Metal & Glass Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Gearless adjustment brackets
- LED Strip lights mounted to posts, concealed wiring
- LED Light mounting clips for extended lengths, as required
- 1" Tubular stainless steel posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 3/8" Tempered glass, horizontal/vertical surfaces

Or as manufactured by Versa-Gard or Vollrath Velocity.

ITEM #98 SPARE NUMBER

ITEM #99 HOT/ COLD SHELF, DROP-IN – QTY. AS PER PLAN & SCHEDULE

LTI Model QSGT-28. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Ceramic glass shelf
- 1 ea. Digital controls
- 1 ea. On/Off rocker switch

Or as manufactured by GA Systems or Delfield.

ITEM #100 FOOD PROTECTOR(S), ADJUSTABLE– QTY. AS PER PLAN & SCHEDULE

Premier Metal & Glass Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Gearless adjustment brackets
- LED Strip lights mounted to posts, concealed wiring
- LED Light mounting clips for extended lengths, as required
- 1" Tubular stainless steel posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 3/8" Tempered glass, horizontal/vertical surfaces

Or as manufactured by Versa-Gard or Vollrath Velocity.

ITEM #101 WARMER/ LED, PROTECTOR MNTD. – QTY. AS PER PLAN & SCHEDULE

Hatco Model GRAHL-30. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Mounting option: Stainless steel hanger tabs
- Mounted in Item #100, Food Protector
- Concealed wiring thru food protector posts
- 1 ea. Built-in toggle/pilot switch
- 1 ea. Stainless steel housing color

Or as manufactured by Premier or Versa-Gard.

ITEM #102 WORK COUNTER W/ SINK – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Built-in work sink, 20" L x 16" W x 12" D
- 1 ea. S.S. Removable sink bowl cover
 - Stainless steel, 14 Gauge
 - Finger holes, lift-off
 - Flush inlay with work sink/top
 - Integral bracket, under counter, to hold when not in use
- 1 ea. Waste valve with lever
- 1 ea. Tail piece
- 1 ea. Waste overflow
- 1 ea. Stainless steel faucet with 12" swing spout and wrist action handles, 1/2" connections
- Cabinet/Door to be flush frame design
- Stainless steel integrated handles, horizontal orientation
- Cylinder locks, keyed alike, as required

- Intermediate stainless steel solid shelves, adjustable
- Stainless steel legs, 6" adjustable

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #103 REFRIGERATOR, UNDERCOUNTER – QTY. AS PER PLAN & SCHEDULE

Continental Refrigerator Model SW48N-U. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Verify door hinging
- Exterior Finish: Stainless Steel
- Interior Finish: Aluminum
- 1 ea. Self-contained refrigeration
- 1 ea. Stainless steel top
- 1 ea. Exterior digital thermometer
- 1 ea. Barrel locks
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Utility Refrigerator or Traulsen.

ITEM #104 PANNINI PRESS, SANDWICH – QTY. AS PER PLAN & SCHEDULE

Equipex Model DIABLO. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, NEMA 6-50P
- Grooved top/bottom plates
- 2 ea. Mechanical timer
- 1 ea. Grill cleaning brush

Or as manufactured by Hatco or Star Mfg.

ITEM #105 CASHIER COUNTER, PORTABLE – QTY. AS PER PLAN & SCHEDULE

LTI Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15R
- Counter Components: Outlets/Junction boxes for drop-in or built-in equipment mounted in counter by K.E.C., wired by E.C.
- Counter Construction: 1" Stainless steel square tubing, fully welded
- Counter Top Material: Corian Surface, Premium Collection, as selected by Architect
- Front Panels: WilsonArt, Premium Collection, as selected by Architect

- End Panels: WilsonArt, Premium Collection, as selected by Architect
- Working Side:
 - Stainless steel finished interior
 - Stainless steel tubular foot rest, 2" diameter
 - Quad receptacle mounted in rear panel
 - Cord/Plug assembly
 - Locking cash drawer
- Counter Heights: 34" Counter Top
- Counter Base: Mounted on heavy duty casters, front two with brakes

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #106 OVEN, HIGH SPEED – QTY. AS PER PLAN & SCHEDULE

Pratica Model ROCKET EXPRESS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, NEMA 6-30P
- 1 ea. Aluminum Paddle
- 1 ea. Bottle of Oven Cleaner
- 1 ea. Bottle of Oven Guard
- 2 ea. Trigger Sprayers
- 2 ea. 10"x 10" Solid Trays
- 2 ea. 10"x 10" Perforated Trays
- 2 ea. 4 Cup Egg Tray

Or as manufactured by TurboChef or MerryChef.

ITEM #107 REFRIGERATED SELF-SERVICE CASE – QTY. AS PER PLAN & SCHEDULE

Structural Concepts Model B4732. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, NEMA 6-20P
- Exterior Finish: WilsonArt, Premium Collection, as selected by Architect
- Interior Finish: Stainless Steel
- 1 ea. Self-contained refrigeration
 - Front access, Breeze™ with Energy Wise
- 1 ea. Louver, painted to match laminate
- 1 ea. Interior LED lighting per shelf
- 1 ea. Roll down security shutter with lock
- 1 ea. Mirrored polished interior ends

Or as manufactured by Federal Industries or RPI.

ITEM #108 HEATED SELF-SERVICE CASE – QTY. AS PER PLAN & SCHEDULE

Structural Concepts Model B4632H. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, NEMA 6-30P
- Exterior Finish: WilsonArt, Premium Collection, as selected by Architect
- Interior Finish: Stainless Steel
- 1 ea. Interior LED lighting per shelf
- 1 ea. Mirrored polished interior ends

Or as manufactured by Federal Industries or RPI.

ITEM #109 SERVING COUNTER – QTY. AS PER PLAN & SCHEDULE

LTI Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Construction: 1" Stainless steel square tubing fully welded
- Counter Top Material: Corian Surface, Premium Collection, as selected by Architect
- Front Panels: WilsonArt, Premium Collection, as selected by Architect
- End Panels: WilsonArt, Premium Collection, as selected by Architect
- Cabinet Base:
 - Millwork door panels, (3) concealed hinges per door
 - Routed finger pull with magnetic touch latch
 - Cylinder locks, keyed alike, as required
 - Stainless steel interior finish with adjustable shelves
- Counter Heights: 34" Counter Top
- Counter Base: Stainless steel legs, 6" adjustable with 16 GA removable kick plate, tapered cove

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #110 CASHIER COUNTER, PORTABLE – QTY. AS PER PLAN & SCHEDULE

LTI Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15R
- Counter Components: Outlets/Junction boxes for drop-in or built-in equipment mounted in counter by K.E.C., wired by E.C.
- Counter Construction: 1" Stainless steel square tubing, fully welded
- Counter Top Material: Corian Surface, Premium Collection, as selected by Architect
- Front Panels: WilsonArt, Premium Collection, as selected by Architect
- End Panels: WilsonArt, Premium Collection, as selected by Architect

- Working Side: •Stainless steel finished interior
 - Stainless steel tubular foot rest, 2" diameter
 - Quad receptacle mounted in rear panel
 - Cord/Plug assembly
 - Locking cash drawer
- Counter Heights: 34" Counter Top
- Counter Base: Mounted on heavy duty casters, front two with brakes

Or as manufactured by EMI New Jersey or South Jersey Metal.

ITEM #111 SOLID SURFACE TOP – QTY. AS PER PLAN & SCHEDULE

LTI Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #105 and #110, Cashier Counter
- Counter Top Material: Corian Surface, Premium Collection, as selected by Architect

Or as manufactured as EMI New Jersey or South Jersey Metal.

ITEM #112 SPARE NUMBER

ITEM #113 REFRIGERATED SELF-SERVICE, DS – QTY. AS PER PLAN & SCHEDULE

Structural Concepts Model FSC463R. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, NEMA 6-20P
- Exterior Finish: WilsonArt, Premium Collection, as selected by Architect
- Interior Finish: Stainless Steel
- 1 ea. Dual-sided access
- 1 ea. Self-contained refrigeration
 - Front access, Breeze™ with Energy Wise
- 1 ea. Interior LED lighting per shelf
- 1 ea. Sound reduction package
- 2 ea. Roll down security shutter with lock
- 1 ea. Mirrored polished interior ends

Or as manufactured by Federal Industries or RPI.

PART 3 - EXECUTION

3.01 GENERAL RELATED CONDITIONS

- A. In each item of equipment hereinafter specified under the "Equipment Schedule," these specifications shall only identify each respective item by name and model number, as well as list various component parts/ accessories provided for same.
- B. Therefore, it shall be intended that these respective items and their component parts shall be of material (mounted where applicable) constructed and furnished in strict accordance to that described in the general specifications for these items and integrally constructed where applicable.
- C. It shall also be intended that where buy-out (pre-fabricated) items are specified, same shall be definitely furnished with all the accessories as normally furnished by manufacturer for these items. Also in strict accordance with current manufacturer's engineering data sheet for each respective item.
- D. Should no list or description be provided for various component parts/ accessories, the Kitchen Equipment Contractor is responsible to provide required components for full and proper operation of said equipment.

3.02 EXAMINATION OF PLANS AND SPECIFICATIONS

- A. Prospective bidders for this work must examine these plans and specifications carefully before bidding, and must request from Architect and/or Food Service Consultant in writing for an interpretation or correction of every apparent ambiguity, inconsistency or error therein. If necessary, such interpretation or correction shall be issued in writing as an addendum.

3.03 SPECIAL NOTES

- A. It shall be the responsibility of Kitchen Equipment Contractor to make as many visits to the job site as is necessary and to keep up to date with progress made in field on the installation of all necessary rough-in to adequately and properly operate and accommodate all equipment furnished by said Contractor and as shown on drawings. Include this service in bid.
- B. Kitchen Equipment Contractor to cooperate with all trades so that the end results of his/her work will be a satisfactory, approved and accepted installation. Written reports of each visit shall be sent promptly to the Architect and/or Food Service Consultant.

3.04 COORDINATION

- A. Procedure of construction is of paramount importance in executions of this project. Kitchen Equipment Contractor to carry on his/her work so that no delay in his/her operations or those of any other contractors occurs at any time.
- B. Kitchen Equipment Contractor to verify with Architect and/or Food Service Consultant as to opening date of the food service area(s), and schedule his/her fabrication and purchasing of equipment so that all will be in readiness, installed, connected, tested, demonstrated, etc., in ample time prior to the scheduled opening date.

3.05 DELIVERY AND INSTALLATION

- A. Shall mean and intend that Kitchen Equipment Contractor shall deliver and assemble all equipment of contract in 1 piece in required locations in building, ready for water, waste, gas, electric and ventilating connections required by other trades.
- B. Any pieces of equipment may be delivered sectionally, but all working surfaces butt-welded, ground and polished on premises so that upon completion, such item of equipment will have true, smooth, even and continuous surfaces. Butt joining and filling with solder not permitted.
- C. Kitchen Equipment Contractor must verify door sizes, delivery platform, elevator size, etc., effecting delivery to food service area(s) for all items of equipment.

3.06 RESERVATIONS AND CONDITIONS

- A. It is the intent of this specification to complete the installation of all equipment covered herein in all phases ready for operation. Contractor shall carefully examine the plans and specifications for building construction contracts and determine therefrom the extent of his operations in all respects. All labor and materials not included in building construction contracts necessary to accomplish this intent are hereby included in this contract.
- B. Kitchen Equipment Contractor shall attend job meetings when required for purpose of coordinating his/her work with other trades.
- C. All equipment shall be received at the building fully protected. It will be the responsibility of the Kitchen Equipment Contractor to protect the equipment until completely installed and accepted.

3.07 NOT USED

END OF SECTION

SECTION 116813 - PLAYGROUND EQUIPMENT

PART 1 - GENERAL

1.1. SECTION INCLUDES

- A. Playground accessories

1.2. DESCRIPTION OF WORK

- A. The extent of playground work is shown on the drawings.

1.3. RELATED SECTIONS

- A. Section 312000 – Earth Moving for Play Area Work
- B. Section 321217 – Asphalt Paving for Play Area Work

1.4. SUBMITTALS

- A. Comply with the requirements of Division 01 for Submittal Procedures.
- B. Product Data: Submit manufacturer's name, specifications and installation instructions for each item specified. Submitted literature and supporting documentation shall include list of materials, finishes and colors demonstrating compliance with the specifications for each required play structure component.
- C. Shop Drawings: Submit shop drawings for all play structures, furnishings and accessories to be installed indicating overall dimensions of each component and specific location of structure and components within the project area, including provisions for footings. A scaled plan view drawing shall be submitted that, as closely as possible, follows the attached drawing. A full color, three-dimensional drawing of the main composite play structure shall also be submitted for review. Equipment layout shall be in conformance to CPSC, ASTM and ADA requirements.
- D. Quality Control Submittals
 - 1. Qualifications Certification: Submit written certification or similar documentation signed by the applicable subcontractor, prime contractor and/or manufacturer (where applicable) indicating compliance with the "Qualifications" requirements specified below in the "Quality Assurance" section of this specification.
 - 2. Experience Listing: Submit a list of completed projects using the products proposed for this project, including owner's contact information and telephone number for each project, demonstrating compliance with applicable "Qualifications" requirements specified in the "Quality Assurance" section of this specification.
- E. Closeout Procedures: Comply with Division 01 requirements including submission of all operation and maintenance instructions for installed structures and components.

1.5. QUALITY ASSURANCE

- A. Consumer Product Safety Commission (CPSC) Compliance: All pieces of playground equipment shall be certified by the Manufacturer to be in compliance with the "Handbook for Public Playground Safety".
- B. Consumer Product Safety Improvement Act (CPSIA) of 2008 Compliance: All playground equipment must be certified by the Manufacturer to be in compliance with all applicable requirements of the CPSIA of 2008. Lead test data that is shipped with the equipment shall be turned over to the Owner immediately after the equipment arrives.
- C. Accessibility: All playground equipment and their associated layout shall conform to the Americans with Disabilities Act accessibility guidelines.
- D. Product Data: Submit manufacturer's product literature indicating materials, finish, and other information required to demonstrate compliance with these requirements for each component. If equipment is other than specified, a component by component description of variations from the specifications must be included with the manufacturer's literature.
- E. Samples: If equipment is other than specified, submit samples including, but not limited to, post, clamp, deck and rail assembly, trolley beam, swing assembly, slides, etc.
- F. Maintenance and Use Manual: Submit information describing the manufacturer's maintenance manual.
- G. Pressure Treated Wood Components: Under no circumstances shall any pressure treated preserved lumber be utilized in the installation of any playground components.
- H. Regulatory Requirements: Obtain written permission from applicable agencies prior to start of construction. Submit one copy of permit to Owner's Designated Representative.

1.6. PROJECT CONDITIONS

- A. Field Measurements: Establish required lines and elevations for grade control.

1.7. SEQUENCING AND SCHEDULING

- B. Proceed with and complete playground construction as rapidly as portions of the site become available, working within seasonal limitations for the work required.

1.8. DELIVERY, STORAGE AND HANDLING

- A. Acceptance of Equipment at Site: Coordinate with the Owner's Designated Representative the delivery of materials. Unloading of all materials is the responsibility of the Contractor. Place the material at the project site where indicated by the Owner's Designated Representative.
- B. Storage and Protection: Store and protect materials as directed by the play structure manufacturer.

PART 2 PRODUCTS

2.1 INDEPENDENT PLAY ITEMS

A. Drop Shot/Plinko Ball

1. Drop Shot: Rotationally molded, U.V. stabilized, linear low-density polyethylene with 3' diameter drop shot units, color as specified.
2. Support Post: 3.5" O.D. RS-20 galvanized steel tubing with ProShield finish, color as specified.
3. Bracket: 1/4" HRPO flat steel with ProShield finish, color as specified.
4. Fasteners: Primary fasteners shall be stainless steel socketed and pinned tamperproof in design per ASTM F 879 unless otherwise indicated.

B. Ga-Ga Pit

1. Perimeter Walls: Blow-molded timbers fabricated from U.V. stabilized, 25% recycled/reclaimed linear high-density polyethylene. Walls to be minimum .080" thick X 4" wide X 12" high X 4'-4" long, black in color.
2. Stake: 3/4" diameter X 30" long shaft with dacromet finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Installer Verification of Conditions: Examine conditions under which new playground equipment is to be constructed with the materials and components specified in this section. Affected Prime Contractors, the Owner's Representative and the Architect shall be notified in writing of any conditions detrimental to the proper and timely installation of the work. When the installer confirms conditions as being acceptable to ensure proper and timely installation of the work and to ensure requirements of applicable warranties or guarantees can be satisfied, submit written confirmation to the Architect. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to the installer.
- B. Do not begin installation of playground equipment until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Fully comply with the playground equipment manufacturer's installation instructions.
- B. Install all play structure components in locations as shown on the Contract Documents in accordance with the play structure manufacturer's tolerances to insure proper functioning of all components.
- C. Adjust all components after completion of installation to comply with Manufacturer's requirements and to provide for safe operations at all times.

3.3 ADJUSTING, CLEANING AND PROTECTION

- A. Adjust all components after completion of installation to comply with the Manufacturer's requirements and to provide for the safe operation of all items.
- B. Clean all surfaces after completion of structure installation and provide means of preventing unauthorized access to structure until surfacing is installed.
- C. Repairs and Protection of Playground Equipment
 - 1. Repair or replace defective playground equipment as directed by the Architect.
 - 2. Protect structures and equipment from damage until acceptance of construction.

END OF SECTION 116813

SECTION 116833 - ATHLETIC FIELD EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Ball safety netting
- B. Futsal soccer goals

1.2 RELATED SECTIONS

- A. Section 312001 – Earth Moving for Play Area Work
- B. Section 321813 – Synthetic Grass Surfacing

1.3 SUBMITTALS

- A. Comply with the requirements of Section 013300 – Submittal Procedures and as modified below.
- B. Product Data: Submit manufacturer's name, specifications and installation instructions for each item specified.
- C. Quality Control Submittals
 - 1. Qualifications Certification: Submit written certification or similar documentation signed by the applicable subcontractor, prime contractor and/or manufacturer (where applicable) indicating compliance with the requirements of this specification.
 - 2. Experience Listing: Submit a list of completed projects using the products proposed for this project, including owner's contact information and telephone number for each project, demonstrating compliance with the applicable portions of this specification.
- D. Closeout Procedures: Comply with the requirements of Section 017700.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide products by a company specializing in the manufacture of athletic equipment with at least five years experience.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Establish and maintain required lines and elevations for grade control.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Deliver all equipment in a manner to protect the material from dirt, water, chemical or mechanical injury.

- B. Acceptance at the Project Site: Deliver all athletic equipment to the site to designated representatives of the Prime Contractor responsible for athletic field equipment for storage and handling when required. The Owner or other contractors on the Project Site shall not store or handle any athletic equipment.

1.7 SEQUENCING AND SCHEDULING

- A. Proceed with and complete athletic field equipment installation as rapidly as portions of the site become available, working within seasonal limitations for the work required.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. For convenience, details and specifications have been based on the following products by the following manufacturers:
 - 1. Ball Safety Netting: StormGuard Multi-Sport Netting System by Sportsfield Specialties, Inc; Delhi, New York (Telephone# 1-888-975-3343):
 - 2. Futsal Soccer Goals: Kwik Goal Official Futsal Goal #2P201 by Anthem Sports, Pawcatuck, CT (800-688-6709)

PART 3 EXECUTION

3.1 EXAMINATION

- A. Installer Verification of Conditions: Examine conditions under which athletic field equipment is to be installed with the materials and components specified in this section. Affected Prime Contractors, the Owner's Representative and the Architect shall be notified in writing of any conditions detrimental to the proper and timely installation of the Work.
 - 1. When the Installer confirms conditions as being acceptable to ensure proper and timely installation of the work and to ensure the requirements of applicable warranties or guarantees can be satisfied, submit written confirmation to the Architect. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to the Installer.

3.2 INSTALLATION

- A. Assemble and install athletic equipment in accordance with the Manufacturer's written instructions under the supervision of a manufacturer's representative.










3.3 ADJUSTING AND CLEANING

- A. Repairs and Protection of Athletic Field Equipment

1. Repair or replace broken or defective components athletic field equipment components as directed by the Architect.
2. Protect athletic field equipment from damage until installation acceptance.

END OF SECTION 116833

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Casework					
Location	Tag		Item	Description	Comments
Classrooms #G33,G35,G37,131,133,135,137,231,331,G51,G53,G55,G42,G43	CW1		Wardrobe	Diversified Spaces #360-3622 K Deluxe Locking Wardrobe cabinet, 36" w x 22" d x 84" h with two file drawers, 3 adjustable shelves coat rod, shelf Oak	
Classrooms #G33,G35,G37,131,133,135,137,231,331 Tech Support G44	CW2		Storage cabinet	Diversified Spaces, General Locking Storage Cabinet GSC-36, Oak , 1" d x 4 h adjustable shelves. Maple at Art, Oak elsewhere	
Classrooms 131,133,135,137,231,331	CW3		Bookcases	Diversified Spaces, Open Oak shelving with one adjustable shelves 1" thick , 36" w 16" d x 35" h and 4" h base #OS-1705K	Coordinate millwork counter spanning over 3 bookcases
Art G33a,G35a,G37a	CW4		General Storage	Diversified spaces #356-4822K Closed general storage with adjustable shelves, Maple	
Art G33,35,37	CW5		Portfolio Cabinet	Diversified Spaces #333-3630 Open cabinet with steel dividers 36" w x 30" d x 84" h, Maple	
Art G33a,G35a,G37a	CW6		Flat paper storage	Diversified Spaces #354-4830 Closed storage cabinet with 7 pull out drawers and shelves, Maple	
See Science casework in section 123553					
Science Room					
Stor 233a, Stor 333a,	MC1		Microscope Cabinets	Sheldon Lab Cabinetry, # T358216-270 - 35" W,	
337, 335, 333, 237,235,233, 207, 209,	IC1		Instructor Cabinets	Sheldon Lab Cabinetry, # T478222-710 - 47" W RH	
Stor 233a, Stor 333a, Stor 337a	AF1		Acid / Flammable Storage Cabinet	Sheldon Lab Cabinetry, # SC4236_35"W x 22" D x 35 1/2" H	
337, 335, 333, 237,235,233, 207, 209,	SG1		Safety Glassed Cabinet	Sheldon Lab Cabinetry, # 31170	

SECTION 122413 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes
 - 1. Manual operation light-filtering shades.
 - 2. Motor operation light-filtering shades.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.
 - 1. Motorized Shade Operators: Include operating instructions.
 - 2. Motors: Show nameplate data, ratings, characteristics, and mounting arrangements
 - 3. Motor controllers.
- B. Shop Drawings: Show location and extent of roller shades. Include elevations, sections, details, and dimensions not shown in Product Data. Show installation details, mountings, attachments to other Work, operational clearances, and relationship to adjoining work
 - 1. Motorized Shade Operators: Show locations and details for installing operator components, switches, and controls. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions.
 - 2. Wiring Diagrams: Power, system, and control wiring.
- C. Samples for Verification:
 - 1. Shade Material: Not less than 12-inch- (300-mm-) square section of fabric, from dye lot used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of material.
- D. Window Treatment Schedule: Include roller shades in schedule using same room designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

- A. Maintenance Data: For roller shades to include in maintenance manuals. Include the following:
 - 1. Methods for maintaining roller shades and finishes.
 - 2. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.

3. Operating hardware.
4. Motorized shade operator.
5. Motor controllers.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed installation of roller shades similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance
- B. Source Limitations: Obtain roller shades through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide roller shade band materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 1. Flame-Resistance Ratings: Passes NFPA 701.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution.
 1. Build mockups of in-place full-size window shade unit in the location as directed by Architect.
 2. Provide one mock-up for each type of window shade fabric and shade configuration (dual and single shades) provided in the Work.
 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in factory packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in a window treatment schedule.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate

measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range.

1.7 WARRANTY

- A. Motorized Roller Shade Hardware, and Shadecloth: Manufacturer's standard non-depreciating twenty-five year limited warranty.
- B. Roller Shade Motors and Motor Control Systems: Manufacturer's standard non-depreciating five-year warranty

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturer: Provide specified shade systems by MechoShade System, Inc. or equivalent by one of the following:
 - 1. Draper Shade & Screen Co., Inc.
 - 2. Hunter Douglas Window Fashions.
 - 3. Levolor Contract; a Newell Company; Joanna
 - 4. Silent Gliss USA, Inc

2.2 BASIS OF DESIGN PRODUCTS

- A. Manual Single-Roll Shades: Provide Mecho/7 Manual System by MechoShade or equal.
- B. Motorized Single-Roll Shades: Provide Electroshade Motorized System by MechoShade or equal.

2.3 MATERIALS

- A. Glare Control Fabric, 1% Open Mesh Type: 75% PVC / 25% polyester in a 2 x 2 basket-weave design, 21 oz./sq yd fabric weight, 0.036"thick, .65 NRC; "ThermoVeil 1700" Series by MechoShade, or equal.
 - 1. Color: 1719 Silver Birch.
- B. Brackets: Plated steel, with adequate projection to clear all window fixtures
- C. Aluminum Extrusions: Alloy and temper recommended by manufacturer for use intended and as required for proper application of finish indicated but not less than the strength and durability properties specified in ASTM B 221 for 6063-T5.

2.4 FABRICATION

- A. Product Description: Roller shade consisting of a roller, a means of supporting the roller, a flexible sheet or band of material carried by the roller, a means of attaching the material to the roller, a bottom bar, and an operating mechanism that lifts and lowers the shade
- B. Components: Noncorrosive, self-lubricating materials.
- C. Rollers: Electrogalvanized or epoxy primed steel or extruded-aluminum tube of diameter and wall thickness required to support and fit internal components of operating system and the weight and width of shade band material without sagging; designed to be easily removable from support brackets; with manufacturer's standard method for attaching shade material.
- D. Direction of Roll: Regular, from back of roller.
- E. Mounting Brackets:
 - 1. Single Roll Shades: Galvanized or zinc-plated steel, style for between jamb mounting unless otherwise indicated.
- F. Fascia: L-shaped, formed-steel sheet or extruded aluminum; long edges returned or rolled; continuous panel concealing front and bottom of shade roller, brackets, and operating hardware and operators; length as required for between the jambs mounting; removable design for access
- G. Bottom Bar: Steel or extruded aluminum, with plastic or metal capped ends. Provide concealed, by pocket of shade material, internal-type bottom bar with concealed weight bar as required for smooth, properly balanced shade operation.
- H. Manual Shade Operation: Bead chain clutch operator.
 - 1. Bead Chain Material: #10 stainless steel chain with 120 lb. breaking strength.
 - 2. Operator Location: On left or right side of shade as directed by Architect for each location.
- I. Shade Units: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):
 - 1. Shade Units Installed between (Inside) Jambs: Edge of shade not more than 1/4 inch (6 mm) from face of jamb. Length equal to head to sill dimension of opening in which each shade is installed.
 - 2. Shade Units Installed Outside Jambs: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- J. Installation Fasteners: Fabricated from metal that is noncorrosive to shade hardware and adjoining construction and to support shades as required by manufacturer's written instructions.

- K. Color-Coated Finish: For metal components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.
- L. Colors of Metal and Plastic Components Exposed to View: As selected by Architect from manufacturer's full range unless otherwise indicated.

2.5 MOTORIZED ROLLER SHADE OPERATORS

- 2.6 General: Provide factory-assembled motorized shade operation systems designed for lifting shades of type, size, weight, construction, use, and operation frequency indicated. Provide operation systems of size and capacity and with features, characteristics, and accessories suitable for Project conditions and recommended by shade manufacturer, complete with electric motors and factory-prewired motor controls, remote-control stations, remote-control devices, power disconnect switches, enclosures protecting controls and all operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with the building electrical system.

- A. Comply with NFPA 70.
- B. Control Equipment: Comply with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6 with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc
- C. Electric Motors: UL-approved or -recognized, asynchronous, totally enclosed, insulated, capacitor-start motors, complying with NEMA MG 1, with thermal overload protection, brake, permanently lubricated bearings, and limit switches; sized by shade manufacturer to start and operate size and weight of shade considering service factor or considering Project's service conditions without exceeding nameplate ratings.
 - 1. Service Factor: According to NEMA MG 1, unless otherwise indicated.
 - 2. Motor Characteristics: Single phase, 120 V, 60 Hz.
 - 3. Motor Mounting: Within manufacturer's standard roller enclosure.
 - 4. Basis of Design Product: Whisper-Shade IQ2 Electronic Drive Unit (EDU) by MechoShade.
- D. Motor Control System: Shades shall be operated by a control panel on the wall; location as indicated.
- E. Remote Controls: Electric controls with NEMA ICS 6, Type 1 enclosure for recessed or flush mounting. Provide the following devices for remote-control activation of shades:
 - 1. Control Stations: Button-operated wall-mounted controls to provide simultaneous raising and lowering of gangs of shades
 - a. Color: As selected by Architect.
 - 2. Connect local wall switches to motor control system.

- F. Limit Switches: Adjustable switches, interlocked with motor controls and set to automatically stop shade at fully raised and fully lowered positions.
- G. Operating Function: Stop and hold shade at any position

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow clearances for window operation hardware.
- B. Install metal parts isolated from concrete or mortar to prevent corrosion.
- C. Install mounting brackets with not less than 2 fasteners per bracket.
- D. Connections: Connect motorized operators to building electrical system.
- E. Coordinate installation of roller shades with placement of interior sign on wall adjacent to rescue windows so that the rescue window is clearly indicated from the interior in the event that the shade is closed.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

- A. Startup Services: Engage a factory-authorized service representative to perform startup services on motor control system and to train Owner's maintenance personnel as specified below:
 - 1. Test and adjust controls and procedures of operation. Replace damaged and malfunctioning controls and equipment.
 - 2. Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, reprogramming, and procedures for testing and resetting motor control system.
 - 3. Schedule training with Owner with at least 7 days' advance notice.

3.6 SHADE TYPES SCHEDULE

- A. Refer to Window Shade Types Schedule on the Drawings.

END OF SECTION 122413

SECTION 123553.19 - WOOD LABORATORY CASEWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wood laboratory casework.
2. Teachers demonstration table
3. Filler and closure panels.
4. Laboratory countertops and sinks
5. Shelves.
6. Storage units.
7. Safety eye wash.
8. Accessories.

1.2 DEFINITIONS

A. MDF: Medium-density fiberboard.

B. Exposed Surfaces of Casework: Surfaces visible when doors and drawers are closed, including bottoms of cabinets more than 48 inches (1200 mm) above floor, and visible surfaces in open cabinets or behind glass doors.

1. Ends of cabinets, including those installed directly against walls or other cabinets, are defined as "exposed."
2. Ends of cabinets indicated to be installed directly against and completely concealed by walls or other cabinets are defined as "concealed."

C. Semiexposed Surfaces of Casework: Surfaces behind opaque doors, such as cabinet interiors, shelves, and dividers; interiors and sides of drawers; and interior faces of doors. Tops of cabinets 78 inches (1980 mm) or more above floor are defined as "semiexposed."

D. Concealed Surfaces of Casework: Include sleepers, web frames, dust panels, and other surfaces not usually visible after installation.

E. Hardwood Plywood: A panel product composed of layers or plies of veneer, or of veneers in combination with lumber core, hardboard core, MDF core, or particleboard core, joined with adhesive and faced both front and back with hardwood veneers.

1.3 SUBMITTALS

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

B. Shop Drawings: For laboratory casework. Include plans, elevations, sections, details, and attachments to other work.

1. Indicate locations of hardware and keying of locks.
 2. Indicate locations and types of service fittings.
 3. Indicate locations of blocking and reinforcements required for installing laboratory casework..
 4. Include details of exposed conduits, if required, for service fittings.
 5. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and other laboratory equipment.
 6. Include coordinated dimensions for laboratory equipment specified in other Sections.
- C. Samples for Initial Selection: For factory-applied finishes and other materials requiring color selection.
- D. Samples for Verification: For each type of cabinet finish and each type of countertop material indicated, in manufacturer's standard sizes.
- E. Qualification Data: For qualified manufacturer.
- F. Product Test Reports for Casework: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory casework with requirements of specified product standard.
- G. Product Test Reports for Countertop Surface Material: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory countertop surface materials with requirements specified for chemical and physical resistance.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that produces casework of types indicated for this Project that has been tested for compliance with SEFA 8.
- B. Source Limitations: Obtain laboratory casework from single source from single manufacturer unless otherwise indicated.
1. Obtain countertops, sinks, accessories and fittings from casework manufacturer.
- C. Product Designations: Drawings indicate sizes and configurations of laboratory casework by referencing designated manufacturer's catalog numbers. Other manufacturers' laboratory casework of similar sizes and similar door and drawer configurations and complying with the Specifications may be considered. Refer to Division 01 Section "Product Requirements."
- D. Casework Product Standard: Comply with SEFA 8, "Laboratory Furniture - Casework, Shelving and Tables - Recommended Practices."
- E. Keying Conference: Conduct conference at project site. Incorporate keying conference decisions into final keying requirements

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

1.6 PROJECT CONDITIONS

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

1.7 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements for support of laboratory casework.

PART 2 - PRODUCTS

2.1 WOOD CABINET MATERIALS

- A. General: All exterior surfaces exposed to view after installation, and all cabinet interior surfaces shall be Maple with the exception of back panels behind opaque doors which shall be Hardboard, and drawer boxes which shall be Birch.
- B. Solid Wood:
 - 1. Exposed Solid Wood: Plain sawn Maple lumber, Grade FAS or better, clear and free of defects. Lumber shall be air dried, then kiln dried, and tempered to a moisture content of 6%-9% before use.
 - 2. Unexposed Solid Wood: Other hardwoods may be used that are Grade FAS or better, clear and free of defects, and properly dried in same manner as exposed solid wood.
- C. Plywood:
 - 1. All plywood panels with veneer core, particleboard core or MDF core shall be CARB Phase 2 Compliant.
 - 2. Hardwood Veneer Core Plywood shall be minimum 3-ply (1/4"), 5-ply (1/2"), or 7-ply (3/4") with select White Maple, Grade B-2, plain sliced, book match, veneer face and back, and shall be compliant with ANSI/HPVA HP-1 2009. All 9-ply (1") plywood shall be Grade B-2, whole piece, rotary cut, maple veneer face and back. Use of other hardwood face veneer shall be acceptable in unexposed areas. Combination core with composite cross bands shall be acceptable in lieu of veneer core.
 - 3. Composite Core Plywood for cabinet drawer fronts and panel doors shall be 3-ply, 3/4" thick with select White Maple Grade B-2, plain sliced, slip match veneer, and shall be compliant with ANSI A208.1-2009 (PBC) or ANSI A208.2-2009 (MDF).

- D. Banding: Plywood panels shall be edge banded where specified with 3mm solid Maple edge band.
- E. Hardboard: Tempered hardboard shall be 1/4" thick. All hardboard shall be composed of wood fibers and resinous binder compressed under heat and pressure.

2.2 AUXILIARY CABINET MATERIALS

- A. Glass for Glazed Doors: Clear tempered glass complying with ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality-Q3; not less than 1/8" thick for framed doors (1/4" at tall cabinets), and 1/4" for frameless sliding doors.

2.3 COUNTERTOP AND SINK MATERIALS

- A. Epoxy: Factory-molded, modified epoxy-resin formulation with smooth, nonspecular finish.
 - 1. Basis of Design Product: Shelresin by Sheldon or equal products of one of the following:
 - a. Durcon.
 - b. Prime Industries, Inc.
 - 2. Physical Properties:
 - a. Flexural Strength: Not less than 10,000 psi (70 MPa).
 - b. Modulus of Elasticity: Not less than 2,000,000 psi (1400 MPa).
 - c. Hardness (Rockwell M): Not less than 100.
 - d. Water Absorption (24 Hours): Not more than 0.02 percent.
 - e. Heat Distortion Point: Not less than 260 deg F (127 deg C).
 - 3. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:
 - a. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), benzene, carbon tetrachloride, dimethyl formamide, ethyl acetate, ethyl alcohol, ethyl ether, methyl alcohol, nitric acid (70 percent), phenol, sulfuric acid (60 percent), and toluene.
 - b. Slight Effect: Chromic acid (60 percent) and sodium hydroxide (50 percent).
 - 4. Color: Black.

2.4 WOOD CABINETS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide "Collegiate Series" laboratory casework and storage units manufactured by Sheldon Laboratory Systems or comparable product by one of the following:
 - 1. ICIscientific, ICICampbellRhea Educational Wood
 - 2. Kewaunee Scientific Corporation

- B. Design: Full overlay casework with drawers and doors designed with square edge with slight radius with vertical match grain fronts and Maple edge band.
- C. Grain Direction:
 - 1. Vertical on doors and drawer fronts.
 - 2. Lengthwise on face frame members.
 - 3. Vertical on end panels.
 - 4. Side to side on bottoms and tops of units.
 - 5. Vertical on knee-space panels.
 - 6. Horizontal on aprons and table frames.
- D. Veneer Matching: Drawer fronts and panel doors on each cabinet shall be cut from one (1) Maple composite core plywood panel as a matching front set, using plain sliced, slip match veneer.
- E. Construction: Provide wood-faced laboratory casework of the following minimum construction:
 - 1. Bottoms of Base Cabinets and Tall Cabinets: 3/4-inch- thick veneer-core hardwood plywood.
 - 2. Tops and Bottoms of Wall Cabinets and Tops of Tall Cabinets: 1-inch-thick veneer-core hardwood plywood.
 - 3. Ends of Cabinets and Vertical Partitions: 3/4-inch- thick veneer-core hardwood plywood.
 - 4. Shelves: 1-inch- thick veneer-core hardwood plywood. Shelves shall be adjustable on 32mm centers, supported by four (4) nickel-plated steel pin and socket type shelf clips.
 - 5. Exposed or semi-exposed edges of end panels, top and bottom panels, partitions, and shelves shall be edged with 3mm solid Maple edge banding
 - 6. Base Cabinet Top Frames: 1-by-3-inch solid wood front rail and back rail with mortise and tenon or doweled connections, glued and pinned or screwed.
 - a. Cross rails for top frames shall be 1" X 2-1/4" solid hardwood fully housed into front and back rails with tongue and groove joints to form a full four-sided top frame.
 - 7. Back Rails:
 - a. Wall Cabinets: Top and bottom back rail shall be 4" x 3/4" hardwood veneer core plywood doweled and glued into end panels, and used for attaching the cabinet to wall.
 - b. Tall Cabinets: Top back rail and center back rail shall be 3" x 1" solid hardwood and bottom back rail shall be 4" x 3/4" hardwood veneer core plywood; all rails shall be doweled and glued into end panels.
 - 8. Base Cabinets Intermediate Rails: Provide on all base cabinets between drawer/drawer configurations and drawer/door configurations. Rails shall be 1" X 3" solid Maple with back grooved to receive lock security panels (when panels are provided). Rails shall be set flush with cabinet ends, doweled and glued into place

9. Recessed Bottom Front Toe Rail for Base Cabinets and Tall Cabinets: 4" x 3/4" Maple veneer core plywood doweled and glued into end panels.
 10. Backs of Cabinets: 1/4-inch- thick, hardwood plywood where exposed, 1/4-inch-thick hardboard dadoed into sides, bottoms, and tops where not exposed.
 11. Drawer Fronts: 3/4-inch- thick, composite core plywood.
 12. Drawer Box Body:
 - a. Front, sides, and back shall be 1/2" thick 9-ply Birch plywood with dovetail joinery all four (4) corners.
 - b. Bottom shall be 1/4" thick white finished hardboard set in grooves on four (4) sides and hot-melt glued on underside.
 - c. Drawer box shall have clear chemical resistant finish.
 - d. Top edge of box shall have a finished top cap to conceal edge of veneer core.
 13. Doors: 3/4 inch thick composite core plywood.
 14. Stiles and Rails of Glazed Doors:
 - a. 3/4" x 3" solid Maple top, bottom, and side rails, doweled and glued together, sanded for smooth fit, and edge detailed with a slight radius.
 - b. Tall Cabinet doors shall have a 3/4" x 6" wide solid Maple center rail.
- F. Filler and Closure Panels: Provide where indicated and as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as adjacent exposed cabinet surfaces unless otherwise indicated.

2.5 WOOD FINISH

- A. Preparation: Sand lumber and plywood before assembling. Sand edges of doors, drawer fronts, and molded shapes with profile-edge sander. Sand after assembling for uniform smoothness at least equivalent to that produced by 220-grit sanding and without machine marks, cross sanding, or other surface blemishes.
- B. Staining: Remove fibers and dust and apply stain to exposed and semiexposed surfaces as necessary to match approved Samples. Apply stain in a manner that will produce a consistent appearance. Apply wash-coat sealer before applying stain to closed-grain wood species.
 1. Stain Color for Storage Units and Laboratory Casework: Authentic Maple 2400SW.
- C. Chemical-Resistant Finish: Apply laboratory casework manufacturer's standard two-coat, chemical-resistant, transparent finish. Sand and wipe clean between coats. Topcoat(s) may be omitted on concealed surfaces.
 1. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8. Acceptance level for chemical spot test shall be no more than three Level 3 conditions.

2.6 HARDWARE

- A. General: Provide laboratory casework manufacturer's standard, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.
 - 1. Finish shall be as selected by Architect.
- B. Hinges: Steel, 5-knuckle heavy-duty institutional hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide 2 for doors 36 inches high or less and 3 for doors more than 36 inches high.
 - 1. Provide in black powder coated finish.
- C. Pulls: Solid steel wire pulls 4" long, back-mounted with screwss. Provide 2 pulls for drawers more than 24 inches wide.
 - 1. Provide in black powder coated finish.
- D. Door Catches: Magnetic self-aligning catches, heavy duty. Provide 2 catches per door
- E. Elbow Catches: Brass with latch held by coiled compressing spring and catch plates of 16-gauge plated steel. Provide on base and wall cabinets with double doors where locks are specified.
- F. Drawer Slides: Shall be easily removable, have a 100 lb. dynamic load rating, and have self-closing, 3/4 extension, epoxy powder coated steel, nylon rollers, bottom mount, positive stop features. File drawers shall have full extension, zinc plated anochrome finish, ball bearing, side mount slides with lever release.
- G. Spring Actuated Latch: Latch has 4-5/8" bevel slide bolt with 2-1/4 lbs./in. actuating spring. Provide on tall cabinets with double doors where locks are specified.
- H. Leg Shoes: Molded vinyl or rubber, black, coved bottom type.
- I. Drawer and Cupboard Locks: Laboratory grade, cylinder cam locks, with 5-disc tumbler mechanism, and a dull chrome-plated face. Tumblers and keys shall be brass, with plug and cylinder of die cast zinc alloy. Locks shall be equipped with RemovaCore™ keying control (With the use of a control key, the key core of the lock assembly can be removed, and a new key core inserted, changing the entire locking system).
 - 1. Provide a minimum of two keys per lock and six master keys. All locks within a room shall be keyed alike with a single master.
 - 2. Provide locks for all doors and drawers.
- J. Label Holders: Stainless steel, aluminum, or chrome plated; sized to receive standard label cards approximately 1 by 2 inches (25 by 50 mm), attached with screws or rivets. Provide where indicated.
- K. Sliding-Door Hardware Sets: Laboratory casework manufacturer's standard, to suit type and size of sliding-door units.

- L. Adjustable Shelf Supports for Wood Cabinets: Powder-coated steel shelf rests complying with BHMA A156.9, Type B04013.
- M. Adjustable Wall Shelf Supports: Surface-type steel standards and steel shelf brackets, with epoxy powder-coated finish, complying with BHMA A156.9, Types B04102 and B04112.

2.7 EPOXY COUNTERTOPS AND SINKS

- A. Countertops and Sinks, General: Provide units with smooth surfaces in uniform plane free of defects. Make exposed edges and corners straight and uniformly beveled. Provide countertop front and end overhang of 1 inch (25 mm), with continuous drip groove on underside 1/2 inch (13 mm) from edge.
- B. Epoxy Countertops:
 - 1. Countertop Fabrication: Fabricate with factory cutouts for sinks, holes for service fittings and accessories, and with butt joints assembled with epoxy adhesive and concealed metal splines.
 - a. Countertop Configuration: Flat, 1 inch (25 mm) thick, with beveled edge and corners, and with drip groove and applied 4" high back and end splashes.
 - b. Countertop Construction: Uniform throughout full thickness.
- C. Epoxy Sinks:
 - 1. Sink Fabrication: Fabricate with factory cutouts for drains, rounded radiused corners, and holes for service fittings and accessories.
 - a. Drop-In ADA Sink Configuration: Outside dimensions of 19.6"w x 16.6"l x 5.5"h with corner outlet; Sheldon Model A25 or equal.
 - b. Drop-in Standard Sink Configuration: Outside dimensions of 19.6"w x 16.6"l x 12.9"h with center outlet; Sheldon Model D30C or equal.

2.8 TEACHERS DEMONSTRATION TABLE

- A. 20790 Sheldon Mobile Instructor Demonstration Center: 54" L. X 24" W. X 36" H. Top is 1" Mobile Instructor's Demo Unit provided with one (1) storage cubical (15"D. x 20"L. x 16-3/4"H) with three drawers. Assembly is provided with finished back; four (4) rubber-tired swivel casters, two (2) with locking brake; 110V electrical raceway with three plug-in receptacles; full length modesty panel; and one (1) 86375 clamp on upright rod assembly. Rod storage is incorporated into the frame. Top is 1" Shelresin.

2.9 SAFETY GLASSES CABINET

- A. Sheldon 31170 Safety Glasses Cabinet (SG1): 32"H. x 24 1/2"W. x 9 1/2"D. Overall. 24-gauge white enameled steel cabinet, doors interlocked with tamper resistant latches, two keys provided for each unit. Wall or shelf mountable with a 7' (2.13 m) grounded electrical cord.

- B. Shuts off automatically if double doors are open. Pilot light confirms UV lamp in use. Five minute cycle controlled by a timer, and no direct UV radiation escapes from cabinet when in use. Unit includes eight (8) removable wire racks, each rack accommodating up to six (6) pairs of glasses or five (5) pairs of goggles. (Glasses and goggles not included.)

2.10 MICROSCOPE CABINETS

- A. Microscope Storage Cabinet (MC1): Unit stores as many as (30) microscopes. Hinged glass doors allow for easy access, as well as instant recognition; Sheldon #T358216-270 - 35" w.

2.11 ACID/FLAMMABLE STORAGE CABINET

- A. Sheldon SC4236 Acid/Flammable Storage Cabinet (AF1): 35" W. x 35 ½" H. x 22"D. Cabinet is constructed of one inch (1") thick, high-density, 9-ply, exterior grade plywood finished with multiple coats of epoxy paint. Cabinet bottom is constructed as a liquid-tight, two inch (2") trough to contain accidental spills. Interior is fully lined with 1/8" thick polypropylene. Storage cabinet is actually two cabinets in one. Acid side features wooden hinge assembly; polypropylene hasp assembly; 10" corrosive label for easy identification. Flammable side features continuous metal hinge; metal lock assembly; adjustable shelf; 10" flammable label for easy identification. Cabinet complies with all O.S.H.A. and National Fire Protection Association standards.

2.12 INSTRUCTOR CABINET

- A. Instructor cabinet (IC1): Cabinet includes (2) file drawers, (3) sloping display shelves, mirror and a wardrobe compartment with clothes rod & fixed hat shelf. RH version. Sheldon Model #478222-710 47"W, RH

2.13 SAFETY EYE WASH

- A. Eyewash, Deck Mounted, 90 Degree AutoFlow™ : AutoFlow™ eyewash for mounting next to sink. Water flow is activated by swinging the spray head assembly over the sink.
 - 1. Construction: Polished chrome plated brass.
 - 2. Spray Head Assembly: Two GS-Plus™ spray heads. Each head has a "flip top" dust cover, internal flow control and filter to remove impurities from the water flow.
 - 3. Valve: 1/2" IPS plug-type valve with Teflon-coated O-ring seals. Swinging spray head assembly from storage to operational position opens orifice and activates water flow. Unit remains in operation until spray head assembly is swung back into the storage position.
 - 4. Strainer: Unit is furnished with in-line strainer to protect valve and spray heads from debris in water line.
 - 5. Supply: 1/2" NPT female inlet.
 - 6. Sign: Furnished with universal identification sign.
 - 7. Mixing Valve: Provide TMV G3600LF thermostatic mixing valve which precisely blends hot and cold water to deliver tepid water as required by ANSI Z358.1-2014.
 - 8. Quality Assurance: Unit is fully assembled and water tested prior to shipment. Unit is third-party certified to comply with ANSI Z358.1-2014.

9. Basis of Design Product: G1805LH (left-hand mounted) by Guardian Equipment, or equal by WaterSaver.

2.14 ACCESSORIES

- A. Glass Drying Rack: Wall-mounted 1" phenolic resin pegboard with removable polypropylene pegs and stainless-steel drip troughs with drain outlet.
 1. Drying Rack: Provide unit with 32 pegs, 20" x 30"; Sheldon Model 79520 or equal.
 2. Drip Trough: Provide unit 20" x 2" x 1", with hose; Sheldon Model MET-511-20 or equal.
- B. Fire Blanket and Cabinet:
 1. Cabinet: Red steel cabinet designed to protect fire blankets from exposure to harsh UV rays, chemicals, moisture, dust, salt air, insects, and temperature extremes. Size: 15" x 15" x 2"
 2. Fire Blanket: 5' x 6' white fiberglass heat resistant blanket used to either cover the fire, cutting off the oxygen supply; or to wrap around a person whose clothes are on fire. Temperature resistance 1000 deg. F
 3. Basis of Design Product: Sellstrom Emergency Fire Blanket by Sheldon Labs, or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of laboratory casework.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF CABINETS

- A. Comply with installation requirements in SEFA 2.3. Install level, plumb, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical. Do not exceed the following tolerances:
 1. Variation of Tops of Base Cabinets from Level: 1/16 inch in 10 feet (1.5 mm in 3 m).
 2. Variation of Bottoms of Upper Cabinets from Level: 1/8 inch in 10 feet (3 mm in 3 m).
 3. Variation of Faces of Cabinets from a True Plane: 1/8 inch in 10 feet (3 mm in 3 m).
 4. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch (0.8 mm).
 5. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch (1.5 mm).

- B. Base Cabinets: Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions with fasteners spaced not more than 24 inches (600 mm) o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform.
 - 1. Where base cabinets are installed away from walls, fasten to floor at toe space at not more than 24 inches (600 mm) o.c. and at sides of cabinets with not less than 2 fasteners per side.
- C. Wall Cabinets: Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through back, near top, at not less than 24 inches (600 mm) o.c.
- D. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.
- E. Adjust laboratory casework and hardware so doors and drawers align and operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

3.3 INSTALLATION OF COUNTERTOPS

- A. Comply with installation requirements in SEFA 2.3. Abut top and edge surfaces in one true plane with flush hairline joints and with internal supports placed to prevent deflection. Locate joints only where shown on Shop Drawings.
- B. Field Jointing: Where possible, make in same manner as shop-made joints using dowels, splines, fasteners, adhesives, and sealants recommended by manufacturer. Prepare edges in shop for field-made joints.
- C. Fastening:
 - 1. Secure epoxy countertops to cabinets with epoxy cement, applied at each corner and along perimeter edges at not more than 48 inches (1200 mm) o.c.
 - 2. Where necessary to penetrate countertops with fasteners, countersink heads approximately 1/8 inch (3 mm) and plug hole flush with material equal to countertop in chemical resistance, hardness, and appearance.
- D. Provide required holes and cutouts for service fittings.
- E. Provide scribe moldings for closures at junctures of countertop, curb, and splash with walls as recommended by manufacturer for materials involved. Match materials and finish to adjacent laboratory casework. Use chemical-resistant, permanently elastic sealing compound where recommended by manufacturer.
- F. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

3.4 INSTALLATION OF ACCESSORIES AND EYE WASH

- A. General: Comply with manufacturer's written instructions.

- B. Built-in Equipment: Securely anchor units to supporting construction with concealed fasteners. Verify that clearances are adequate for proper functioning and that rough openings are completely concealed.
- C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.
- D. Utilities: Comply with plumbing and electrical requirements.
- E. Mount equipment as per manufacturer's directions and as required by field conditions.
- F. Adjust moving parts to operate smoothly, easily, properly, and without binding.

3.5 CLEANING AND PROTECTING

- A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- B. Protect countertop surfaces during construction with 6-mil (0.15-mm) plastic or other suitable water-resistant covering. Tape to underside of countertop at a minimum of 48 inches (1200 mm) o.c.

3.6 SCHEDULE OF LABORATORY CASEWORK AND ACCESSORIES

- A. Refer to Schedule of Casework included in Division 12.

END OF SECTION 123553.19

SECTION 123559 - INSTITUTIONAL CASEWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Art room storage casework
 - 2. Classroom storage furniture.
- B. Related Sections include the following:
 - 1. Division 06 Section "Interior Architectural Woodwork" for custom wood and laminate clad casework and plastic laminate countertops.
- C. Refer to Classroom and Art Room Casework Schedule included in Division 12 for scope.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details for institutional casework. Include plans, elevations, sections, details, and attachments to other Work.
- C. Samples for Verification: 6-inch- (150-mm-) square samples for each type of finish

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative of institutional casework manufacturer for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain institutional casework, including cabinets and tops, through one source from a single manufacturer.
- C. Product Designations: Drawings indicate sizes, configurations, and finish material of institutional casework by referencing designated manufacturer's catalog numbers. Other manufacturers' casework of similar sizes and door and drawer configurations, of same finish material, and complying with the Specifications may be considered. Refer to Division 01 Section "Product Requirements."

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver institutional casework only after painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas

where environmental conditions meet requirements specified in "Project Conditions" Article.

- B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install institutional casework until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where institutional casework is indicated to fit to other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating institutional casework without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.6 COORDINATION

- A. Coordinate layout and installation of metal framing and reinforcements in gypsum board assemblies for support of institutional casework.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of institutional casework that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Delamination of components or other failures of glue bond.
 - 2. Warping of components.
 - 3. Failure of operating hardware.
 - 4. Deterioration of finishes.
- B. Warranty Period, Art and Classroom Furniture: Lifetime from date of Substantial Completion

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: The design for institutional casework is based on the products of Diversified Spaces. Subject to compliance with requirements, provide the named products or a comparable product by one of the following:

1. Marco Group
2. Stevens Industries

2.2 MATERIALS

A. General:

1. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
2. Hardwood Plywood: HPVA HP-1, either veneer core or particle core, unless otherwise indicated.
3. Softwood Plywood: DOC PS 1.
4. Particleboard: ANSI A208.1, Grade M-3i; Minimum 43 lb. density, 3-ply construction.
5. Medium-Density Fiberboard: ANSI A208.2, Grade MD.
6. Hardboard: AHA A135.5, S2S finish.

B. Exposed Cabinet Materials, Art and Classroom Furniture: Maple or oak veneer as scheduled.

C. Core Materials: Particleboard.

D. Hardware: Manufacturer's standards.

2.3 ART ROOMS AND CLASSROOMS STORAGE UNITS FABRICATION

A. General: Casework shall be constructed of solid maple and maple veneers. Finish shall be chemical resistant, UV finish with rubber base molding. Casework shall be SEFA compliant and MAS Certified and have a lifetime warranty.

B. Cabinet CW1: Tall locking wardrobe, Diversified Spaces #360-3622 K Deluxe Locking Wardrobe cabinet, 36"w x 22"d x 84"h with two file drawers, 3 adjustable shelves coat rod, shelf Oak.

C. Cabinet CW2: Storage cabinet, Diversified Spaces, General Locking Storage Cabinet GSC-36, Oak, 1" d x 4 h adjustable shelves. Maple at Art, Oak elsewhere.

D. Cabinet CW3: Bookcases, Diversified Spaces, Open Oak shelving one adjustable shelf 1" thick, 36"w 16"d x 36"h and 4"h base #OS-1705K.

E. Cabinet CW4: Locking tall cabinet with four maple doors; top and bottom doors lock separately. Shelves are 1" thick and the weight capacity for each shelf is 40 lbs. per sq. ft.

1. Cabinet Size: 48"W x 22"D x 84"H
2. Basis of Design Product: Access Tall Cabinet with Split Doors #356-4822M by Diversified Spaces, or equal

- F. Cabinet CW5: Portfolio cabinet, Diversified Spaces #333-3630 Open cabinet with steel dividers 36"w x 30"d x 84"h, Maple
- G. Cabinet CW6: Locking tall cabinet with two maple doors and a three-point locking system: The top of the unit has three shelves (two adjustable, one fixed) and the bottom of the unit has seven large drawers (4"H x 44"W x 26"D) with full extension glides, having a maximum weight limit of 100 lbs.
 - 1. Cabinet Size: 48"W x 30"D x 84"H
 - 2. Basis of Design Product: Perspective Flat Paper Storage Cabinet with Drawers #354-4830M by Diversified Spaces, or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of institutional casework.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 CASEWORK INSTALLATION

- A. Install plumb, level, and true; shim as required, using concealed shims. Where institutional casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- B. Cabinets: Set cabinets straight, level, and plumb. Adjust tops within 1/16 inch (1.5 mm) of a single plane. Fasten cabinets to partition framing, wood blocking, or reinforcements in partitions with fasteners spaced 24 inches (600 mm) o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch (1.5 mm).

3.3 CLEANING AND PROTECTING

- A. Repair or remove and replace defective work as directed on completion of installation.
- B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

END OF SECTION 123559

SECTION 123663 - ULTRACOMPACT (PORCELAIN) COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes ultracompact, sintered porcelain countertops and surrounds..

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Each variety of ultracompact material
 - 2. Accessories and other manufactured products.
- B. Shop Drawings: Include plans, sections, details, and attachments to other work.
- C. Samples for Verification: For each ultracompact material color and pattern indicated, in sets of samples not less than 12 inches (300 mm) square. Include two or more Samples in each set and show the full range of variations in appearance characteristics expected in completed Work.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Sealant Compatibility Test Report: From sealant manufacturer, complying with requirements in Division 07 Section "Joint Sealants" and indicating that sealants will not stain or damage ultracompact material.
- C. Maintenance Data: For ultracompact material countertops to include in maintenance manuals. Include Product Data for maintenance products used or recommended by Installer, and names, addresses, and telephone numbers of local sources for products.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate ultracompact material countertops similar to that indicated for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of products.
- C. Source Limitations: Obtain each variety of ultracompact material from a single manufacturer with resources to provide materials of consistent quality in appearance and physical properties.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store ultracompact material on wood A-frames or pallets with nonstaining separators and nonstaining, waterproof covers. Ventilate under covers to prevent condensation.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions of construction to receive ultracompact material countertops by field measurements before fabrication

PART 2 - PRODUCTS

2.1 ULTRACOMPACT MATERIAL

- A. Ultracompact Material: High performance porcelain comprised of natural minerals and pigments sintered under high pressure into slabs, sheets or panels..
 - 1. Basis of Design Product: Provide Corian Endura manufactured by DuPont or equal product by one of the following:
 - a. Neolith
 - b. Lapitec
 - c. DEKTON
 - d. Laminam
 - 2. Thickness: 20 mm
 - 3. Colors: Smoky Marble.
 - 4. Finish: Satin.
 - 5. Edges: Radius at exposed edges.
 - 6. Flame Spread: Class A.
 - 7. Warranty: 10 year limited.

2.2 ADHESIVES, GROUT, SEALANTS, AND STONE ACCESSORIES

- A. General: Use only adhesives formulated for ultracompact material and recommended by their manufacturer for the application indicated. Use adhesives that have a VOC content of not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Mounting Adhesive: 100% silicone adhesive recommended by manufacturer.
- C. Joint Adhesive: Commercial joint adhesive for porcelain surfaces recommended by manufacturer.
 - 1. Basis of Design Product: Corian Joint Adhesive or equal.
 - 2. Color: As selected by Architect from manufacturer's full range
- D. Sealant for Countertops: Manufacturer's standard sealant of characteristics indicated below that comply with applicable requirements in Division 07 Section "Joint Sealants" and will not stain the ultracompact material it is applied to.

1. Product as recommended by countertop manufacturer.
 2. Color: As selected by Architect from manufacturer's full range.
- E. Cleaner: Cleaner specifically formulated for ultracompact material types, finishes, and applications indicated, as recommended by ultracompact material producer and, if a sealer is specified, by sealer manufacturer. Do not use cleaning compounds containing acids, caustics, harsh fillers, or abrasives.

2.3 FABRICATION, GENERAL

- A. Fabricate ultracompact material countertops in sizes and shapes required to comply with requirements indicated, including details on Drawings and Shop Drawings.
1. Dress joints straight and at right angle to face, unless otherwise indicated.
 2. Cut and drill sinkages and holes in ultracompact material for anchors, supports, and attachments.
 3. Provide openings, reveals, and similar features as needed to accommodate adjacent work.
 4. Fabricate molded edges with machines having abrasive shaping wheels made to reverse contour of edge profile to produce uniform shape throughout entire length of edge and with precisely formed arris slightly eased to prevent snipping, and matched at joints between units. Form corners of molded edges as indicated with outside corners slightly eased, unless otherwise indicated.
 5. Finish exposed faces of ultracompact material to comply with requirements indicated for finish of each type of ultracompact material required and to match approved Samples and mockups. Provide matching finish on exposed edges of countertops, splashes, and cutouts.
- B. Carefully inspect finished ultracompact material units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.

2.4 COUNTERTOPS

- A. Nominal Thickness: Provide thickness indicated.
- B. Edge Detail: As indicated.
- C. Provide backsplashes and endsplashes as required.
- D. Joints: Fabricate countertops without joints, to greatest extent possible. Where not possible fabricate countertops in sections for joining in field, with joints at locations indicated and as follows:
1. Sealant-Filled Joints: 1/16 inch (1.5 mm) in width.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates indicated to receive ultracompact material countertops and conditions under which ultracompact material countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of ultracompact material countertops.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Advise installers of other work about specific requirements for placement of inserts and similar items to be used by ultracompact material countertop Installer for anchoring ultracompact material countertops. Furnish installers of other work with Drawings or templates showing locations of these items.

3.3 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/16 inch in 48 inches (1.5 mm in 1200 mm).
- B. Variation from Level: Do not exceed 1/8 inch in 96 inches (3 mm in 2400 mm), 1/4 inch (6 mm) maximum.
- C. Variation in Joint Width: Do not vary joint thickness more than 1/4 of nominal joint width.
- D. Variation in Plane at Joints (Lipping): Do not exceed 1/64-inch (0.4-mm) difference between planes of adjacent units.
- E. Variation in Line of Edge at Joints (Lipping): Do not exceed 1/64-inch (0.4-mm) difference between edges of adjacent units, where edge line continues across joint.

3.4 INSTALLATION OF COUNTERTOPS

- A. General: Install countertops by adhering to supports with silicone adhesive.
- B. Do not cut ultracompact material in field, unless otherwise indicated. If ultracompact material countertops or splashes require additional fabrication not specified to be performed at Project site, return to fabrication shop for adjustment.
- C. Set ultracompact material to comply with requirements indicated on Drawings and Shop Drawings. Shim and adjust ultracompact material to locations indicated, with uniform joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerances. Install anchors and other attachments indicated or necessary to secure ultracompact material countertops in place.

- D. Bond joints with ultracompact material adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
- E. Apply sealant to joints and gaps specified for filling with sealant; comply with Division 07 Section "Joint Sealants." Remove temporary shims before applying sealant.

3.5 ADJUSTING AND CLEANING

- A. In-Progress Cleaning: Clean countertops as work progresses. Remove adhesive and sealant smears immediately.
- B. Remove and replace ultracompact material countertops of the following description:
 - 1. Broken, chipped, stained, or otherwise damaged ultracompact material.
 - 2. Defective countertops.
 - 3. Defective joints, including misaligned joints.
 - 4. Interior ultracompact material countertops and joints not matching approved Samples and mockups.
 - 5. Interior ultracompact material countertops not complying with other requirements indicated.
- C. Replace in a manner that results in ultracompact material countertops matching approved Samples and mockups, complying with other requirements, and showing no evidence of replacement.
- D. Clean ultracompact material countertops not less than six days after completion of sealant installation, using clean water and soft rags. Do not use wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods that could damage ultracompact material.

END OF SECTION 123663

SECTION 124813 - ENTRANCE FLOOR MATS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Surface-mounted berber carpet tile mats

1.2 SUBMITTALS

- A. Product data for each type of floor mat and frame specified, including manufacturer's specifications and installation instructions, details of construction relative to materials, dimensions of individual components, profiles, and finishes..
- B. Shop drawings showing layout and types of floor mat, full-scale sections of typical installations, details of patterns or designs, anchors, and accessories.
- C. Samples for Architect's verification of color(s) for berber carpet mats.
- D. Maintenance data in the form of manufacturer's printed instructions for cleaning and maintaining floor mats.

1.3 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain each type of floor mats from one source of a single manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Construction Specialties, Inc.
 - 2. Mats Inc.
 - 3. Reese Enterprises, Inc.
 - 4. Pawling Corp.

2.2 MATS

- A. Carpet-Tile Type Mats: Non-woven needle punched polypropylene carpet bonded to non-skid rubber tile backing to form tiles 1/2 inch thick with nonraveling edges.

1. Pile Weight: 52 oz/sq yd
2. Flammability: Passes DOC FF-1-70
3. Pattern: Nubby Hobnail
4. Tile Size: 19-11/16" x 19-11/16"
5. Color: Charcoal #38
6. Edging: BSF-225 beveled vinyl nosing edging on all 4 sides
7. Basis of Design Product: "EM-22 Berber Carpet Tiles" by Pawling Corp., or equal.

2.3 ACCESSORIES

- A. Installation Adhesive: Type provided by carpet tile manufacturer, meeting local VOC requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Adhere tiles to comply with manufacturer's instructions at locations indicated.

3.2 PROTECTION

- A. Defer installation of floor mats until time of Substantial Completion for Project.

END OF SECTION 124813

SECTION 142100 - ELECTRIC TRACTION ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes electric traction passenger elevators.
- B. Related Sections include the following:
 - 1. Division 03 Section for setting sleeves, inserts, and anchoring devices in concrete.
 - 2. Division 04 Section for setting sleeves, inserts, and anchoring devices in masonry.
 - 3. Division 05 Sections for the following:
 - a. Attachment plates, angle brackets, and other preparation of structural steel for fastening guide-rail brackets.
 - b. Machine beams.
 - c. Structural-steel shapes for subsills and entrance frames that are part of steel frame.
 - d. Pit ladders.
 - 4. Division 09 Sections for finish flooring in elevator cars.
 - 5. Division 26 Section for smoke detectors in elevator lobbies to initiate emergency recall operation and heat detectors in shafts and machine rooms to disconnect power from elevator equipment before sprinkler activation and for connection to elevator controllers.
 - 6. Division 26 Section for telephone service to elevators.
 - 7. Division 26 Sections for electrical service for elevators to and including fused disconnect switches at machine room door and standby power source, transfer switch, and connection from auxiliary contacts in transfer switch to controller.

1.2 DEFINITIONS

- A. Defective Elevator Work: Operation or control system failures; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; the need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

1.3 SUBMITTALS

- A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information. Include product data for the following:
 - 1. Car enclosures and hoistway entrances.
 - 2. Operation, control, and signal systems
- B. Shop Drawings: Show plans, elevations, sections, and large-scale details indicating service at each landing, machine room layout, coordination with building structure,

relationships with other construction, and locations of equipment and signals. . Include large-scale layout of car control station and standby power operation control panel. Indicate variations from specified requirements, maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.

- C. Samples: For exposed finishes of cars, hoistway doors and frames, and signal equipment; 3-inch- (75-mm-) square samples of sheet materials; and 4-inch (100-mm) lengths of running trim members.
- D. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, including emergency generator, as shown and specified, are adequate for elevator system being provided.
- E. Maintenance Manuals: Include operation and maintenance instructions, parts listing with sources indicated, recommended parts inventory listing, emergency instructions, and similar information. Include diagnostic and repair information available to manufacturer's and Installer's maintenance personnel. Submit for Owner's information at Project closeout.
- F. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.
- G. Qualification Data: For Installer
- H. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Elevator manufacturer or an experienced installer approved by elevator manufacturer who has completed elevator installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Regulatory Requirements: In addition to local governing regulations, comply with applicable provisions in ASME A17.1, "Safety Code for Elevators and Escalators" and Building Code of New York State.
- C. Accessibility Requirements: In addition to local governing regulations, comply with ANSI A117.1 - 2017.
- D. NFPA: Comply with applicable NFPA codes, and specifically with sections relating to electrical work and elevators.
- E. Fire-Rated Door Assemblies: Door and frame assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible according to NFPA 252.

- F. Design Criteria: The drawings and specifications indicate the cab clear inside dimensions, motor horsepower and hoistway dimensional requirements and other requirements of the electric traction elevator, and are based on the specific types and models indicated. Electric traction elevators by other manufacturers may be considered, provided deviations in dimensions are minor, and do not change the hoistway dimensions. Motor horsepower must be less than or equal to that specified or the proposer shall pay all costs associated with increasing electrical service to elevator as necessary. The burden of proof of equality is on the proposer.

1.5 COORDINATION

- A. Coordinate installation of sleeves, block outs, elevator equipment with integral anchors, and other items that are embedded in concrete or masonry for elevator equipment. Furnish templates, sleeves, elevator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
- B. Coordinate locations and dimensions of other work relating to electric traction elevators including pit ladders, sumps, and floor drains in pits; entrance subsills; and electrical service, electrical outlets, lights, and switches in pits and machine rooms.

1.6 WARRANTY

- A. Special Manufacturer's Warranty: Written warranty, signed by manufacturer agreeing to repair, restore, or replace defective elevator work within specified warranty period.
 - 1. Warranty Period: 12 months from date of Acceptance.

1.7 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Acceptance, provide 12 months' full maintenance service by skilled employees of the elevator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity. Provide parts and supplies as used in the manufacture and installation of original equipment.
 - 1. Perform maintenance, during normal working hours.
 - 2. Provide emergency 24-hour callback service.
 - a. Response Time: Two hours or less.
- B. Continuing Maintenance Proposal: Provide a continuing maintenance proposal from Installer to Owner in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Provide specified products of Otis or equivalent elevator manufactured by KONE or ThyssenKrupp.

2.2 MATERIALS AND COMPONENTS

- A. General: Provide manufacturer's standard elevator systems. Where components are not otherwise indicated, provide standard components, published by manufacturer as included in standard preengineered elevator systems and as required for a complete system.
 - 1. Provide machine-room-less type elevator.
- B. Passenger Elevator Machines: Provide variable-voltage, variable-frequency ac-type hoisting machines. Provide solid-state power converters.
 - 1. Provide energy-efficient machine with permanent magnet synchronous motor, dual solenoid service and emergency brakes, mounted to the car guide rail at the top of the hoistway.
 - 2. Provide regenerative drive system.
- C. Coated Steel Belts: Polyurethane coated belts with high-tensile-grade, zinc-plated steel cords and a flat profile on the running surface and the backside of the belt. All driving sheaves and deflector sheaves should have a crowned profile to ensure center tracking of the belts. A continuous 24/7 monitoring system using resistance based technology has to be installed to continuously monitor the integrity of the coated steel belts and provide advanced notice of belt wear
- D. Inserts: Furnish required concrete and masonry inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work where installation of devices is specified in another Specification Section.
- E. Guide Rails and Attachments: Guide rails shall be Tee-section steel rails with brackets and fasteners. Side counterweight arrangements shall have a dual-purpose bracket that combines both counterweight guide rails, and one of the car guide rails to building fastening
- F. Car Frame and Platform: Welded steel units.
- G. Finish Materials: Provide the following materials and finishes for exposed parts of elevator car enclosures, car doors, hoistway entrance doors and frames, and signal equipment as indicated:
 - 1. Satin Stainless Steel: ASTM A 666, Type 304, with No. 4, directional satin finish.
 - 2. Enameled-Steel Sheet: Cold-rolled steel sheet complying with ASTM A 366/A 366M, matte finish, stretcher-leveled standard of flatness. Provide with factory-applied enamel finish; colors as selected by Architect.

3. Prime-Painted Steel Sheet: Cold-rolled steel sheet, ASTM A 366/A 366M, or hot-rolled steel sheet, ASTM A 569/A 569M, with factory-applied rust-inhibitive primer.
4. Plastic Laminate: High-pressure type complying with NEMA LD 3, Type GP-50; color, texture, and pattern as scheduled.

2.3 OPERATION SYSTEMS

- A. Passenger Elevators: Provide manufacturer's standard microprocessor operation system for each elevator or group of elevators as required to provide type of operation system indicated.
 1. Single Elevator: Provide "selective collective automatic operation" as defined in ASME A17.1.
- B. Auxiliary Operations: In addition to primary operation system features, provide the following operational features for elevators where indicated
 1. Loaded-Car Bypass: When car load exceeds a predetermined weight, car will respond only to car calls, not to hall calls. Predetermined weight can be adjusted.
 2. Automatic Dispatching of Loaded Car: When car load exceeds a predetermined weight, doors will begin closing.
 3. Nuisance Call Cancel: When car calls exceed a preset number while the car load is less than a predetermined weight, all car calls are canceled. Preset number of calls and predetermined weight can be adjusted.
 4. Automatic Self-Leveling: Provide each elevator car with a self-leveling feature to automatically bring the car to the floor landings and correct for overtravel or undertravel. Self-leveling shall, within its zone, be automatic and independent of the operating device. Maintain the car approximately level with the landing irrespective of its load
 5. Independent Service: Keyswitch in car control station removes car from group operation and allows it to respond only to car calls. Key cannot be removed from keyswitch when car is in independent service. When in independent service, doors close only in response to the door close button.
 6. Automatic emergency recall and fire fighter's emergency service (Phase I fire service and Phase II car fire service in accordance with ASME A17.1);
 - a. Elevator A and B: Return to ground floor(designated floor), with alternate floor the First Floor.
 7. Controls for emergency operation shall be located in each car.
 8. Access at bottom landing with zoning.
 9. Access at top landing with zoning.

2.4 SIGNAL EQUIPMENT

- A. General: Provide signal equipment for each elevator or group of elevators with hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements of acrylic or other permanent, non-yellowing translucent plastic.

- B. Car Control Stations: Provide manufacturer's standard semirecessed or fully recessed car control stations. Mount in return panel adjacent to car door, if not otherwise indicated.
 - 1. Include call buttons for each landing served and other buttons, switches, and controls required for specified car operation.
 - 2. Mark buttons and switches with manufacturer's standard identification for required use or function that complies with ASME A17.1.
 - 3. Mount controls at heights complying with ANSI A117.1- 2017.
- C. Emergency Communication System: Provide system that complies with ASME A17.1 and ANSI A117.1-2017. On activation, system dials preprogrammed number of monitoring station and identifies elevator location to monitoring station. System provides two-way voice communication without using a handset and provides visible signals that indicate when system has been activated and when monitoring station has responded. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
- D. Emergency Two-Way Communication System for the Deaf, Hard of Hearing and Speech Impaired: Provide two-way communication system that provides visible text and audible modes that provides the following:
 - 1. When operating in each mode, includes a live interactive system that allows back and forth conversation between the elevator occupants and emergency personnel.
 - 2. Is operational when the elevator is operational.
 - 3. Allows elevator occupants to select the text-based or audible mode depending on their communication needs to interact with emergency personnel.
- E. Car Position Indicator: For passenger elevator cars, provide illuminated-signal type, digital-display type, or segmented type, located above car door or above car control station. Also provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served.
 - 1. Include travel direction arrows if not provided in car control station.
- F. Key-Operated Hall Push-Button Stations: Provide one hall push-button station with keyed operation at each landing for each elevator or group of elevators, but not less than one station for each four elevators in a group. For each group of passenger elevators, locate between two elevators at center of group or at location most convenient for approaching passengers.
 - 1. Provide units with flat faceplate for mounting with body of unit recessed in wall.
 - 2. Provide units with direction-indicating buttons; two buttons at intermediate landings; one button at terminal landings.
 - 3. Firefighters Phase I key switch shall be located at Ground Floor.
- G. Combination Hall Lanterns/Hall Position Indicators: Provide illuminated-signal type or digital-display type, located above each hoistway entrance. Provide units with illuminated arrows, but provide single arrow at terminal landings.

1. Provide units with flat faceplate for mounting with body of unit recessed in wall and with illuminated elements projecting from faceplate for ease of angular viewing.
 2. With each lantern, provide audible signals indicating car arrival and direction of travel, including floor passing signal.
- H. Corridor Call Station Pictograph Signs: Provide signs matching hall push-button stations with text and graphics according to ASME A17.1, Figure 2.27.9.
- I. Fireman's Warning Signal (Third Signal): Provide illuminated fireman's hat which shall light in the event a fire is detected in the elevator machine room or hoistway per NFPA 72-6.15.3.9 and ASME A17.1-2.27.3.2.6.
- J. Controllers: Provide contact points in the controllers for fire alarm system interface.
- K. Standby Power Elevator Selector Switches: Provide switches, as required by ASME A17.1, where indicated. Adjacent to switches, provide illuminated signal that indicates when normal power supply has failed. For each elevator, provide illuminated signals that indicate when they are operational and when they are at the designated emergency return level with doors open.

2.5 DOOR REOPENING DEVICES

- A. Infrared Array: Provide door reopening devices with a uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more of the light beams shall cause doors to stop and reopen.
1. Nudging Feature: After car doors are prevented from closing for a predetermined adjustable time, through activating door reopening device, a loud buzzer shall sound and doors shall begin to close at reduced kinetic energy.

2.6 ELEVATOR MONITORING SYSTEM

- A. Remote Elevator Monitoring: Provide microprocessor controlled system that allows remote monitoring of elevators for maintenance needs and repair requests.

2.7 PASSENGER ELEVATOR CAR ENCLOSURES

- A. General: Provide manufacturer's standard steel-framed car enclosures with nonremovable wall panels as required for wall panel finish specified, suspended ceiling, trim, accessories, access doors, doors, power door operators, sills (thresholds), lighting, and ventilation.
1. Stainless Steel: ASTM A 167, Type 302 or 304, with No. 4 satin finish.
 2. Sills: Extruded aluminum, with grooved surface, 1/4 inch thickness, mill finish.
 3. Wall Panels: Plastic laminate panels, in color and pattern as scheduled.
 4. Fabricate car door frame integrally with front wall of car in stainless steel.
 5. Fabricate car with recesses and cutouts for signal equipment.
 6. Car Doors: Satin finish stainless steel doors.

7. Luminous Ceiling: Brushed stainless steel finish dropped ceiling with 6 round LED lights.
 8. Flooring: By others as specified in Division 09 Section "Resilient Flooring and Accessories".
 9. Handrails: Satin stainless steel, flat, 2" x 1/2", at sides and rear walls.
 10. Wall Protection Pads: Provide hooks and removable protection pads for interior of cab to completely cover walls, in color selected by Architect.
- B. Emergency Light: Integrated emergency light in a module inclined 20 degrees from vertical, illuminating automatically upon loss of the building's normal power supply.
- C. Top of Car Access: Provide top of car access door complying with ASME/ANSI A17.1.
- D. Car Fan: Provide top of car ventilation fan, one-speed, with key-operated switch in car control station

2.8 PASSENGER HOISTWAY ENTRANCES

- A. General: Provide manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Provide frame size and profile to coordinate with hoistway wall construction.
1. Where gypsum board wall construction is indicated, provide self-supporting frames with reinforced head sections.
 2. Provide units bearing Underwriters' Laboratories "B" labels.
 3. Comply with elevator manufacturer's requirements for elevator wall interface with hoistway entrance assembly.
- B. Interlocks: Equip each hoistway entrance with an Underwriters' Laboratories "B" label approved type interlock tested as required by code. Design interlock to prevent operation of the car away from the landing until the doors are locked in the closed position as defined by code and prevent opening the doors at any landing from the corridor side unless the car is at rest at that landing or is in the leveling zone and stopping at that landing.
- C. Materials and Fabrication: Provide manufacturer's standards but not less than the following:
1. Stainless-Steel Frames: Formed from stainless steel sheet, with satin finish.
 2. Stainless-Steel Doors: Flush, hollow-metal construction, fabricated from stainless steel with satin finish.
 3. Sills: Extruded aluminum, with grooved surface, 1/4 inch (6 mm) thickness, mill finish.
 4. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

2.9 SIGNAGE

- A. Provide signage complying with Safety Code for Elevators and Escalators (ASME A17.1), ANSI A117.1 - 2017 and the Building Code of New York State.

2.10 PASSENGER ELEVATORS

- A. Elevator No. A:

1. Type: One front opening gearless traction elevator
2. Basis of Design Product: Otis Gen 3 Edge, or equal.
3. Rated Load: 3500 lb.
4. Rated Speed: 200 fpm.
5. Operation System: Simplex operation, microprocessor control.
6. Power Characteristics: 480V, 3 phase, 60 Hz.
7. Number of Stops: 4
8. Motor HP: 15
9. Auxiliary Operations:
 - a. Loaded-car bypass.
 - b. Automatic dispatching of loaded car.
 - c. Nuisance call cancel.
 - d. Access at top landing with zoning.
 - e. Access at bottom landing with zoning.
 - f. Earthquake Emergency Operation: Comply with requirements in ASME A17.1.
 - g. Elevator shall be tied into building emergency power system.
 - h. Automatic emergency recall and fire fighter's emergency service (Phase I fire service and Phase II car fire service in accordance with ASME A17.1); return to Ground Floor (designated floor), with alternate floor the First Floor.
 - i. Options: Provide all optional features specified or as required for code compliance.
10. Car Enclosures: As follows:
 - a. Inside Width: 6'-5-9/16"
 - b. Inside Depth: 5'-5-9/16".
 - c. Inside Height: 7'-9"
 - d. Front Walls: Satin stainless steel with integral car door frames.
 - e. Car Fixtures: Satin stainless steel.
 - f. Car Walls: Plastic laminate panels, vertical orientation, in Amber Cherry.
 - g. Door Faces (Interior): Satin stainless steel.
 - h. Door Sills: Aluminum.
 - i. Ceiling: Satin finish dropped stainless steel ceiling with 6 round LED lights.
 - j. Handrails: Satin stainless steel, flat, 2" x 1/2", at sides and rear walls.
 - k. Floor: By others as specified in Division 09 Section "Resilient Flooring and Accessories."
 - l. Ventilation: Fan.
11. Hoistway Entrances: As follows:
 - a. Width: 3'-6"
 - b. Height: 7'-0"

- c. Type: One speed side opening.
 - d. Frames: Stainless steel.
 - e. Doors: Stainless steel.
 - f. Sills: Aluminum.
12. Hall Fixtures: Satin stainless steel
13. Additional Requirements: As follows:
- a. Provide inspection certificate in each car, mounted under acrylic cover with satin stainless-steel frame.
 - b. Provide protective blanket hooks on cab front and walls and one set of vinyl full-height protection pads in color selected by Architect.
 - c. Provide inspection switch and car top inspection station.

B. Elevator No. B:

- 1. Type: One front and rear opening gearless traction elevator
 - 2. Basis of Design Product: Otis Gen 3 Edge, or equal.
 - 3. Rated Load: 3500 lb.
 - 4. Rated Speed: 150 fpm.
 - 5. Operation System: Simplex operation, microprocessor control.
 - 6. Power Characteristics: 480V, 3 phase, 60 Hz.
 - 7. Number of Stops: 2
 - 8. Motor HP: 11
 - 9. Auxiliary Operations:
 - a. Loaded-car bypass.
 - b. Automatic dispatching of loaded car.
 - c. Nuisance call cancel.
 - d. Access at top landing with zoning.
 - e. Access at bottom landing with zoning.
 - f. Earthquake Emergency Operation: Comply with requirements in ASME A17.1.
 - g. Elevator shall be tied into building emergency power system.
 - h. Automatic emergency recall and fire fighter's emergency service (Phase I fire service and Phase II car fire service in accordance with ASME A17.1); return to Ground Floor (designated floor), with alternate floor the First Floor.
 - i. Options: Provide all optional features specified or as required for code compliance.
10. Car Enclosures: As follows:
- a. Inside Width: 6'-5-9/16"
 - b. Inside Depth: 5'-6-1/8".
 - c. Inside Height: 7'-9"
 - d. Front Walls: Satin stainless steel with integral car door frames.
 - e. Car Fixtures: Satin stainless steel.
 - f. Car Walls: Plastic laminate panels, vertical orientation, in Amber Cherry.
 - g. Door Faces (Interior): Satin stainless steel.
 - h. Door Sills: Aluminum.
 - i. Ceiling: Satin finish dropped stainless steel ceiling with 6 round LED lights.
 - j. Handrails: Satin stainless steel, flat, 2" x 1/2", at side walls.

- k. Floor: By others as specified in Division 09 Section "Resilient Flooring and Accessories."
 - l. Ventilation: Fan.
11. Hoistway Entrances: As follows:
- a. Width: 3'-6"
 - b. Height: 7'-0"
 - c. Type: One speed side opening.
 - d. Frames: Stainless steel.
 - e. Doors: Stainless steel.
 - f. Sills: Aluminum.
12. Hall Fixtures: Satin stainless steel
13. Additional Requirements: As follows:
- a. Provide inspection certificate in each car, mounted under acrylic cover with satin stainless-steel frame.
 - b. Provide protective blanket hooks on cab front and walls and one set of vinyl full-height protection pads in color selected by Architect.
 - c. Provide inspection switch and car top inspection station.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Examine hoistways, hoistway openings, pits, and machine rooms as constructed; verify critical dimensions; and examine supporting structure and other conditions under which elevator work is to be installed. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. For the record, prepare a written report, endorsed by Installer, listing dimensional discrepancies and conditions detrimental to performance.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions.
 - 1. Install hoistway frames according to NFPA 80
- B. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators.
- C. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts designed to minimize transmission of vibrations to structure and thereby minimize structure-borne noise from elevator system.

- D. Lubricate operating parts of systems, including ropes, as recommended by manufacturers.
- E. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.
- F. Leveling Tolerance: 1/8 inch (3 mm), up or down, regardless of load and direction of travel.
- G. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.

3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting use (either temporary or permanent) of elevators, perform acceptance tests as required and recommended by ASME A17.1 and governing regulations and agencies. All tests shall be witnessed by a qualified elevator inspector (QEI) retained by the Owner.
- B. Operating Test: Load elevators to rated capacity and operate continuously for 30 minutes over full travel distance, stopping at each level and proceeding immediately to the next. Record temperature rise of elevator machines during 30-minute test period. Record failure of elevators to perform as required.
 - 1. Perform operating test specified above on one elevator of each type, capacity, speed, and travel distance.
- C. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times tests are to be performed on elevators.

3.4 DEMONSTRATION

- A. Instruct Owner's personnel in proper use, operation, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of operational failure and other building emergencies. Train Owner's personnel in procedures to follow in identifying sources of operational failures or malfunctions. Confer with Owner on requirements for a complete elevator maintenance program.
- B. Make a final check of each elevator operation with Owner's personnel present and before date of Substantial Completion. Determine that operation systems and devices are functioning properly.

3.5 PROTECTION

- A. Temporary Use: Do not use elevators for construction purposes unless cars are provided with temporary enclosures, either within finished cars or in place of finished cars, to protect finishes from damage.
1. Provide full maintenance service by skilled, competent employees of elevator Installer for elevators used for construction purposes. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity. Use same parts and supplies as used in the manufacture and installation of original equipment.
 2. Provide protective coverings, barriers, devices, signs, and other procedures to protect elevators. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.
 3. Provide services of an elevator operator to operate the elevator during construction for construction purposes once temporary enclosures are in place. Cost of operator's services shall be borne by Contractor.

END OF SECTION 142100