TRO

PROJECT MANUAL - VOLUME ONE

Package 'H' - Charles Street Project
Permit Set/Not for Construction
Date of Issue: September 24, 2004

PROJECT

Maine Medical Center
Charles Street Project
MMC Project No. 21084A
Architect's Commission Number 4673

OWNER

Maine Medical Center
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Portland, Maine 04102-3175

ARCHITECT

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CONSULTANTS

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Structural Engineer
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CONSTRUCTION MANAGEMENT

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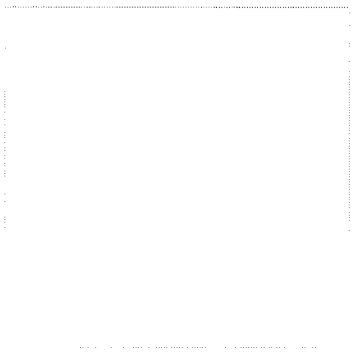

William K. Davis

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END OF SECTION 00005

SECTION 02070 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Demolition and removal of designated building construction, equipment and fixtures.

B. Demolition and removal of designated partitions and components.

C. Demolition and removal of designated foundations and floor slabs. Grind down portions of existing concrete slabs to meet designated grades and elevations.

D. Demolition and removal of designated window sash and associated items. Remove designated window and door assemblies to rough openings.

E. Demolition and removal of designated HVAC equipment, ductwork, supports, electrical and plumbing fixtures and equipment.

1.2 QUALITY ASSURANCE

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

B. Standards: Comply with ANSI A10.6 and NFPA 241.

1.3 PROJECT CONDITIONS

A. Occupancy: Areas to be demolished will be occupied prior to start of work. Demolition work will be phased to comply with the Owner's use requirements.

B. Condition of Structures: Owner assumes no responsibility nor makes any claim as to the actual condition or structural adequacy of any existing construction to be demolished. The Contractor shall investigate and assure himself of the condition of the work to be demolished and shall take all precautions to ensure safety of persons and property.

C. Salvage: Items of value which are not indicated to be returned to the Owner or reused on this project shall become the property of the Contractor. Storage or sale of items on the project site is prohibited.

1. Items indicated to be salvaged shall be removed with extreme care to prevent damage. All components and parts of salvaged items shall be saved and packaged. Store salvaged

items as directed by Owner . Items to be salvaged and returned to the Owner or reused on this project include, but are not limited to, the following:

a. Wood doors removed during construction.
b. Plumbing fixtures and related accessories
c. All convector cabinets which are necessarily removed.
d. Other items as directed by Owner or Architect.

2. Salvage removed face brick for reuse under the work of Section 04210 - Brick Masonry. Face brick to be reused shall be fully intact, completely free of mortar and shall be neatly stacked and protected.

D. Traffic: Conduct operations and removal of debris to ensure minimum interference with the normal use of public passages and other adjacent facilities. Do not close or obstruct traffic ways, corridors, streets, walks or other used facilities without the written permission of the Owner and authorities having jurisdiction.

E. Protection: Ensure the safe passage of persons in and around the space and the building during demolition. Prevent injury to persons and damage to property. Protect items to remain. Maintain fire protection systems in operation throughout the work of this project.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 EXECUTION

A. Remove all equipment and building items not required for new construction in an orderly and careful manner. Protect existing foundations, footings, slabs, and supporting structural members not required to be removed.

B. Mechanical and electrical equipment, including fixtures, receptacles, ductwork, piping, wiring, conduit, fans and all other such items required to be removed to complete the work, shall be disconnected, capped and lowered to the floor under the work of Division 15, Mechanical, and Division 16, Electrical. After such items have been lowered to the floor, removal from the site shall be included under the work of this Section 02070.

C. Proceed with demolition systematically. Demolish in small sections and avoid overloading. Remove all associated adhesives, clips, hangers and other attachment devices with removal of finishes.

1. Interior walls:
   a. Remove interior walls and partitions as indicated and as needed to accommodate new work.
   b. Where existing walls-to-remain are indicated to receive new finishes, completely remove trim and fasteners.

2. Ceilings: Where ceilings are indicated to be removed, also remove ceiling mounted systems and equipment leaving only bare structure free from hangers.
   a. Ceilings which must be temporarily removed for mechanical, plumbing or fire protection work shall be carefully removed and stored for reinstallation when work has been completed .
3. Doors and Frames: Where doors and frames are indicated to be removed from walls or partitions which are to remain, remove doors and frames carefully so as to minimize damage to wall. Repair and patch wall as necessary to accommodate new door frame or other new work.
4. Roofing and Floor Penetrations: Remove existing roofing decking only after roofing contractor has removed existing roofing system leaving deck surface bare and clean. All penetrations in floors and roof shall be framed with miscellaneous iron prior to cutting and demolition of deck and concrete. Coordinate the demolition work with Division 15 - Mechanical. Make all existing and new conditions satisfactory for application of new elastomeric roofing membrane. Perform this work in a timely manner to minimize weather damage to the building.
5. Remove all existing structure indicated to be removed and create new openings in walls, floors, and roofs as needed to properly complete the work of the Contract. Protect openings to prevent injury to persons in compliance with authorities having jurisdiction.

D. Except where noted otherwise, immediately remove demolished materials from site. Remove and promptly dispose of contaminated, vermin infested, or dangerous materials encountered.

E. Removal of existing flooring:

1. Completely remove existing flooring located in areas scheduled to receive new flooring surfaces and elsewhere as noted. Remove all layers of flooring down to the existing substrate. Other than for terrazzo floors, where existing flooring is installed in a setting bed, the existing setting bed shall be completely removed.
2. Remove resilient flooring and adhesive in strict accordance with the technical bulletin entitled " Recommended Work Practices for the Removal of Resilient Floor Covering", dated July 1990 and applicable updates, as issued by Resilient Floor Covering Institute, 966 Hungerford Drive, Suite 12B, Rockville, MD 20850.Tel: (301) 340-8580.

F. Preparation of existing floors:

1. Remove all foreign materials from existing floor surfaces by use of mechanical abraders , grinders or other methods required to clean the existing surfaces to a smooth clean finish acceptable for the application of new flooring surfaces or cementitious underlayment.
2. Chemicals required for cleaning of floors shall be free of fumes and odors which will affect building occupants . Obtain Owner's approval for use of all such chemicals prior to start of work.

G. Remove foundation walls, footings and concrete slabs.

H. Remove window assemblies, door assemblies and stairs.

I. Completely remove all elevator equipment associated with elevators as indicated, including but not limited to, cab, platform, rails, hoistway entrances, machines, and cables. Perform all work as required by code and local authorities having jurisdiction in regards to such work.

J. Where existing elevator machine room is to be relocated, coordinate with the work of Section 14240, Hydraulic Elevators for sequencing of the work. Coordinate with Owner regarding demolition of spaces housing elevator equipment to provide the adjacent elevator in operation.

K. Broom clean floor slabs at completion of demolition work. Flooring materials indicated to remain shall be covered and protected from soiling and construction debris.

L. Remove all debris from site and dispose of legally. Burning on site is not permitted.

END OF SECTION 02070

SECTION 02466

DRILLED CONCRETE MINI-PILES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies the furnishing of all labor, equipment, and materials to design, furnish, and install minimum 10-inch-diameter drilled, cast-in-place, reinforced concrete piles (i.e., drilled mini-piles) with a vertical compression design capacity as shown on the Drawings. The pile design shall permit load testing to at least twice the design load in compression.

B. The Contractor shall perform a load test that demonstrates an ultimate failure load equal to at least twice the maximum compressive design load. Based on the maximum compressive capacity of 100 tons, the test load shall be 200 tons. The load test must be performed prior to beginning installation of the mini-piles.

C. The piles are to be installed along grid line J.6 of the new Charles Street Building as shown on the Drawings.

1.3 DESIGN REQUIREMENTS

A. Minimum pile diameter shall be 10 inches.

B. Minimum area of reinforcing steel shall be determined by the Contractor, but not less than 2.25 square inches (1 - #14 Bar).

C. Provide a minimum 2-inch concrete or grout cover for all steel reinforcing. Centralizers attached to tie reinforcing steel shall be used to ensure the minimum grout cover.

D. Piles shall be designed as friction piles and shall be drilled to a sufficient depth to achieve adequate load carrying capacity.

E. All mini-piles shall have a minimum 28-day concrete compressive strength of 4,000 psi.

F. Maximum allowable stress on steel reinforcing shall be 40 percent of the specified yield strength, but not exceeding 24,000 psi.

G. The pile design shall provide for not less than 40 percent of the design compressive load to be carried by the reinforcing steel.

H. Perform at least one compression load test to confirm the capacity of the mini-pile design. If tests shows that the pile has a failure load of less than twice the maximum

compressive design load, the pile will need to be redesigned and additional load tests performed. The additional load tests shall be at the expense of the Contractor.

I. Requirements for obstructions removed during all excavation and subsurface work and definition of when the removal of obstructions qualifies for separate payment shall be in accordance with Part III of this specification.

1.4 RELATED SECTIONS

A. Section 02200 – Earthwork

B. Section 03300 – Cast-in-Place Concrete

C. Section 05120 – Structural Steel

1.5 LAYOUTS AND GRADES

A. The Contractor shall employ a Registered Land Surveyor (RLS) familiar with the type of work who shall establish lines and levels. The RLS shall be responsible for establishing the correct plan location of each mini-pile in the field and shall determine and certify the actual location of each mini-pile as installed, including a determination of the deviation (s) of the center of each pile from plan location at design cut-off elevation.

B. The Contractor shall be responsible for correct location of piles and as-installed pile tip elevations. The Contractor shall show locations of the centers of as-installed piles on a drawing in relation to the design location and the as-installed pile tip elevation and submit to the Engineer within five days after the pile is installed. The Contractor shall provide to the Engineer, within two weeks after completion of installation of all piles, a plan, certified by said Surveyor, showing the as-installed location of all piles to the nearest 1/2 inch. The Contractor shall establish and be responsible for the protection and maintenance of a project benchmark.

C. The Contractor shall submit a certified list of the piles completed to the Engineer. The certified list shall include as a minimum:

1. Top of pile elevation immediately after installation to the nearest 0.1 foot.

2. Cut-off elevation as installed to the nearest 0.1 foot.

3. Tip elevation as installed to the nearest 0.1 foot.

4. Deviation from specified plan location in inches to the nearest 1/2 inch.

5. Pile length immediately after installation to the nearest 0.1 foot.

6. Pile designation number.

7. Damage (if any) to pile.

1.6 REFERENCES

A. American Society of Testing and Materials (ASTM)

ASTM A615 Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

ASTM C109 Test Method for Compressive Strength of Hydraulic Cement Mortars Using 2 inch Cube Specimens.

ASTM C150 Standard Specification for Portland Cement, Type I, II, or III.

ASTM C404 Aggregates for Masonry Grout.

B. 1999 BOCA Building Code, Foundation Systems and Retaining Walls.

1.7 SUBMITTALS

At least 30 days prior to commencing mini-pile installation, submit data required in Items A through G below.

A. Submit calculations for pile design including steel reinforcement design, splice details, pile length, and pile layout.

B. Submit cement grout or concrete design mix; frequency of obtaining cube samples for testing, and cube test results.

C. Submit to the Engineer for review any admixtures to be used in the grout.

D. Submit descriptions of the type of equipment and methods of advancing hole through soils and rock, method to maintain an open hole, method to flush the drilled hole, and method of placing the grout.

E. Submit to the Engineer for review proposed methods and procedures for removing obstructions.

F: Submit to the Engineer for review proposed method of excavation to bottom of pile cap and proposed method of monitoring movement and protection of existing adjacent buildings during mini-pile installation, including type and frequency of monitoring.

G. Submit details of when mini-piles will be installed with respect to anticipated cast-in-place foundation installation schedule.

H. Submit field records of as-built pile installation within 2 days after completion of each pile, including data required in Article 1.5C, Layout and Grades.

I. Submit results of grout cube testing as specified in Article 3.5G.

J. At least 30 days before commencing mini-pile installation, the Contractor shall schedule a Mini-Pile Preconstruction Meeting. Attendance shall include the General Contractor, Drilling Subcontractor, Ready-Mix/Grout Supplier, Engineer of Record and Field Testing Laboratory. Agenda of the meeting shall be prepared by the contractor and shall include, but not be limited to the following:

1. Review of Proposed installation schedule and sequence
2. Field testing and inspection and quality control
3. Load testing program

1.8 QUALIFICATIONS

A. Provide a written statement demonstrating that the contractor and the Superintendent have at least 3 years of experience in this type of mini-pile installation.

B. Provide a written statement identifying at least 3 comparable mini-pile installations.

1.9 PROJECT CONDITIONS

A. Protect adjacent structures from damage due to excessive undermining.

B. Visit site to review access conditions.

C. Protect existing utilities to remain in accordance with the same requirements of authorities having jurisdiction over same.

1.10 SUBSURFACE SOIL DATA

A. Refer to Geotechnical Engineering Reports by S.W. Cole Engineering, Inc., dated 29 March 2002.

B. The geotechnical data is for general information only. The data is believed to be accurate at the locations and time the borings were made. It is the Contractor's responsibility to make interpretations and conclusions on the character of the materials to be encountered and the impact on this Work based upon his knowledge of mini-pile installation techniques.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cement Grout

1. Mixture of Portland Cement (ASTM C150, Type II), sand (ASTM C404; Size No. 1), and clean potable water mixed to maintain solids in suspension and flowable to provide adequate bond in the bearing stratum.

2. Minimum ASTM C109 compressive strength of 5,000 psi at 28 days.

3. Admixtures, if used, mixed in accordance with the Manufacturer's recommendations.

B. Reinforcing Steel:

1. The steel core shall consist of steel reinforcing bars or steel pipe sections that conform to the following requirements:

a. Deformed steel bars - ASTM A615, Grade 60.

b. Steel Pipe sections – ASTM A53, Type E or S, Grade B

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, vibration, and other hazards created by drilled mini-pile operations.

B. Verify site conditions for access, support of equipment, and headroom constraints

C. Obtain prior review by the Engineer of the proposed drilling system

3.2 INSTALLATION

A. Use equipment and procedures that will minimize vibrations and loss of ground and will prevent undermining of existing foundations. When drilling within 10 feet of an existing foundation or utility, use a drilling method in which the drill water returns inside the drill casing or drill the pile within a surface casing that extends at least 5 feet deeper than the nearby footing or utilities.

B. Drill a minimum 10-inch-diameter cased hole to the proposed depth at the planned location. Handling and disposal of drill fluid and cuttings shall be done in a manner that is approved by the Engineer. The use of drilling med will not be permitted:

C. Install the steel reinforcement in the drill hole either before or after grouting but prior to removal of the drill casing. Use centralizers to center the steel reinforcement in the drill hole. Grout the hole within 48 hours of installing the steel reinforcement.

D. Immediately prior to grouting, flush the hole with clean water to remove all contaminated water and cuttings. The hole shall be flushed with the grout pipe located at the bottom of the hole. The water shall be pumped at a high velocity until the wash water at the top of the casing is clear. After flushing, the depth of the hole shall be checked with a weighted measuring tape to confirm that the hole is cleaned out to the bottom of the drill casing. The hole shall be grouted immediately thereafter. In case of delay, the hole shall be reflushed and rechecked prior to grouting as directed by the Engineer.

E. Place cement grout using a tremie pipe extending to the bottom of the hole. Grouting shall continue until the grout return at the top of the hole is of the same consistency as the grout being pumped into the hole: A positive displacement grout pump shall be used. The grouting equipment shall prevent the introduction of oil, air, or other foreign substances into the grout. The grouting equipment shall have a screen to sieve the grout before being introduced into the grout pump. Measure the volume of grout being pumped to an accuracy of 10 percent. Submit detailed grouting procedure and equipment to the Engineer for acceptance.

F. Apply a pressure to the top of the grout column if desired or needed for adequate grout placement. Maintain the level of grout in the casing during casing removal.

G. Install required reinforcing dowels, at the top of pile to provide connection to the pile cap/grade beam.

H. Production piles shall be installed using identical procedures used for the test pile.

3.03 OBSTRUCTIONS

A. Obstructions shall be removed by pretrenching or other approved methods as part of the Work. When obstructions make it impossible to install piles at the locations shown and/or to proper depth, the Contractor shall resort to all usual methods to install piles including excavation, down-the-hole hammers, spudding, jetting, or other methods. No extra payment shall be made for drilling through boulders, granite blocks, or other obstructions.

3.04 TOLERANCES AND ACCEPTANCE CRITERIA

A. Install piles as close as practicable to the plan location. A maximum lateral deviation from the correct location at cutoff elevation equal to 3 inches will be permitted. A maximum deviation from design cutoff elevation equal 1 inch will be permitted. Pile verticality shall be within 5 percent, as measured from top of casing to bottom of casing. Pulling piles into position will not be permitted.

B. Piles that are damaged or defective due to defective materials, improper installation procedure, improper welding of steel reinforcing; or piles that have an installed volume of cement grout not exceeding a volume equal to 90% of the theoretical volume of the drill hole will not be accepted.

C. Piles that are damaged, defective, or mislocated beyond a specified tolerances shall be abandoned and shall be replaced by additional piles installed adjacent thereto, as directed by the Engineer and at no additional cost to the Owner.

3.05 FIELD QUALITY CONTROL

A. Install mini-piles only in the presence of the Engineer or the Owner's Testing and Inspection Firm. Provide 24 hours notice to the Engineer that his presence will be required.

B. The following will be sufficient cause for rejection of mini-piles:

1. Deviation from location or vertical alignment.

2. Improper installation methods.

C. Notify the Engineer immediately of any damage or deviation, which may affect the acceptability of the pile, so that corrective measures, if required, may be carried out with minimum delay.

D. Correct, abandon, and/or replace rejected piles to the satisfaction of the Engineer at no cost to the Owner.

E. Provide the Engineer free and safe access to the work areas at all times.

F. Pile acceptance by the Engineer shall not relieve the Contractor of his responsibilities from performing the Work in accordance with the Specifications and the Contract Drawings.

G. Cement grout cube specimens shall be obtained and tested, with a minimum of one set of three 2 inch grout test cubes taken for each mini-pile grouted. Test cubes shall be made, cured and tested in accordance with ASTM C109, except the grout shall be restrained from expansion by a top plate.

3.06 PILE LOAD TESTS

A. Perform one compression pile load test to twice the design capacity. Perform the test in accordance with the current 1999 BOCA Building Code provisions, except as modified herein. Load tests shall be conducted, the results evaluated, and the method of installation approved by the Engineer prior to installing the production piles.

B. Submit to the Engineer the details of the proposed load test setup and all equipment and measurement systems to be used for the test, and obtain acceptance from the Engineer before any load test is made. All load tests shall be observed by the Engineer. Provide 48 hours notice.

C. The load test pile shall be identical to the production piles and installed according to the procedures outlined in this specification with the following exceptions:

1. The test pile shall include one telltale located at the pile tip and strain gauges located at intervals along the length of the pile, as described below in paragraphs F. and G.

D. Apply the load to the pile by means of a single hydraulic jack acting against a dead load or anchored reaction for compression test. Construct the apparatus for applying the load to the test pile so that the loads are applied axially to the pile. Use bottled compressed gas to provide pressure for the hydraulic system. Connect at least one full backup regulator to automatically maintain the gas pressure. Provide electronic load cell to independently measure applied load. Calibrate the test load jacking system including the hydraulic jack couplings, gas pump, and pressure gauge, and load cell, prior to the test so that the load applied is controlled to within 3% of the total applied load. Submit calibration reports prior to the start of the pile load test.

E. Provide all necessary materials and labor for construction of a settlement measuring system for each test, as follows.

1. Provide a steel reference beam with a moment of inertia of no less than 105 inches^4 about its neutral axis of rotation. The reference beam must be independently supported with supports firmly embedded in the ground at a distance of between 8 to 10 feet from the test pile and not less than 8 feet from any reaction pile. One end of the reference beam must be free to move as the length of the beam changes with temperature variations.

2. Mount three dial gauges equidistant from the center of the test pile and at 120° intervals around the pile. Attach the dial gauges rigidly to the reference beam. Align gauge stems vertically and provide smooth glass horizontal bearing surfaces for the gauge stems. Dial gauges shall have at least a 2-inch travel and shall read to 0.001 inch.

3. Establish a reference point on the test pile and at each end or at the center of the reference beam. The reference points shall consist of graduated scale machine divided into 0.02 inch and attached securely to the pile and reference beam. The reference points shall be monitored during the pile load test.

4. Protect the pile movement measuring system against rain, wind, frost, and any other disturbances that could affect the reliability of the movement measurements. Provide sunshading for the measuring system for the duration of the test and for a minimum of 1 hour prior to the start of the test.

F. Provide one telltale attached to the bottom of the pile. Provide dial gauges to measure the deflection of the telltale. The dial gauges must have a minimum of 2 inches travel and read to 0.001 inch.

G. Provide approved strain gauges attached to the steel core at the bottom of the pile, at the third points between the bottom of the pile and bottom of the surface casing, at the bottom of the surface casings and at top of the surface casing. Provide gauges at opposite sides of the steel core at each gauge location (total of ten gauges). Provide strain gauge switching unit and readout unit for reading the gauges during the load test.

H. Apply the test load as indicated in the 1999 BOCA Building Code.

I. Submit a detailed report including such information as pile location, type, diameter, length, movement readings, and all other pertinent data as indicated in ASTM D1143 and Building Code Section 1214 and 1217.

J. Piles that are installed during the pile load test program may be considered for use as production piles at the discretion of the Engineer. Piles that are not used as production piles shall be cut off 3 feet below the design cutoff elevation for production piles in that area.

PART 4 - COMPENSATION

4.01 METHOD OF MEASUREMENT

The Work of this Section will be measured on a linear foot basis.

4.02 BASIS OF PAYMENT

Work of this Section will be paid for at the Contract unit price per linear foot, including all tests with their associated costs.

4.03 PAYMENT ITEMS

Drilled mini-piles

END OF SECTION 02466

SECTION 03300

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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.

B. Cast-in-place concrete described in this section includes all labor, materials, equipment, and services necessary to complete the cast-in-place concrete work as shown on the drawings and specified herein, including but not limited to the following:

1. Foundations, footings and pile caps
2. Foundation walls
3. Slabs-on-grade
4. Slabs placed on metal decking
5. Equipment (Housekeeping) Pads
6. Concrete for infilling metal pan stairs
7. Architectural Site Walls

C. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 3 Section 03410 "Structural Precast Concrete"

1.3 REFERENCED STANDARDS

A. Codes and Standards:

Follow the guidelines contained in the latest editions of the following codes, specifications, and standards, including references contained in each document, except where more stringent requirements are shown or specified.

1. American Concrete Institute (ACI):

a ACI 211.1 – "Recommended Practice for Selecting Proportions for Normal Weight Concrete."

b ACI 214 – "Recommendation for Evaluation of Compression Test Results of Field Concrete."

c ACI 301 – "Specification for Structural Concrete for Buildings."

d ACI 304 – "Recommended Practice for Measuring, Mixing and Placing Concrete."

e ACI 305 – "Recommended Practice for Hot Weather Concreting."

f ACI 306 – "Recommended Practice for Cold Weather Concreting."

g ACI 308 – "Recommended Practice for Curing Concrete."

h ACI 309 – "Recommended Practice for Consolidation of Concrete."

i ACI 311 – "Recommended Practice for Concrete Inspection."

j ACI 315 – "Manual of Standard Practice for Detailing Reinforced Concrete Structures."

k ACI 318 – "Building Code Requirements for Reinforced Concrete."

l ACI 613 – "Recommended Practice for Selecting Proportions for Concrete."

2. American Society for Testing and Materials (ASTM):

a C 31 – "Standard Method of Making and Curing Concrete Test Specimens in the Field."

b C 33 – "Standard Specification for Concrete Aggregates."

c C 39 – "Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens."

d C 94 – "Standard Specification for Ready-Mixed Concrete."

e C 143 – "Standard Method of Test for Slump of Portland Cement Concrete."

f C 150 – "Standard Specification for Portland Cement."

g C 173 – "Standard Method of Test for Air Content of Freshly Mixed Concrete by the Volumetric Method."

h C 192 – "Method of Making and Curing Concrete Compression and Flexure Test Specimens in the Laboratory."

i C 231 – "Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method."

j C 260 – "Standard Specification for Air-Entraining Admixtures for Concrete."

k C 309 – "Standard Specification for Liquid Membrane – Forming Compounds for Curing Concrete."

l C 494 – "Standard Specifications for Chemical Admixtures of Concrete."

m C 595 – "Standard Specification for Blended Hydraulic Cement."

n E 329 – "Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel and Bituminous Materials as Used in Construction."

3. American Association of State Highway and Transportation Officials (AASHTO):

a AASHTO T 260 "Methods of Sampling and Testing for Total Chloride Ion in Concrete and Concrete Raw Materials."

4. National Ready Mixed Concrete Association:

a NRMCA Check List for Certification of Ready Mixed Concrete Production Facilities.

1.4 SUBMITTALS

A. General:

1. All submissions shall be in accordance with the submission schedule, which shall be developed and agreed between the Architect and Contractor at the commencement of the project.

2. Submittals shall be made in compliance with the Conditions of the Contract and Division 1 Specification Section 01300, "Submittals."

3. Review of submittals is of a general nature only, and the responsibility for conformance with intent of drawings shall remain with the Contractor. Review does not imply or state that the fabricator has correctly interpreted the construction documents.

B. Submit the following action submittals for review and approval:

1. Concrete mix design for each type of concrete. The Contractor shall warrant by the submission of the design mixes that such mixes are totally representative of the concrete that he intends to supply to meet the requirements of the Contract Documents. Submit new design mixes for review and approval when any change in materials is required or needed. Include the following information for each concrete mix design:

a Method used to determine the proposed mix design (per ACI-301, Article 3.9).

b Compressive strength at 7 and 28 days: Submit strength test records, mix design materials, conditions, and proportions for concrete used for record of tests, standard deviation calculation, and determination of required average compressive strength.

c Gradation of fine and coarse aggregates: Testing data confirming proposed coarse aggregate meets ASTM C33 class designation. Include ASTM test results for aggregates subject to freeze-thaw environment.

d Proportions of all ingredients including all admixtures to be added either at the time of batching or at the job site.

e Water-cement ratio.

f Slump tested in accordance with ASTM C143.

g Air content of freshly mixed concrete by the pressure method, ASTM C231, or the volumetric method, ASTM C173.

h Unit weight of concrete - ASTM C138.

i Mill test reports of fly ash chemical and physical analysis and certification of compliance with ASTM C618 Class C or F, if used.

j Manufacturer's Spec Data Sheets of each concrete admixture, including brand name, manufacturer, and dosage rate range.

2. Shop drawings for reinforcement detailing, fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.

3. Product Data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, curing compounds, and others if requested by the Architect.

4. Proposed methods for curing CIP concrete

C. Submit the following informational submittals for record:

1. Health and Safety Data Sheets for each concrete admixture.

2. Proposed Schedule of Concrete Placement. Contractor shall keep a permanent log of the dates and times of concrete placement and where on the project the concrete was cast. This log shall be made available to the Architect for inspection, upon request.

3. Qualifications of Concrete Foreman showing five years experience with this type of concrete installation.

4. Tickets for each batch of concrete delivered to the jobsite containing the following information:

a. The compressive strength of the concrete being delivered.

b. The volume of concrete in the delivery truck.

c. The time the concrete was batched (ie. the time that water was discharged into the delivery truck to mix with the cement and aggregates).

d. List of admixtures.

e. Slump of concrete as placed.

f. Volume of water added to the delivery truck after initial batching.

g. Location where the concrete is being placed (i.e., foundation walls along grid line A, between grids 1 and 4).

If, upon reaching the job site, the concrete cannot be placed within the time limits stated, or if the type of concrete delivered is incorrect, the Owner's Testing Laboratory will reject the load.

1.5 QUALITY CONTROL

A. The Contractor shall perform all work in strict accordance with all applicable laws and regulations of the building code and with all other authorities having jurisdiction. All such requirements shall take precedence over the requirements of the Specifications except in cases where the requirements of the Specifications are more exacting or stringent.

B. Concrete Mix Design: The Contractor shall employ an independent testing laboratory, acceptable to the Owner, to perform material evaluation tests and to design concrete mixes or, when acceptable to the Engineer, provide copies of recently made material tests and mix designs.

1. If, at any time during construction, the concrete resulting from the approved mix design deviates from Specification requirements, the Contractor shall have his laboratory modify the design, subject to approval, until the specified concrete is obtained.

C. Testing of materials and inspections of installed work shall be completed throughout the duration of the project, as directed by the Engineer. Contractor shall provide free and safe access to material stockpiles and facilities for inspectors. Retesting of rejected materials or reinspection of deficient work, shall be done at the Contractor's expense.

D. The Contractor is responsible for correction of concrete work that does not conform to the specified requirements, including strength, mix proportions, air void system, tolerances, and finishes. Correct deficient concrete as directed by the Engineer.

E. A minimum of one concrete finishing crewmember shall be an ACI Certified Concrete Flatwork Finisher for all slabs-on-grade. The certified finisher shall have input to the crew's placement and finishing procedures regarding the application of ACI Standards for quality flatwork. The ACI Standards that shall be observed are contained in the ACI "Concrete Craftsman Series."

F. The Architect will reject Cast-in-Place Concrete that exhibits the following defects:

1 Bulging: Concrete surfaces that bulge due to insufficiently secured formwork, undersized ties, or flat bar clamps.

2 Wavy Concrete: Concrete surfaces that exhibit waves along plywood joints due to moisture migration into unsealed cuts of plywood sheets causing swellings.

3 Spalling: Concrete spalling due to shale, alkali reactivity, rusting steel too close to the surface, carbonation, improper removal of formwork, expansion of cast-in-steel during the welding process, or other reasons.

4 Cracking and Crazing: Concrete cracking and crazing due to lack of control joints or high water/cement ratio above 0.50.

5 Air holes: Air holes resulting from improper vibration and excessive heights of individual layers of pours between vibration. Air holes due to spreading of concrete with vibrators rather than moving buckets or hoses.

6 Honeycombing: Concrete honeycombing including loss of fines from leaking formwork or other causes.

7 Discoloration: Concrete discoloration caused by any reason, including inconsistent concrete mix, different sources of cement and aggregates, temperature variation between individual pour and curing phases, improper and inconsistent use of vibrators, variation of time span of concrete in formwork, form oils, and migration of plasticizer into concrete from exposed sealant beads on formwork and around cast-in items such as electrical outlet boxes.

8 Visible Pour Joints: Visible pour joints in concrete resulting from leaking formwork due to lack of gaskets and insufficient overlap with old concrete preventing proper tightening of formwork. Placement of concrete layers in excessive heights and spreading concrete with vibrator.

9 Debris in Concrete: Concrete that includes debris, whether caused by insufficient cleaning of formwork or lack of cleanout and access doors at base of formwork.

G. The Contractor shall schedule a Concrete Preconstruction Meeting at least 30 days prior to placement of any concrete. Attendance at the meeting shall include the Contractor, Ready-Mix Supplier, Concrete Pumping Subcontractor, Field Testing Laboratory, and the Engineer of Record (EOR). The agenda of the meeting shall be prepared by the Contractor and shall include, but not be limited, to the following:

1. Review of concrete mix designs.

2. Field testing and quality control.

3. Concrete placing sequence and schedule.

4. Formwork, shoring, reshoring, and stripping.

5. Placing, jointing, and finishing procedures.

6. Curing and protection procedures.

1.6 QUALITY ASSURANCE

A. Foreman's Qualifications: Concrete work shall be done under the supervision of an experienced concrete foreman having at least five years of foreman experience with "Cast-in-Place" concrete, similar to that used on this project.

B. The Owner shall employ an independent Testing Agency to perform a Program of Structural Tests and Inspections for compliance with Chapter 17 of the BOCA 1999 Building Code. The testing agency shall prepare a statement of structural tests and inspections, specifying the tests and inspections to be performed throughout the construction of this project. Submission and approval of this statement must be complete prior to beginning construction.

The Testing Agency will organize and direct the test and inspection program. All inspection and test reports shall be submitted to the General Contractor (GC), the Owner's Representative and the Structural Engineer of Record (SER). The General Contractor shall be responsible for understanding the test and inspection program and notifying the Testing Agency and the SER when work is ready for tests and/or inspections in accordance with Section 01410. The Contractor will provide access to the Testing Agency and the SER in accordance with Section 01410 and ACI 301. Inspections and tests by the Testing Agency will not relieve the Contractor of responsibility for supervision, testing, and inspection for quality control of the work.

The Owner's Representative will provide testing and inspection reports to the local building official when requested by the local building official. Upon completion of the construction, the independent Testing Agency will make a final report on the satisfactory completion of the Program for Structural Tests and Inspection to the building official and to the Owner's Representative.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Forms for Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.

B. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 g/L volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

C. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A-615, Grade 60, deformed.

B. Welded Wire Fabric: ASTM A-185, welded steel wire fabric.

C. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports with plastic tips, complying with CRSI specifications.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C-150, Type I.

1. Use one brand of cement throughout Project unless otherwise acceptable to Architect.

B. Normal-Weight Aggregates: ASTM C-33.

C. Water: Potable.

D. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.

E. Air-Entraining Admixture: ASTM C-260, certified by manufacturer to be compatible with other required admixtures.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

a. Air-Tite, Cormix Construction Chemicals.
b. Air-Mix or Perma-Air, Euclid Chemical Co.
c. Darex AEA or Daravair, W.R. Grace & Co.
d. MB-VR or Micro-Air, Master Builders, Inc.
e. Sealtight AEA, W.R. Meadows, Inc.
f. Sika AER, Sika Corp.

F. Water-Reducing Admixture: ASTMC 494, Type A.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

a. Chemtard, ChemMasters Corp.
b. PSI N, Cormix Construction Chemicals.
c. Eucon WR-75, Euclid Chemical Co.
d. WRDA, W.R. Grace & Co.
e. Pozzolith Normal or Polyheed, Master Builders, Inc.
f. Metco W.R., Metalcrete Industries.
g. Prokrete-N, Prokrete Industries.
h. Plastocrete 161, Sika Corp.

G. High-Range Water-Reducing Admixture: ASTM C-494, Type F or Type G.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

a. Super P, Anti-Hydro Co., Inc.
b. Cormix 200, Cormix Construction Chemicals.
c. Eucon 37, Euclid Chemical Co.
d. WRDA 19 or Daracem, W.R. Grace & Co.
e. Rheobuild or Polyheed, Master Builders, Inc.
f. Superslump, Metalcrete Industries.
g. PSPL, Prokrete Industries.
h. Sikament 300, Sika Corp.

H. Water-Reducing, Accelerating Admixture: ASTM C-494, Type E.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

a. Q-Set, Conspec Marketing & Manufacturing Co.
b. Lubricon NCA, Cormix Construction Chemicals.
c. Accelguard 80, Euclid Chemical Co.
d. Daraset, W.R. Grace & Co.
e. Pozzutec 20, Master Builders, Inc.
f. Accel-Set, Metalcrete Industries.

I. Water-Reducing, Retarding Admixture: ASTM C-494, Type D.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

    a. PSI-R Plus, Cormix Construction Chemicals.
    b. Eucon Retarder 75, Euclid Chemical Co.
    c. Daratard-17, W.R. Grace & Co.
    d. Pozzolith R, Master Builders, Inc.
    e. Protard, Prokrete Industries.
    f. Plastiment, Sika Corporation.

2.4 RELATED MATERIALS

A. Vapor Retarder: Provide vapor retarder that is resistant to deterioration when tested in accordance with ASTM E-154, as follows:

1. Water-resistant barrier consisting of heavy kraft papers laminated together with glass-fiber reinforcement and overcoated with black polyethylene on each side.

    a. Product: Subject to compliance with requirements, provide Moistop by Fortifiber Corporation.

B. Moisture-Retaining Cover: One of the following, complying with ASTM C-171.

1. Waterproof paper.
2. Polyethylene film.
3. Polyethylene-coated burlap.

C. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C-309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. m when applied at 200 sq. ft./gal.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

    a. A-H 3 Way Sealer, Anti-Hydro Co., Inc.
    b. Spartan-Cote, The Burke Co.
    c. Conspec #1, Conspec Marketing & Mfg. Co.
    d. Sealco 309, Cormix Construction Chemicals.
    e. Day-Chem Cure and Seal, Dayton Superior Corp.
    f. Eucocure, Euclid Chemical Co.
    g. Horn Clear Seal, A.C. Horn, Inc.
    h. L&M Cure R, L&M Construction Chemicals, Inc.
    i. Masterkure, Master Builders, Inc.
    j. CS-309, W.R. Meadows, Inc.
    k. Seal N Kure, Metalcrete Industries.
    l. Kure-N-Seal, Sonneborn-Chemrex.
    m. Stontop CS2, Stonhard, Inc.

D. Water-Based Acrylic Membrane Curing Compound: ASTM C-309, Type I, Class B.

1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 g/L.
2. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

    a. Highseal, Conspec Marketing and Mfg. Co.
    b. Sealco - VOC, Cormix Construction Chemicals.
    c. Safe Cure and Seal, Dayton Superior Corp.
    d. Aqua-Cure, Euclid Chemical Co.
    e. Dress & Seal WB, L&M Construction Chemicals, Inc.
    f. Masterkure 100W, Master Builders, Inc.
    g. Vocomp-20, W.R. Meadows, Inc.
    h. Metcure, Metalcrete Industries.
    i. Stontop CS1, Stonhard, Inc.

E. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

    a. Aquafilm, Conspec Marketing and Mfg. Co.
    b. Eucobar, Euclid Chemical Co.
    c. E-Con, L&M Construction Chemicals, Inc.
    d. Confilm, Master Builders, Inc.
    e. Waterhold, Metalcrete Industries.

2.5 PROPORTIONING AND DESIGNING MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301 and ACI 318. For the trial batch method, use an independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

1. Do not use the same testing agency for field quality control testing.

2. Limit use of fly ash to not exceed 25 percent of cement content by weight.

B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed and approved by Architect.

C. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:

1. 4000 psi, 28-day compressive strength; water-cement ratio, 0.45 maximum except 0.40 where subjected to freezing, thawing or moisture.

D. Design mixes to provide light-weight concrete with the following properties as indicated on the drawings and schedules:

1. 4000 psi, 28-day compressive strength; water-cement ratio, 0.45 maximum.

E. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

1. Ramps, slabs, and sloping surfaces: Not more than 3 inches.
2. Reinforced foundation systems: Not less than 1 inch and not more than 4 inches.
3. Concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8 inches after adding admixture to site-verified 2 - 3 inch slump concrete.
4. Other concrete: Not more than 4 inches .

F. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in Work.

2.6 ADMIXTURES

A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.

B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 40 deg F.

C. Use high-range water-reducing admixture in pumped concrete and concrete with water-cement ratios below 0.45.

D. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:

1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:

a. 4.5 percent (moderate exposure); 5.5 percent (severe exposure) for 1-1/2 inch maximum aggregate.
b. 4.5 percent (moderate exposure); 6.0 percent (severe exposure) for 1 inch maximum aggregate.
c. 5.0 percent (moderate exposure); 6.0 percent (severe exposure) for 3/4 inch maximum aggregate.
d. 5.5 percent (moderate exposure); 7.0 percent (severe exposure) for 1/2 inch maximum aggregate.

2. Other concrete not exposed to freezing, thawing, or hydraulic pressure, or to receive a surface hardener: 2 to 4 percent air.

E. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: All concrete shall be ready-mixed complying with requirements of ASTM C-94, and as specified.

1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 GENERAL

A. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

3.2 FORMS

A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:

1. Provide Class A tolerances for concrete shelves and surfaces receiving brick.
2. Provide Class C tolerances for other concrete surfaces.

B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.

C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces.

D. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

E. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 VAPOR RETARDER/BARRIER INSTALLATION

A. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.

B. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.

1. Cover vapor retarder/barrier with sand cushion and compact to depth indicated.

3.4 PLACING REINFORCEMENT

A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.

1. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Architect.

D. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Locate reinforcing splices for wall-beams, beams and slabs only where specified on the drawings.

3.5 JOINTS

A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect. Joints at wall-beams, beams and slabs shall be at midspan only.

B. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.

C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.

D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.

3.6 INSTALLING EMBEDDED ITEMS

A. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.

1. It shall be the responsibility of the Contractor to coordinate and verify the installation of all embedded items, inclucing those furnished and installed by Subcontractors. He shall be responsible for avoiding, or reconciling, interferences between locations of inserts for all purposes, subject to the approval of the Architect.
2. In addition, the Contractor shall provide all items shown on the drawings but not required to be provided by a Subcontractor, including anchors for fastening items to the concrete.

B. Install dovetail anchor slots in concrete structures as indicated on drawings.

C. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.7 PREPARING FORM SURFACES

A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.

B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

1. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.8 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
1. In all cases, the Contractor shall give the Architect at least 24 hours notice of intended concrete placement and no placement shall begin until the Engineer has approved the condition of foundations, forms, reinforcement, and embedded items

B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.

C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.

E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.

1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
3. Maintain reinforcing in proper position on chairs during concrete placement.

F. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

G. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.

1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

H. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F. Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water.
2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.

3.9 FINISHING FORMED SURFACES

A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.

B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.

C. Smooth-Rubbed Finish: Provide smooth-rubbed finish on scheduled concrete surfaces that have received smooth-formed finish treatment not later than 1 day after form removal.

1. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 MONOLITHIC SLAB FINISHES

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.

1. After placing slabs, finish surface to tolerances of F(F) 15 (floor flatness) and F(L) 13 (floor levelness) measured according to ASTM E-1155. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.

1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E-

1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.

1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 20 (floor flatness) and F(L) 17 (floor levelness) measured according to ASTM E-1155. Grind smooth any surface defects that would telegraph through applied floor covering system.

D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.

E. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.11 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete 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: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.12 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

C. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.

D. Provide moisture curing by the following methods:

1. Keep concrete surface continuously wet by covering with water.
2. Use continuous water-fog spray.

E. Provide moisture-retaining cover curing as follows:

1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

F. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:

1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

G. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

H. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.

1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

3.13 REMOVING FORMS

A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.

3.14 REUSING FORMS

A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Architect.

3.15 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect.

B. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.

1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.

C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.

1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.

1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.

4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

E. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. General: The Owner will employ an independent Testing Agency to perform tests and to submit test reports.

B. Sampling and testing for quality control during concrete placement may include the following, as directed by Architect.

1. Sampling Fresh Concrete: ASTM C-172, except modified for slump to comply with ASTMC 94.

   a. Slump: ASTM C-143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
   b. Air Content: ASTM C-173, volumetric method for lightweight or normal weight concrete; ASTM C-231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
   c. Concrete Temperature: ASTM C-1064; one test hourly when air temperature is 40 deg F and below, when 80 deg F and above, and one test for each set of compressive-strength specimens.
   d. Compression Test Specimen: ASTM C-31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
   e. Compressive-Strength Tests: ASTM C-39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.

3. When total quantity of a given class of concrete is less than 50 cu. yd., Architect may waive strength testing if adequate evidence of satisfactory strength is provided.
4. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
5. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.

C. Test results will be reported in writing to Architect, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.

D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

E. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C-42, or by other methods as directed.

END OF SECTION 03300

SECTION 03410

STRUCTURAL PRECAST CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK INCLUDED

A. Provide precast concrete Modular Box Culvert Units to assemble into a below-grade tunnel between the sub-basement of the existing LL Bean Building and the sub-basement of the new Charles Street Building (Precast box culvert sections are being considered as an alternate to the cast-in-place tunnel shown in the design drawings).

B. The work in this Section includes all precast concrete labor, materials, equipment, and services necessary to complete the precast concrete modular box culvert units as shown on the drawings and specified herein, including, but not limited to, the following:

1. Structural precast concrete modular box culvert units of dimensions indicated on the Drawings.

a Final design of all precast concrete box culvert modular units shall be the responsibility of the precast manufacturer.

b Precast concrete box culvert modular units to be located below-grade between the sub-basements of the Bean Building and the Charles Street Building including design and construction of all temporary shoring and bracing required during transportation and handling of the modular units.

c Fabrication of complete precast concrete box culvert modular units with all reinforcing bars, welded wire mesh, inserts, mechanical couplers, and erection lugs. Fabrication shall include furnishing and installing all anchorage items and related installation materials including, but not limited to: embedded unistrut for mounting utility piping and ductwork, etc.

2. Anchorage items for the complete installation of precast concrete box culvert modular units.

3. The Contractor is responsible for the handling, transportation and erection of all precast concrete members including the job-site mock-up.

1.3 RELATED SECTIONS

A. Section 03300 – Cast-In-Place Concrete

1.4 REFERENCED STANDARDS

A. Codes and Standards:

Follow the guidelines contained in the latest editions of the following codes, specifications, and standards, including references contained in each document, except where more stringent requirements are shown or specified.

1. American Concrete Institute (ACI)

   a. ACI 301 "Specifications for Structural Concrete for Buildings."

   b. ACI 311 "Recommended Practice for Concrete Inspection."

   c. ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures."

   d. ACI 318 "Building Code Requirements for Reinforced Concrete."

   e. ACI 347 "Recommended Practice for Concrete Formwork."

2. American Association of State Highway and Transportation Officials (AASHTO)

   a AASHTO T 260 "Methods of Sampling and Testing for Total Chloride Ion in Concrete and Concrete Raw Materials."

3. American Welding Society (AWS)

   a AWS D1.4 "Structural Welding Code – Reinforcing Steel."

4. Concrete Reinforcing Steel Institute (CRSI)

   a CRSI WCRSU "Placing Reinforcing Bars."

5. Precast/Prestressed Concrete Institute (PCI)

   a PCI MNL-116 – Manual of Quality Control for Plants and Production of Precast and Prestressed Concrete Products.

   b PCI MNL-117 – Manual of Quality Control for Plants and Production of Architectural Precast and Prestressed Concrete Products.

   c PCI MNL-120 – Design Handbook – Precast and Prestressed Concrete.

   d PCI MNL-123 – Manual of Design of Connections for Precast and Prestressed Concrete.

1.5 DESIGN REQUIREMENTS

A. The Precast Box Culvert Manufacturer shall be responsible for the final design of all precast concrete modular units. Design of precast concrete elements shall be in accordance with the 1999 BOCA Building Code and shall be performed by a Professional Engineer licensed in the state of Maine.

B. The Precast Module Manufacturer is responsible for determining and addressing all handling and transportation stresses. Precast concrete box culvert modules shall be lifted and supported during manufacturing, stocking, transporting, and erection operations only at the lifting or supporting points as shown on the shop drawings provided by the Module Manufacturer. The Manufacturer will design the handling and transportation process such that the handling and transportation stresses in the precast concrete modules will be in accordance with PCI MNL-120-92, Section 5.2.4, "Handling Without Cracking."

C. The Precast Module Manufacturer is responsible for the design and installation of all temporary bracing and shoring required during transportation and handling. A Professional Engineer registered in Maine shall design all temporary bracing and shoring. Design shall be in accordance with the 1999 BOCA Building Code and the Referenced Standards of this Section.

1.6 SUBMITTALS

A. General

1. All submissions shall be in accordance with the submission schedule, which shall be developed and agreed upon between the Architect and Contractor at the commencement of the project.

2. Submittals shall be made in accordance with the requirements of Section 01300, "Submittals."

3. Prior to final approval of Shop Drawings for the production of modular box culvert units, the Mock-Up specified in Article 1.7 herein shall be completed and approved. Any modifications resulting from the Mock-Up shall be incorporated into the submitted Shop Drawings.

B. Material Submittals

1. Concrete mix design for each type of concrete. The Manufacturer shall warrant by the submission of the design mixes that such mixes are totally representative of the concrete that he intends to supply to meet the requirements of the Contract Documents. Submit new design mixes for review and approval when any change in materials is required or needed. Include the following information for each concrete mix design:

a. Method used to determine the proposed mix design (per ACI-301, Article 3.9).

b. Compressive strength at 7 and 28 days: Submit strength test records, mix design materials, conditions, and proportions for concrete used for record of tests, standard deviation calculation, and determination of required average compressive strength.

c. Gradation of fine and coarse aggregates: Testing data confirming proposed coarse aggregate meeting ASTM C33 class designation. Include ASTM test results for aggregates subject to freeze-thaw environment.

d. Proportions of all ingredients including all admixtures to be added either at the time of batching or at the job site.

e. Shrinkage tests for each mix design. Perform tests in accordance with shrinkage testing of proposed mix designs. Follow ASTM C157. Wet cure samples for 7 days and dry at 50 R.H. for 28 days. Measure strains every 7 days.

f. Water-cement ratio.

g. Slump tested in accordance with ASTM C143.

h. Certification and test results of the water-soluble chloride ion content of the design mix tested in accordance with FHWA RD-77 or AASHTO T 260-X4.

i. Air content of freshly mixed concrete by the pressure method, ASTM C231, or the volumetric method, ASTM C173.

j. Air content tests on hardened concrete mix designs tested in accordance with ASTM C457.

k. Unit weight of concrete - ASTM C138.

l. Mill test reports of fly ash chemical and physical analysis and certification of compliance with ASTM C618 Class C or F.

m. Manufacturer's Spec Data Sheets of each concrete admixture, including brand name, manufacturer, and dosage rate range.

2. Reinforcing Steel: Contractor shall submit the following items for each type of reinforcement used in the precast concrete modules, roof assemblies and parapets described in this section:

a. Mill Certificates: Submit steel producer's certificates of mill analysis, including steel source, description, heat number, yield point, ultimate tensile strength, elongation percent, bend test, and the chemical composition of each heat as determined by ladle analysis before using steel in production of the precast concrete elements.

C. Shop Drawings:

1. Submit shop details for approval prior to fabrication.

2. Shop drawings shall show in detail the sizes, sections and dimensions of all precast concrete elements, reinforcement, the arrangement of joints, inserts, anchorage items for installation of precast concrete, and all other necessary and required details.

3. Each precast concrete modular box culvert unit shall be numbered on an erection plan and submitted for approval prior to beginning erection. Each such precast element shall

have the corresponding number marked on an embedded "tag" on its side for identification and setting. Date of fabrication shall also be included on the module "tag" and the "tag" shall be located such that it is not visible when the modular unit is fully erected and in use.

4. All fabrication of precast concrete modular box culvert units for use on the project shall conform to the approved shop drawings.

5. Erection Drawings:

   a. Plans and elevations locating and defining all products and elements furnished by the precast manufacturer.

   b. Sections and details showing connections, cast-in items, and the relation to the existing structures and below-grade utilities.

   c. Relationship to adjacent material.

   d. Member piece marks and completely dimensioned size and shape of each member.

   e. Joints and openings between members and between members and existing structures.

   f. Field installed anchor locations.

   g. Erection sequence and handling requirements.

   h. Temporary shoring and bracing locations, sections, and details. All drawings pertaining to temporary shoring and bracing shall bear the stamp of a Professional Engineer registered in Maine.

8. Production Drawings:

   a. Elevation view of each member.

   b. Sections and details to indicate quantities and position of reinforcing steel, anchors, inserts, etc.

   c. Lifting and erection devices.

   d. Dimensions and finishes.

   e. Concrete strengths and reinforcing specifications.

   f. Methods for storage and transportation.

D. Structural Calculations

1. Final Structural Calculations for the design of the precast concrete box culvert modular units. Calculations must be in accordance with the BOCA 1999 Building Code and must be signed and stamped by a Professional Engineer licensed in the state of Maine.

2. Calculations demonstrating that the handling and transportation stresses will be within the limits of the design requirements.

3. Calculations demonstrating that all temporary shoring and bracing will be adequate to safely resist the handling and transportation loads.

E. Concrete Curing Methods and Controls:

1. Submit comprehensive proposed curing procedures, including proposed lengths of time in controlled environment and how and when precast concrete elements will be introduced to adverse weather.

F. Hot and Cold Weather Concreting Procedures per ACI 305 and ACI 306.

G. Other Materials

1. Submit product data sheets on all other materials and products to be used in this section of the work.

2. Welding Certificates: Copies of certificates for welding procedures and personnel.

1.7 MOCK-UP UNIT

A. The Precast Concrete Manufacturer shall fabricate a complete box culvert modular unit to serve as a mock-up for the project. The mock-up unit shall be delivered to the project site and located as directed by the Architect. The mock-up shall be full-size and shall be finished in an identical fashion as that proposed for the production modular units.

B. The Mock-up shall include all anchorage items, lifting devices, etc. to be used on production units.

C. The mock-up unit shall be revised or replaced to the extent required by the Architect until approval of the Architect has been obtained.

D. All installed production modular units shall conform to the standards approved by the Architect in the mock-up unit.

1.8 QUALITY CONTROL

A. Precast Concrete Box Culvert Module Manufacturer shall provide a written statement demonstrating at least 3 years of experience in this type of Precast Concrete Modular Construction. The Precast Concrete Module Manufacturer's superintendent shall also have at least 3 years of experience in supervising precast concrete production.

B. Manufacturer/Fabricator Qualifications:

1. The precast concrete manufacturing plant shall be certified by the Precast/Prestressed Concrete Institute, Plant Certification Program, prior to the start of production. A copy of the PCI plant certification shall be submitted to the Engineer of Record for record purposes.

2. Fabrication shall be performed in fabricator's plant.

3. Proposed Fabricator shall be a reputable firm with a minimum of at least five years of continuous operation. The firm shall have been regularly engaged in the business of precasting structural concrete modular units similar to the modular units required for this project. A list of at least three representative projects, comparable to the precast concrete work herein specified, shall be submitted to the Architect for approval.

4. Module Fabricator shall maintain a Professional Engineering in-house consultant or staff, as well as a laboratory facility headed by a qualified Professional Structural Engineer, specifically qualified in testing of material, techniques, and their certification.

5. Fabricator shall maintain his own mold fabrication department capable of producing molds with maintenance of dimensions and tolerances specified herein.

C. Contractor's Quality Control Testing:

1. In accordance with PCI MNL-116 and PCI MNL-117.

1.9 QUALITY ASSURANCE

A. The Owner shall employ an independent Testing Agency to perform periodic tests and inspection for compliance with Chapter 17 of the BOCA 1999 Building Code. The testing agency shall prepare a statement of structural tests and inspections, specifying the tests and inspections to be performed throughout the fabrication of precast concrete modular box culvert units. Submission and approval of this statement must be complete prior to beginning fabrication of precast elements.

The Testing Agency will organize and perform the test and inspection program. All inspection and test reports shall be submitted to the General Contractor (GC), the Owner's Representative and the Structural Engineer of Record (SER). The Precast Manufacturer shall be responsible for understanding the test and inspection program and notifying the Testing Agency and the SER when work is ready for tests and/or inspections in accordance with Section 01410. The Precast Manufacturer will provide access to the Testing Agency and the SER in accordance with Section 01410 and ACI 301. Inspections and tests by the Testing Agency will not relieve the Contractor of responsibility for supervision, testing, and inspection for quality control of the work.

The Owner's Representative will provide testing and inspection reports to the local building official when requested by the local building official. Upon completion of the precast fabrication and erection, the independent Testing Agency will make a final report on the satisfactory completion of the Program for Structural Tests and Inspection to the building official and to the Owner's Representative.

1.10 PROJECT SITE CONDITIONS

A. The Precast Concrete Manufacturer shall visit the site prior to bidding, to review existing conditions, including but not limited to site access conditions.

B. The Module Manufacturer shall take all necessary measurements at the site as required to ensure proper fabrication of the work specified in this section.

1.11 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Transport and handle precast concrete modular box culvert units with proper equipment to protect precast elements from dirt and damage.

B. Store precast concrete modular units to protect them from contact with soil or ground. Store precast elements on firm surfaces to avoid warping and cracking.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General

The total chloride ion content of the concrete mix shall not exceed the limits set in Table 4.4.1 of ACI 318-99 for the member exposure under consideration.

B. Portland Cement:

1. Type I or II, ASTM C150, with use of at least two years with proposed aggregates without detrimental reaction. Color to be approved by the Architect and may include natural pozzolans or fly ash.

2. One brand from the same source shall be used throughout the duration of the project.

C. Water: Conform to ACI 301.

D. Fine and Coarse Aggregate: ASTM C33.

E. Admixtures: ASTM C494. Calcium chloride shall not be used.

F. Reinforcing Steel:

1. Bars: All deformed reinforcing bars, unless otherwise noted: ASTM A615, Grade 60.

2. Welded Wire Fabric: ASTM A185 and ASTM A497.

G. Grout and/or Dry-pack:

1. Grout between precast concrete modular box culvert units: Set Grout by Master Builders or approved equal.

H. Dowel bar mechanical connectors: DB-SAE Dowel Bar Splicer System by Richmond Screw Anchor Company or approved equal.

I. Corrugated dowel grout sleeves: High density polyethylene in-place form to provide grout sleeve for reinforcing bar dowels, sleeves to be corrugated to provide bond between grouted bar assembly and concrete substrate, such as SINCO/Wilson Anchor Bolt Sleeve. Grout sleeve requires tests or other substantiating data that corrugation achieves sufficient bond to yield bars.

2.2 PROPORTIONING AND DESIGN OF MIXES

A. To establish the suitability of any material used in the concrete work, prepare design mixes for each type and strength of concrete as indicated in Table 1, either by the laboratory trial batch or the field experience method, as specified in ACI 301. If the trial batch method is used, use

an approved independent testing facility for preparing and reporting the proposed mix designs. Bear all costs in connection with these tests and for the design of the concrete mixes.

B. In addition to the tests required to establish the suitability of materials, make one test for each design mix to verify that the total chloride ion content of each mix is within the specified limits. Chloride tests to be in accordance with AASHTO T 260.

C. Perform shrinkage tests for each mix design. Perform tests in accordance with shrinkage testing of proposed mix designs. Follow ASTM C157. Wet cure samples for 7 days and dry at 50 R.H. for 28 days. Measure strains every 7 days. The final maximum strain at 28 days to be less than 300 μ strain. Include test results with mix submittal.

D. No change of brand or source of any of the concrete ingredients will be allowed until tests as specified in A, B and C above have been completed and approved.

E. Concrete shall be air-entrained to yield a total air content of 6.5% +/- 1%.

F. The proposed mix designs and all testing procedures and results will be subject to the review and approval of the testing agency engaged by the Owner.

Table 1: Type and Strength of Concrete

Item	Mix Description
Type of Mix	Modular Box Culvert Units
Concrete grade (psi)	5,000 min.
Cement type ASTM C150	Type I or Type II
Aggregate type:	
Coarse: ASTM	C33
Fine: ASTM	C33
Nominal aggregate max. size	3/4 in
Minimum cement content	NR
Workability:	
Slump	–
VB(s)	–
Compacting factor	–
Maximum free-water/cement ratio	0.40
Maximum cement content (lb per yd)	NR
Special cement	color to be approved by Architect
Maximum Chloride ion content	0.06%
Fine aggregate (%)	***
Admixtures permitted (AR)	Yes (AR)
Entrained Air	Yes
Max./min. temp of fresh concrete	85/55°F
Max./min. density of concrete (PCF)	145 +/- 3%

Notes:
NR = no special requirements
AR = additional requirements, see specifications

2.3 FORM WORK

A. Form work for precast concrete modular box culvert units shall be plastic lined, smooth metal, or other materials designed to produce sharp corners, to ensure excellence in the finished product, and shall be non-staining.

B. Forms shall be constructed and maintained true to the shapes and dimensions shown on the approved drawings. Forms shall be well braced and shall be stiffened against deformation under the pressure of wet concrete. Interior and exterior forms shall have smooth joints. Form surfaces shall be accessible for adequate cleaning after each use.

C. All items scheduled to be cast into the precast modular units shall be secured to the formwork. Cast-in items shall be securely anchored, properly positioned, and accurately aligned as per approved shop drawings.

D. All precast modular box culvert units shall be cast separately on unyielding bases. Tolerances of structural precast members shall be within the tolerances prescribed in the PCI manual for quality control and those listed in Article 2.9 of this specification.

2.4 WELDING

A. All welding must be approved by the project Architect prior to performing weld.

B. Welding, when necessary, shall conform in all respects to the appropriate sections of the Structural Welding Code by the American Welding Society and shall be executed by certified welders qualified through tests given in the AWS Code. Such tests shall be carried out with the same type electrodes to be used in this work. Welders shall be duly licensed, if so required, by locality having jurisdiction.

C. Surfaces to be welded shall be free from loose scale, slag, rust, and other foreign material, and shall be free of fins and tears.

D. Welding rods shall be E70XX Series. Preparations and use shall be in accordance with the AWS Code.

E. Parts to be welded shall be brought as close as possible, but in no case shall they be more than 1/8 in. apart. Shims may be provided where necessary, but must be incorporated in such a manner as to ensure a proper structural weld of the combined units.

F. Upon completion of all welding, the welds shall be thoroughly cleaned of flux, rust, etc.

G. All galvanized field connections shall be given a coat of liquid galvanizing compound immediately after welding.

2.5 EMBEDMENTS

A. Plates cast in concrete shall conform to ASTM A36 or A441.

B. All exposed connection material shall be stainless steel in accordance with ASTM A666.

C. All plates, inserts, templates, and brackets required to connect precast concrete modular units to cast-in-place abutment and/or adjacent precast modular units shall be furnished. Precast Concrete Manufacturer must coordinate with Cast-in-Place Concrete Contractor any embedded items required in the CIP foundation walls.

2.6 PLACING CONCRETE

A. Before placing concrete, formwork shall be thoroughly cleaned of all debris and foreign matter. Concrete is to be transported to place of final deposit as rapidly as practicable by methods that prevent separation of ingredients and displacement of reinforcement and that avoid rehandling. Partially-hardened concrete is not to be deposited.

B. No concrete is to be placed until reinforcement, inserts, sleeves, anchor plates, and other work to be embedded has been properly installed. All reinforcement shall be thoroughly cleaned of loose rust, mill scale, earth, and other materials that reduce or destroy the bond with concrete.

C. When concrete is conveyed by chutes, the equipment shall be of such size and U-shaped designs as to ensure a continuous flow in the chute. Chutes shall be of metal or metal-lined and uniformly sloped to prevent segregation. The discharge end of the chute shall be maintained as near the surface of deposit as practicable. Concrete shall not be allowed to flow horizontally in the forms over distances exceeding 5 ft. Chutes shall be thoroughly cleaned before and after each run. Debris and any water used in cleaning shall be discharged outside the forms.

D. Concrete shall be thoroughly compacted during and immediately after depositing by means of suitable tools. Vibrations shall be done by experienced operators under close supervision and shall be carried on only long enough to produce homogeneity and optimum consolidation without permitting segregation of the solid constituents or "pumping" of air.

E. Placement, vibration, finishing, and curing of precast units shall, in all respects, conform to the provision of ACI 318. Vibrators shall not be used to move concrete.

F. Each precast box culvert module shall be an integral pour without construction or "cold" joints.

2.7 CURING

A. General

1. Curing of the concrete box culvert modular units shall be performed to prevent shrinkage, warping, and/or ultimate loss of concrete strength.

2. Curing shall be performed to prevent loss of moisture from the concrete for the first 7 days after casting and/or exposure of the units to thermal-shock.

3. The methods and controls of curing shall be submitted to the Architect for review and approval prior to starting production.

B. Initial Curing

1. Mold and ambient temperature shall ensure an average curing temperature of 70°F. Special attention shall be given to avoid extremely high temperatures to prevent shrinkage cracks.

2. If live steam is used, application shall be gradual and not before one hour after initial set of the cement has taken place. Closing down of steam shall occur two hours before stripping of the element. Temperature curve and maximum temperature shall be regulated to avoid extremes in beginning, end, and peak.

3. Concrete in mold shall be covered during the period of hardening until stripping to prevent loss of moisture.

4. Surface membrane-forming compounds shall not be used unless specifically approved by the Engineer of Record.

C. Curing After Stripping

1. Concrete modular units, roofs and parapets, when stripped, shall be kept in a surface-damp condition for a period of 7 days.

2. If atmospheric conditions require such, units shall be periodically sprinkled with water or fog-sprayed. Care shall be taken that this treatment does not stain the concrete or in any way become detrimental to it.

3. Units may be wrapped in polyethylene film to keep the concrete surface moist.

4. Concrete units, after stripping, shall not be exposed to thermal-shock but shall be allowed to cool off gradually.

D. Precast members shall be additionally air cured in storage for a period of at least 28 days before erection.

2.8 FINISH SURFACES

A. The Contractor shall provide high quality finished concrete surfaces that are free from bug holes, form marks, honeycombs, blemishes, and other defects. All edges and corners shall be sharp and clean and any featherings shall be sanded off. If defects exist, they shall be patched using materials and methods that have been approved by the project Architect and the Engineer of Record, prior to applying the specified finish.

B. Interior concrete surfaces in the precast modular units shall be shop painted as specified by the project architect.

2.9 PRODUCT TOLERANCES

A. Tolerances for all precast concrete box culvert modular units shall be based on uniform joints of 1 in.

B. All precast Modular units shall be manufactured to dimensional tolerances listed in the PCI Manual for Quality Control and as follows (the more stringent tolerance governs):

1. Width, height, and length of Modular Units: ±1/8 in. for dimensions of 10 ft or less, ± 1/4 in. for dimensions greater than 10 ft.

2. Precast Wall Thickness: - 1/8 in., + 1/4 in.

3. Out of squareness of the major and minor axes: 1/8 in./10 ft of length.

4. Bowing of any part of a flat surface: Length of bow divided by 360. Maximum tolerance on differential bowing between any two units is 1/2 in.

5. Warping of one corner out of plane of the other three: 1/16 in./ft distance from the nearest adjacent corner.

6. Location of cast-in-items other than corrugated dowel bar sleeves: ±1/4 in.

7. Location of cast-in corrugated dowel bar sleeves: ±1/8 in. from the theoretical center of the sleeve as shown on the approved shop drawings.

8. Contractor shall ensure that cumulative tolerances will not prevent proper mating of precast modular units, roofs and parapets.

PART 3 - EXECUTION

3.1 PREPARATION

A. Survey existing buildings and notify General Contractor and Architect of any conditions that require modifications to allow for future installation of precast concrete box culvert modular units.

3.2 HANDLING AND ERECTION

A. Employ only competent workmen to handle modular units. Handle, transport, and store modular units in such a manner to prevent staining, overstressing, chipping, and cracking of concrete and protect edges and corners from damage.

B. Precast Fabricator shall transport modular units to the job site in sequence as directed by the General Contractor. Prior to delivery, at the manufacturing plant, the General Contractor shall ascertain that units comply with all contract requirements.

C. The General Contractor shall inspect each modular unit immediately upon its delivery to the job site. All damage shall be brought to the Architect's attention. Defective Modular units, roofs and parapets shall be removed from the site at the precast manufacturer's expense.

D. Immediately prior to erection of modular units, each unit shall be in perfect condition without cracks, spalls, chips, stains, or other defects. The Precast Concrete Manufacturer shall repair imperfect units to the satisfaction of the Architect. Modular units, roofs and parapets damaged beyond repair shall be replaced as directed by the Architect.

END OF SECTION 03410

SECTION 03450 - ARCHITECTURAL PRECAST CONCRETE

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide architectural precast concrete where shown on the Drawings, as specified herein; and as needed for a complete and proper installation.

PART 2 - PRODUCTS

2.1 FINISH

A. Finish surface shall consist of a combination of cement and aggregate, lightly treated with retarder or lightly sand blasted on surfaces that will be within view in the final installation. Color and finish shall be selected by the Architect.

2.2 REINFORCEMENT AND ACCESSORIES

A. Provide reinforcement, accessories, and connection materials required in accordance with final design as approved by the Architect.

B. Anchors, Dowels, Ties, Cramps: Steel, ASTM A-36, galvanized after fabrication to ASTM A-123, 1.25 oz/sq. ft. of sizes and configurations required for support of stone and applicable superimposed loads. As manufactured by Hohmann & Barnard, Inc., or approved equal.

C. Supports: Steel, ASTM A-36, galvanized after fabrication to ASTM A-123, 1.25 oz/sq. ft.

D. Bolts, Washers and Nuts: Galvanized steel.

E. Lifting Hooks: Removable type for panels in excess of 75 lbs.

F. Setting Buttons: Plastic.

G. Galvanized touch-up: Zinc-Rich Coating: MIL-P-21035, self-curing, one-component, sacrificial organic coating.

2.3 CONCRETE

A. Concrete: Provide normal weight, 28 day 5,000 psi minimum compressive strength concrete with 4% to 6% total air content. Concrete slump shall be 3" to 4". No calcium chloride will be permitted in mix.

1. Portland Cement: Provide ASTM C150 Type III. Use only one brand throughout project.
   a. Color: Provide standard gray cement .
2. Air Entraining Admixture: ASTM C260 as approved by Architect.
3. Water-Reducing Admixture: ASTM C494, Type A.
4. Water: Provide clean potable water free from substances harmful to concrete and embedded steel.
5. Sand Blast: (if selected for finish) Visually exposed precast, and edges to receive sealant, shall receive a light sand blast to obtain desired texture and appearance.
6. Exposed Aggregate Retarder: (if selected for finish) Provide non-staining product which produces results matching approved samples and mock-ups.
7. Avoid the use of Coloring agents, using judicious selection of aggregate as required to provide sample.

B. Aggregates:

1. Fine Aggregates: Washed, inert, manufactured sand material with color characteristics which when combined with other constituents will produce concrete of specified colors; select material of colors, type and size gradation to match panel in Architect's Office. Fine aggregate shall conform to ASTM C33, with the further restriction that only half the ASTM C-33 tolerance for organic content will be allowed. Provide each carefully selected and well graded; free of material, such as iron oxides, or chloride salts, causing staining or reacting with cement.

C. Design mixes:

1. Prepare design mix type of concrete required, and obtain the Architect's approval of the proposed design mix.
2. Pay costs for obtaining the design mix.
3. Have mixes prepared either by the testing agency selected in accordance with Section 01456 of these Specifications, or by qualified precast concrete manufacturing personnel .
4. Proportion mixes either by laboratory trial batch or field experience methods, using materials to be employed on the Work for type of concrete required, and complying with ACI 211.1.

2.4 FABRICATION

A. General:

1. Fabricate the work of this Section to the sizes and shapes indicated, and of texture matching the approved Samples.
2. Provide finished units which are straight, true to size and shape, and within the specified casting tolerances.
3. Make exposed edges sharp, straight, and square. Make flat surfaces into a true plane.
4. Warped, cracked, broken, spalled, stained, or otherwise defective units will not be acceptable.

5. Place and secure in the forms all polyserts and other anchors, clips, stud bolts, inserts, ferules, shear ties, and other devices required for handling and installing the precast units and for attachment as indicated or specified.

B. Form cure or moist cure the work of this Section as required.

C. Casting tolerances: Maintain casting, bowing, warping, and dimension tolerance to match the allowable tolerances of the Precast/Prestressed Concrete Institute, Architectural Precast Concrete, Second Edition, Section 6.4, unless listed in the following maximums:

1. Overall dimension for width of units: Plus or minus 1/8". For height: Plus 1/8" to minus 1/4".
2. Thickness of units: plus 1/4" or minus 1/8".
3. Bowing or warping: Do not exceed 1/360 of the span.
4. Insert locations: Place within plus-or-minus 3/8" in each direction.
5. Opening dimensions to figured dimensions: Accurate with a tolerance of plus 1/4" to minus zero.
6. Variation form square, or difference in length of the two diagonal measurements: 1/8" per 8 ft. of diagonal, up to 3/8" maximum.
7. Angular variation of plane of side mold: plus or minus 1/16".
8. Differential bowing in adjacent panel units of the same design: 3/8".
9. Warping: 1/16" per three feet from nearest adjacent corner.

END OF SECTION

SECTION 03515 - SELF-LEVELING CONCRETE UNDERLAYMENT

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this section includes, but is not limited to, self-leveling, concrete underlayment as required to achieve a level subfloor within the tolerances specified in the following areas:

1. In areas where existing resilient flooring occurs and new flooring is scheduled to be installed, apply underlayment over existing resilient flooring wherever required to achieve tolerance of levelness specified herein.

B. Fill and level depressions in existing concrete slabs remaining after completion of demolition work.

C. Leveling recess at recessed floor mat.

1.2 QUALITY ASSURANCE

A. Source: Provide self-leveling concrete underlayment materials which are the products of one manufacturer. Provide secondary materials which are acceptable to the manufacturers of the primary materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. Basis of Design: Self-leveling concrete underlayment is based on "Ardex K-15" by Ardex Engineered Cements, Inc., Aliquippa, PA 15001, (724) 857-6400. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

1. The following products are listed as equals to the specified product:
   a. Silflo 200 manufactured by Silpro Corp., Ayer, MA, (978) 772-4444.
   b. Ultra/Plan manufactured by Mapei Corp., Deerfield Beach, FL 33442, (800) 426-2734.
   c. Elastiment 945 manufactured by Boiardi Corp., Little Falls, NJ 07424, (800) 352-8668.
   d. Level-Rite, manufactured by Gyp-Crete Corporation.

B. Performance Specifications:

1. Thickness Range: From feather edge to 2".

2. Working Time: At least 30 minutes at 70°F.
3. Flowing Time: At least 10 minutes at 70°F.
4. Initial Set: As defined by ASTM C191, 30 minutes at 70°F.
5. Final Set: As defined by ASTM C191, 2 hours at 70°F.
6. Compressive Strength: ASTM C109, 2630 psi after 1 day, 4100 psi after 28 days.
7. Flexural Strength: ASTM C348, 770 psi after 1 day, 1000 psi after 28 days.
8. Compatibility: Compatible with flooring adhesives which are compatible with normal concrete.
9. Meets other specification requirements.

C. Aggregate: Provide coarse sand for underlayment up to 1/8" thick and pea gravel for thicker installations.

D. Water: Clean and drinkable.

E. Primers: As recommended by underlayment manufacturer for subfloor condition and porosity.

END OF SECTION 03515

SECTION 04210 - BRICK MASONRY

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide brick masonry installation and brick masonry accessories.

1. Construct exterior masonry walls of face brick backed with metal stud construction.

B. Perform all necessary cutting and patching for whatever trade requires penetrations in brick masonry.

1.2 REFERENCES

A. *The BOCA® National Building Code/1999,* Fourteenth Edition, referred to herein as "BOCA 99".

B. American Concrete Institute:

1. ACI 530-95/ASCE 5-95/TMS 402-95 – *Building Code Requirements for Masonry Structures*, referred to herein as "ACI 530-95".
2. ACI 530.1-95/ASCE 6-95/TMS 602-95 – *Specification for Masonry Structures*, referred to herein as "ACI 530.1-95".

C. Brick Institute of America:

1. *Technical Notes on Brick Construction*, referred to herein as "BIA Tech Notes", number of applicable technical notes as specified herein.

1.3 QUALITY ASSURANCE

A. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one source and by a single manufacturer for each different product required.

B. Single-Source Responsibility 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.

PART 2 - PRODUCTS

A. Face brick shall match the existing (abutting, adjacent building) for size, texture and color. Refer to Section 01210 - Allowances.

B. General: Provide face brick conforming to the following requirements:

1. Conform to ASTM C 216, Grade SW, Type FBS.
2. Provide solid face brick units, 100% solid with no voids, at the following locations:
   a. Wherever cores of face brick would be exposed to view or to weather.
   b. Corbeled masonry.

C. Special brick shapes:

1. Conform to ASTM C-216, Grade SW, Type FBS. Units shall be 100% solid with no voids, factory formed to profiles indicated. Saw cut units will no be accepted.
2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.

2.2 MORTAR

A. General: Mortar for non-reinforced and reinforced unit masonry shall be in accordance with ASTM C 270, and shall be Portland cement and lime mortar.

1. Masonry cement will not be approved.

B. Mortar:

1. Portland cement: Comply with ASTM C 150, Type I.
2. Hydrated lime: Type S, complying with ASTM. C 207.
3. Aggregate: Provide clean, sharp, well graded aggregate free from injurious amounts of dust, lumps, shale, alkali, surface coatings, and organic matter, and complying with ASTM C 144.
4. Admixtures:
   a. Mortar color: Chemically inert synthetic iron oxide pigments, lightfast, weather resistant, complying with ASTM C 979.
   b. "H" color series, as selected by Architect, manufactured by Solomon Grind-Chem Services, Inc., Springfield, IL (217) 522-3112. Centurion Pigments manufactured by Centurion Colorbond (subsidiary of Lafarge Corp.) Hamburg, PA (215) 562-3000 will be considered as equal to the specified product.
   c. Use no other admixtures unless specifically approved in advance by the Architect.

C. Water: Provide water free from deleterious amounts of acids, alkalis, and organic materials. Water shall be potable.

2.3 BRICK VENEER ANCHORAGE

A. Anchor And Tie Manufacturer: Hohmann & Barnard, Inc. (516) 234-0600.

B. Brick veneer anchorage for attachment to metal stud wall system:

1. DW-10HS Series.
2. Anchor shall be 12 gage, hot dipped galvanized.
3. Provide screw holes to accommodate specified screws for installing anchor.
4. No other anchor system shall be used.
5. Masonry Tie: As specified herein.
6. Fasteners for attaching masonry anchors to steel stud backup:
   a. Self drilling screw with hex washer head and bonded neoprene washer; screw type 12-14x1-1/2-HWH- #2, Kwik Seal finish, manufactured by HILTI.

C. Masonry Ties:

1. Tie Construction: 3/16 inch diameter, hot dipped galvanized.
   a. Seismic interlocking tie assembly conforming to UBC 3006 (d) l (i) as follows:
      1) Box Byna-tie®.
      2) Size ties with seismic clip to penetrate a minimum of 1-1/2 inches into the depth of the veneer wythe when measured from the back face of veneer wythe while maintaining a minimum of 5/8 inch mortar cover from the outside edge of clip to the outside face of joint.

2.4 MISCELLANEOUS MATERIALS

A. Mortar Screen: Mortar Net Green™ as manufactured by Hohmann & Barnard, Inc., Hauppauge, NY (516) 234-0600 or approved equal.

1. Thickness: 2 inches.
2. Material: 200 Denier 100 percent recycled polyester.

B. Weep Inserts: #QV - Quadro-Vent™ as manufactured by Hohmann & Barnard, Inc., or approved equal.

1. Honeycombed polypropylene, 2-1/2 inches in height, color as selected by Architect.

C. Lintel Weep Inserts:

1. Where "Lintel Weeps" are indicated on the Drawings, provide 3/8 inch O.D. medium-density polyethylene weep hole #341, as manufactured by Hohmann & Barnard, Inc., or approved equal.

D. Grout to provide sloped base for exterior horizontal brickwork and installation of elevator sills shall be non-shrink, non-metallic:

1. Five Star General Purpose Grout manufactured by U.S. Grout Corp.
2. Crystex manufactured by L&M Construction Chemicals, Inc.
3. Or as approved equal.

E. Veneer Expansion Joints:

1. Expansion joint filler shall be "Ceramar" flexible foam expansion joint filler manufactured by W.R. Meadows, Elgin, IL (800) 342-5976 or approved equal, conforming to ASTM D 1752.
   a. Size: As detailed on the Drawings.
   b. Note: Backer seal and sealant for brick masonry expansion joint provided under Section 07920 - Sealants and Calking.
2. Expansion Joint Stabilizer:
   a. "Slip-Set™ Stabilizer" as manufactured by Hohmann and Barnard, Inc.
   b. Finish: Hot-dip galvanized.
   c. Provide style "H" stabilizer for level horizontal mortar joints.
   d. Provide style "V" stabilizer for to connect intersecting walls or new walls.
   e. Fasteners For Securing Style "V" Stabilizer To Existing Masonry: 1-1/4 inch long by 3/16 inch diameter tapered flat head screw fastener, designed for fastening into masonry with corrosion-resistant coating; HILTI Kwik-Con II+316-114 TFH or approved equal.

F. Bond Breaker: Self-adhered through-wall flashing strips (refer to Section 07650 – Through-Wall Flashing).

G. Backer Rod: Where backer rod is detailed on the Drawings in conjunction with veneer expansion joint at masonry opening, provide 3/8 inch diameter non-absorbing, non-staining, extruded from a blend of polyolefin. Sof-Rod as manufactured by Applied Extrusion Technologies or Sof-Type, manufactured by I.T.P. Corp.

2.5 MORTAR MIXES

A. Mixing:

1. Comply with ASTM C 270, Proportion Specification, for job-mixed mortar, of types indicated below.
2. Mechanically mix in a batch mixer for not less than three minutes, using only sufficient water to produce a mortar which is spreadable and of a workable consistency. When mixing use known volume measures; do not batch by shovel.
3. Add color admixture in strict accordance with color manufacturer's specifications for the type of mortar required.
4. Retemper mortar with water as required to maintain high plasticity. On mortar boards, retemper only by adding water within a basin formed with mortar, and by working the mortar into the water. Discard and do not use mortar which is unused after 1-1/2 hours following initial mixing.
5. Provide Type N mortar for interior masonry and exterior masonry above grade, except as indicated otherwise.
6. Provide Type S mortar for reinforced and load-bearing masonry, and elsewhere as indicated.
7. Provide Type M mortar for masonry below grade and in contact with earth and elsewhere as indicated.

END OF SECTION 04210

SECTION 04220 - CONCRETE MASONRY UNITS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Concrete masonry units for the following applications:

1. Interior partitions.
2. Curbs at mechanical room plenum wall.

B. Concrete masonry types for this project include the following:

1. Standard concrete masonry units

C. Reinforcement, anchorages and accessories.

1.2 References

A. *The BOCA® National Building Code/1999,* Fourteenth Edition, referred to herein as "BOCA 99".

B. National Concrete Masonry Association:

1. TEK Manual for Concrete Masonry Design And Construction, referred to herein as "NCMA TEK".

1.3 QUALITY ASSURANCE

A. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one source and by a single manufacturer for each different product required.

B. Single-Source Responsibility 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.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. General

1. Units shall be of standard sizes, shapes, including necessary closures, fitters and split units where piping and conduit are built into exposed finish walls. Provide "U" block units where indicated on the drawings. Surfaces to be exposed or painted shall be smooth and of uniform texture.
   a. Provide special shapes for corners, jambs, sash, control joints, headers, bonding, and other special conditions.
   b. Provide square-edged units for outside corners.
2. Where concrete masonry units are required to have fire-resistance ratings, provide units manufactured to meet requirements of American Insurance Association.
   a. Provide fire rated units using equivalent thickness method conforming with:
      1) National Concrete Masonry Association (N.C.M.A.)
   b. Provide manufacturer's certificate indicating that masonry units comply.with the above requirements.
3. Masonry units for reinforced masonry shall be two core units.
4. Solid Units: Provide solid units where voids would be exposed to view after installation.
5. Concrete masonry units shall conform with ASTM Designation C-90, Grade N, Type I for hollow load-bearing units.

B. Interior Concrete Masonry Units

1. Aggregate shall comply with ASTM Designation C 331 Lightweight Aggregate for CMU; do not use cinder aggregate.
2. Lightweight units shall have a dried mix weight not exceeding 105 pounds per cubic foot.
3. Size: 8 inches wide by 8 inches high by 16 inches in length, unless otherwise indicated on the Drawings.

2.2 MORTAR MATERIALS

A. General: Mortar for non-reinforced and reinforced unit masonry shall be in accordance with ASTM C270, and shall be Portland cement and lime mortar. Masonry cement will not be approved.

B. Ingredients:

1. Portland cement: Comply with ASTM C150, type I.
2. Lime: Provide hydrated lime complying with ASTM C207, Type S.
3. Aggregate: Provide clean, sharp, well graded aggregate free from injurious amounts of dust, lumps, shale, alkali, surface coatings, and organic matter, and complying with ASTM C144.
4. Admixtures: Do not use admixtures unless specifically approved in advance by the Architect.
5. Water: Provide water free from deleterious amounts of acids, alkalis, and organic materials.

2.3 GROUT MATERIALS

A. General: Grout for non-reinforced and reinforced masonry shall be in accordance with ASTM C-476-33.

B. Ingredients:

1. Portland cement: Comply with ASTM C150, type I or type II, free from water soluble salts and alkalies.
2. Aggregate: Provide clean, sharp, well graded aggregate free from injurious amounts of dust, lumps, shale, alkali, surface coatings, and organic matter.
3. Admixtures: Do not use admixtures unless specifically approved in advance by the Architect.
4. Water: Provide water free from injurious amounts of acids, alkalis, and organic materials.

2.4 REINFORCEMENT AND ANCHORAGE

A. Reinforcement Bars: Provide deformed bars of following grades complying with ASTM A 615, except as otherwise indicated.

1. Provide Grade 60 for bars No. 3 to No. 18, except as otherwise indicated.
2. Shop-fabricate reinforcing bars which are shown to be bent or hooked.

B. Anchor And Tie Manufacturer: Hohmann & Barnard, Inc. (516) 234-0600.

C. Horizontal Joint Reinforcement For Single Wythe Construction:

1. Lox All® Truss-Mesh.
2. Conform to ASTM A82 for cold drawn steel wire; nine-gage side rods, nine-gage cross rods; with a hot-dip galvanized finish.
3. Include preformed welded corners.

D. Column anchors: Hot-dipped galvanized.

1. #353 1-1/4 inches wide x 12 gage thick.
2. #354 1-1/4 inches wide x 12 gage thick.

E. Formed Wire: Provide 3/16 inch diameter rectangular dovetail anchors. Dovetail to be compatible with anchor slot specified under Section 03300.

F. Wire Mesh: 19 gage galvanized steel wire, 1/2 inch square mesh, sized for width of masonry unit.

G. Mesh Ties: Provide 1/2 inch square, 16 gage hot dipped galvanized mesh, 16 inches long x 1/2 unit width.

H. Miscellaneous Ties: Provide straps, bars, rods and similar items which are fabricated from not less than 16 gage sheet steel or 3/16 inch diameter steel wire.

I. Galvanizing: Provide hot-dip galvanized, ASTM A153, class B2, 1.5 oz/ft^2 zinc coating on all ties, reinforcing, anchors and similar items which extend into an exterior wall assembly. Semi-exposed areas shall be considered exterior.

2.5 EMBEDDED FLASHING MATERIALS

A. Refer to Section 07600 - Flashing and Sheet Metal and Section 07650 - Through-Wall Flashing.

2.6 MISCELLANEOUS MATERIALS

A. Bond Breaker: Self-adhered through-wall flashing strips (refer to Section 07650 – Through-Wall Flashing).

B. Compressible Filler:

1. Compressible joint filler material shall be "Ceramar" flexible foam expansion joint filler manufactured by W.R. Meadows, Elgin, IL (800) 342-5976 or approved equal, conforming to ASTM D 1752.
   a. Size: As detailed on the Drawings.
   b. Note: Backer seal and sealant for veneer masonry expansion joint provided under Section 07920 - Sealants and Calking.

C. Control Joints:

1. Rubber shear keys conforming to ASTM D 2000, with a minimum durometer hardness of 80 when tested in accordance with ASTM D 2240.
2. Hohmann and Barnard #RS Series or approved equal.
3. Control Joints at Fire-Rated Assemblies: Where control joints are required at fire-rated CMU assemblies, provide control joint accessories in accordance with the provisions of the fire-resistance design being utilized and the provisions of NCMA TEK 7-1A – *Fire Resistance Rating of Concrete Masonry Assemblies.*

2.7 MORTAR MIXES

A. Mixing:

1. Mixing Proportions: Comply with ASTM C 270, Proportion Specification, for job-mixed mortar, of types indicated below.
2. Mechanically mix in a batch mixer for not less than three minutes, using only sufficient water to produce a mortar which is spreadable and of a workable consistency. When mixing use known volume measures; do not batch by shovel.
3. Retemper mortar with water as required to maintain high plasticity. On mortar boards, retemper only by adding water within a basin formed with mortar, and by working the mortar into the water. Discard and do not use mortar which is unused after 1-1/2 hours following initial mixing.

4. Provide type N mortar for masonry above grade and interior and exterior work, except as indicated otherwise.
5. Provide type S mortar for reinforced and load-bearing masonry, and elsewhere as indicated.
6. Provide type M mortar for masonry below grade and in contact with earth and elsewhere as indicated.

END OF SECTION 04220

SECTION 04230 – CALCIUM SILICATE MASONRY UNITS

PART 1 - GENERAL

1.1 SCOPE

A. Provide calcium silicate masonry units for walls.

1. Calcium silicate masonry units designated on the Drawings as "Manufactured Stone".

1.2 REFERENCES

A. *The BOCA® National Building Code/1999,* Fourteenth Edition, referred to herein as "BOCA 99".

1.3 QUALITY ASSURANCE

A. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one source and by a single manufacturer for each different product required.

B. Single-Source Responsibility 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.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Manufacturer of calcium silicate masonry units having products considered acceptable for use:

1. Calcium Silicate Masonry Units: "Renaissance Masonry Units" by Arriscraft International Inc., Cambridge, ON (519) 653-3275.

B. Calcium Silicate Masonry Units: ASTM C73, Grade SW; solid units having been pressure formed and autoclaved; 3-5/8" bed depth; modular sizes as indicated on drawings; rocked finish on exposed faces and ends; color as by Architect, and having the following typical average properties when tested to the identified standard:

1. Compressive Strength: 6600 psi, to ASTM C170.
2. Absorption: 8.8 percent, to ASTM C97.
3. Density: 129 lbs/ft3, to ASTM C97.
4. Modulus of Rupture: 770 psi, to ASTM C99.

2.2 REINFORCEMENT AND ANCHORAGE

A. Joint reinforcing and tie system at masonry walls constructed of calcium silicate masonry units with metal stud wall back-up:

1. DW-10-HS Series, manufactured by Hohmann & Barnard, Inc., Hauppauge, NY, (516) 234-0600, 12 gage anchor, and 3/16 inch diameter Box Byna-Tie. Anchor and tie: hot dipped galvanized.
   a. Fasteners: Self drilling screw with hex washer head and bonded neoprene washer; screw type 12-14x1-1/2-HWH- #2, Kwik Seal finish, manufactured by HILTI.

2.3 MISCELLANEOUS MATERIALS

A. Mortar Screen: Mortar Net Green™ as manufactured by Hohmann & Barnard, Inc., Hauppauge, NY (516) 234-0600 or approved equal.

1. Thickness: 2 inches.
2. Material: 200 Denier 100 percent recycled polyester.

B. Weep Inserts: #QV - Quadro-Vent™ as manufactured by Hohmann & Barnard, Inc., or approved equal.

1. Honeycombed polypropylene, 2-1/2 inches in height, color as selected by Architect.

C. Lintel Weep Inserts:

1. Where "Lintel Weeps" are indicated on the Drawings, provide 3/8 inch O.D. medium-density polyethylene weep hole #341, as manufactured by Hohmann & Barnard, Inc., or approved equal.

D. Bond Breaker: 15 lb. roofing felt complying with ASTM D226 or ASTM D227.

E. Control Joints: Solid rubber strips with Shore A hardness of 60 to 80 and designed to fit standard control joint masonry units and maintain the lateral stability of the wall.

F. Compressible Filler: Glass fiber batts of 3 pound density.

2.4 MORTAR

A. General: Mortar for non-reinforced and reinforced unit masonry shall be in accordance with ASTM C 270, and shall be Portland cement and lime mortar.

1. Masonry cement will not be approved.

B. Mortar:

1. Portland cement: Comply with ASTM C 150, Type I.

2. Hydrated lime: Type S, complying with ASTM. C 207.
3. Aggregate: Provide clean, sharp, well graded aggregate free from injurious amounts of dust, lumps, shale, alkali, surface coatings, and organic matter, and complying with ASTM C 144.
4. Admixtures:
   a. Mortar color: Chemically inert synthetic iron oxide pigments, lightfast, weather resistant, complying with ASTM C 979.
   b. "H" color series, as selected by Architect, manufactured by Solomon Grind-Chem Services, Inc., Springfield, IL (217) 522-3112. Centurion Pigments manufactured by Centurion Colorbond (subsidiary of Lafarge Corp.) Hamburg, PA (215) 562-3000 will be considered as equal to the specified product.
   c. Use no other admixtures unless specifically approved in advance by the Architect.

C. Water: Provide water free from deleterious amounts of acids, alkalis, and organic materials. Water shall be potable.

2.5 GROUT MATERIALS

A. General: Grout for non-reinforced and reinforced masonry shall be in accordance with ASTM C-476-33.

B. Ingredients:

1. Portland cement: Comply with ASTM C150, type I or type II, free from water soluble salts and alkalies.
2. Aggregate: Provide clean, sharp, well graded aggregate free from injurious amounts of dust, lumps, shale, alkali, surface coatings, and organic matter.
3. Admixtures: Do not use admixtures unless specifically approved in advance by the Architect.
4. Water: Provide water free from injurious amounts of acids, alkalis, and organic materials.

END OF SECTION 04230

SECTION 04850 – GRANITE CLADDING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. This Section includes exterior granite cladding in the following applications:

1. Anchored to concrete backup.
2. Anchored to light-gage metal framing and sheathing.

1.2 QUALITY ASSURANCE

A. Source Limitations for Stone: Obtain each variety of stone, regardless of finish, from a single quarry with resources to provide materials of consistent quality in appearance and physical properties.

B. Source Limitations for Mortar Materials: Obtain ingredients of a uniform quality for each mortar component from a single manufacturer and each aggregate from one source or producer.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide stone cladding system capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

B. Wind loads to be used are based on the applicable Building Code and are as follows:

1. Outside Salient Corners (form corner through first 13'-6"): 70 psf.
2. Inside Salient Corners (from 13'-6" of corner through 26'-6" inside of corner): 50 psf.
3. Field Area: minimum 35 psf.

C. Seismic Requirements

1. General Seismic Requirements: Architectural components and their attachments shall comply with seismic design requirements of the referenced building code for a project in Seismic Hazard Exposure Group **III**, with a Seismic Performance Category of **C**:
2. Architectural Components Design: The glazed aluminum curtain wall system and attachments shall be designed in accordance with the requirements of **Section 1610.6.3 of BOCA 99**, in its entirety, and for seismic forces (F_p) in accordance with the formula $F_p = A_v C_c P W_c$ where the following values are used:
   a. The coefficient representing effective peak velocity-related acceleration (A_v) = **0.10g**.
   b. The seismic coefficient for architectural components (C_c):

1) Components (C_c) = 0.9.
2) Attachments (C_c) = 3.0

c. Performance criteria factor from **Table 1610.6.3 of BOCA 99** (P) = 1.5.

d. W_c = weight of architectural component.

PART 2 - PRODUCTS

2.1 STONE

A. Granite: Provide granite complying with ASTM C 615 and NBGQA's "Specifications for Architectural Granite" and as follows:

1. Description: Uniform, medium-grained stone without veining.
2. Varieties and Sources: As selected by Architect.
3. Finish: Match Architect's sample.

2.2 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I except Type III may be used for cold weather construction. Provide gray or white cement as needed to produce mortar color which shall match color of limestone.

B. Hydrated Lime: ASTM C 207. Type S.

C. Aggregate: ASTM C 144: and as indicated below:

1. For joints narrower than 1/4" use aggregate graded with 100 percent passing the No. 8 sieve and 95 percent the No. 16 sieve. Sand color shall be as required to achieve mortar which matches limestone.

D. Water: Clean, non-alkaline and potable.

2.3 STONE ANCHORS AND ATTACHMENTS

A. Provide anchors and attachments of type and size required to support the stonework fabricated from the following metals for conditions indicated below:

1. Stainless Steel, AISI Type 302 or 304, for anchors and expansion bolts embedded within the stone.

B. Hot-Dip Galvanized Steel as follows:

1. Galvanized malleable iron for adjustable inserts embedded in the concrete structure.
2. For anchor bolts, nuts and washers not in direct contact with stone; comply with ASTM A 307, Grade A, for material and ASTM C 153, Class C, for galvanizing.

3. For steel plates, shapes and bars not indirect contact with stone; comply with ASTM A 36 for materials and ASTM A 123 for galvanizing.
4. For expansion bolts not in direct contact with stone use zinc plated or cadmium plated bolts with stainless steel expansion clips.
5. For steel angles supporting limestone; comply with ASTM A 36 for materials and ASTM A 123 for galvanizing. Supports protected with one shop coat of zinc-rich or other rust-inhibiting paint, and one job coat of similar, compatible paint, may be used at the discretion of the architect.

C. Dovetail Slots: Where required, furnish dovetail slots, with filler strips, of slot size required to receive anchors provided, fabricated from 0.0336 (22-gage) galvanized sheet steel complying with ASTM A 446, G90.

2.4 FABRICATION

A. Stone shall be free from starts, cracks or seams which might impair its structural integrity or appearance. Color shall vary only as indicated by approved samples. Exposed surfaces shall be free from spots, stains, spalls, chips and other defects; and shall be of best quality obtainable for the purpose intended.

B. Provide Stone thicknesses required to comply with performance requirements but not less than shown on architectural drawings. Fabricate granite to the dimensions shown on the Drawings, within fabricating tolerances. Face size tolerance shall be plus or minus 1/16". Thickness tolerance shall be plus or minus 1/4". Comply with recommendations in NBGQA's "Specifications for Architectural Granite."

C. Beds and joints shall be full cut and square for the full thickness of the stone with various shapes as detailed. Joints shall generally be 1/4" in width. The backs of stones shall be sawn to approximate true planes parallel to the face.

D. Granite coming in contact with structural shapes shall be back-checked as indicated on the Drawings. Stone resting on structural members shall have beds shaped to fit the supports.

E. Cut/drill holes in granite for all anchors, cramps, dowels, etc. called for on approved Shop Drawings.

F. Arises on finished faces shall be slightly blunted to remove sharp edges and minimize chipping.

END OF SECTION 04850

SECTION 05120

STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Refer to other Divisions of these specifications to determine the type and extent of work therein affecting the work of this trade, whether or not such work is specifically mentioned in this Section.

1.2 SUMMARY

A. The Work includes labor, materials, equipment, and services required for completion of Work under this section as shown on drawings and as specified here.

B. This Section includes the following:

1. Structural Steel.

2. Architecturally Exposed Structural Steel.

3. Prefabricated building columns.

4. Shop installed headed shear studs.

C. Related Sections include the following:

1. Division 1, Section 01410, "Testing Laboratory Services" for independent Testing Agency procedures and administrative requirements.

2. Division 3, Section 03300, “Cast-In-Place Concrete”

3. Division 5, Section 05300, "Metal Decking" for field installation of headed shear stud connectors.

4. Division 5, Section 05500, "Metal Fabrications" for other metal items not defined as structural steel.

5. Division 9, Section 09900, “Painting” for surface preparation and priming requirements.

D. Work furnished under this Section and installed under other Sections:

1. Division 3 Section “Cast-in-Place Concrete”: Installation of structural shapes, bolts, angles, plates, and inserts embedded in new concrete.

1.3 DEFINITIONS

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

B. Architecturally Exposed Structural Steel: Structural steel designated as architecturally exposed structural steel in the Contract Documents.

C. Testing Agency: Personnel performing Owner provided testing and inspections as specified and as required by the 1999 BOCA Building Code

1.4 PERFORMANCE REQUIREMENTS

A. The detailing of all structural steel members, and the designing, proportioning and detailing of connections to resist moments, shears, and direct forces given on the drawings or inferable, therefrom, is part of this Contract.

B. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated and AISC's "Manual of Steel Construction, Load and Resistance Factor Design," Volume 2, Part 9

2. Engineering Responsibility: Fabricator's responsibilities include having a qualified professional engineer prepare structural analysis data for structural-steel connections.

C. Construction: Type 1, rigid frame, and Type 2, simple framing as indicated on the drawings.

1.5 SUBMITTALS

A. Make submittals in compliance with Division 1, Section 01300, "Submittals".

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

1. Expansion anchors.

2. Adhesive anchors.

3. Welding electrodes.

4. Galvanizing repair paint.

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

1. Before submitting shop drawings to the Architect, precheck the shop drawings for conformity of details to the Contract Documents and as coordinated with other work. Include signature of Contractor's representative indicating that the drawings have been prechecked. The Contractor is wholly responsible for the conformity of dimensions and details of the shop drawings with the Contract Documents.

2. Submit typical, job, or shop standard connection details and calculations before detail drawings. Submit connection information in tabular form with:

   a. Weld sizes.

   b. Sizes and material of connecting elements.

   c. Number, size, and type of bolt.

   d. Material; minimum thickness of supporting member part.

   e. Material and minimum thickness of supported member part.

3. Submit erection plans before detail drawings.

4. Include:

   a. Details and dimensions of all pieces.

   b. Steel material designation.

   c. Details of cuts, connections, splices, camber, holes, and other pertinent data.

   d. Identification marks cross referenced to erection plans.

5. Include embedment drawings.

6. Prepare details avoiding interference of steel connections, gussets, and bracing elements with architectural details, shaft openings, and wall openings.

7. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.

8. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.

9. For structural-steel connections indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

10. Approval of the shop drawings is for size and arrangement of principal and auxiliary members and strength of connections. Approval does not relieve the Contractor's responsibility for dimensions, fabrications, and correct fitting of structural members.

D. Connection Design:

1. Connections designed by this Contractor, together with all the necessary computations, shall be submitted to the Engineer of Record for review. The contractor shall accept full responsibility for the design of all connections, as required to resist the loads and reactions shown on the Contract Drawings, and as specified, excepting those indicated on the drawings as "Engineer Mandated" which are completely designed by the Engineer of Record and whose components are completely or partly detailed on the contract documents.

2. Immediately upon submission of initial Typical Detail Sheets and/or erection drawings, the contractor shall submit an affidavit from a licensed Professional Engineer in the state of Maine, whose registration number shall appear on the affidavit, stating the following:

   "All connections and details required to resist the loads and reactions shown on the Contract Drawings and as specified, excepting those completely designed and detailed on the Contract Documents will be designed by me personally or by qualified personnel under my direct supervision."

3. At the completion of the work, the same licensed Professional Engineer shall submit an affidavit stating:

   "All connections and details required to resist the loads and reactions shown on the Contract Drawings and as specified, excepting those completely designed and detailed on the Contract Documents have been designed by me personally or by qualified personnel under my direct supervision."

E. Forces imposed on base building structure by temporary attachments for bracing of cranes, hoists, or any other equipment imposing loads on the structure during construction. Provide drawings and calculations of temporary bracing stamped and signed by a Professional Engineer licensed in the state of Maine.

F. Welder qualification certificates.

G. Qualification Data: For erector, fabricator, and fabricators quality control Testing Agency if separate from fabricator.

H. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:

1. Structural steel including chemical and physical properties.

2. Bolts, nuts, and washers including mechanical properties and chemical analysis.

3. Tension-control, high-strength bolt-nut-washer assemblies.

4. Shop primers.

I. Source quality-control test reports.

J. Galvanizing: Submit an original and two copies for the coating applicator's notarized Certificate of Compliance that the hot-dip galvanized coating meets or exceeds the specified requirements of ASTM A123 or A 153 as applicable. At the time of initial shipment to the job site, issue and submit a notarized statement indicating conformity to the specifications.

1.6 QUALITY ASSURANCE

A. Erector Qualifications:

1. A qualified erector who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CASE.

2. A minimum of five years experience in the satisfactory erection of structural steel on projects of this magnitude.

B. Fabricator Qualifications:

1. A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category Cbd.

2. A minimum of five years experience in the satisfactory fabrication of structural steel on projects of this magnitude.

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

D. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code – Steel."

E. Comply with applicable building codes and Contract Documents; and comply with the applicable provisions and recommendations of the most recent editions of the following specifications and documents:

1. AISC's "Code of Standard Practice for Steel Buildings and Bridges" as amended here.

2. AISC's "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2."

3. AISC's "Load and Resistance Factor Design Specification for Structural Steel Buildings."

4. AISC's "Specification for the Design of Steel Hollow Structural Sections."

5. AISC's "Specification for Load and Resistance Factor Design of Single-Angle Members."

6. RCSC's "Specification for Structural Joints Using ASTM A325 or A 490 Bolts."

7. AWS's "Structural Welding Code – Steel."

8. SSPC's "Steel Structures Painting Council: Steel Structures Painting Manual, Vol.2."

F. Mockups: Build mockups of architecturally exposed structural steel to set quality standards for fabrication and installation.

1. Coordinate finish painting requirements with Division 9 painting Sections.

2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

G. Fabrication and Erections Errors: Notify Engineer of fabrication or erection errors requiring field work. Before performing corrective work, submit description of field work for review and approval.

1.7 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. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.

2. 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.

1.8 COORDINATION

A. Furnish 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.

1.9 PRE-CONSTRUCTION CONFERENCES

A. Hold one conference at least 35 days before the start of shop drawings and one at least 35 days before start of fabrication.

B. Pre shop-drawing conference:

1. Agenda to cover but not be limited to the following:

a. Connection calculations.

b. Procedures for review of submissions.

c. Detailing procedures and preferences.

d. Connection details.

e. Welding procedures.

f. Submission procedures.

g. RFI procedures.

h. Fabrication procedures and preferences.

i. Specification and design drawing requirements.

2. Pre shop drawing conference attendees include but are not limited to:

a. General Contractor or Construction Manager

b. Contractor's Superintendent

c. Contractor's Assistant Superintendent or equivalent responsible for the structural steel.

d. Fabricator's representative.

e. Representative of Professional Engineer performing connection calculations.

f. Architect.

g. Structural Engineer of Record.

h. Owner's representative.

C. Pre-erection conference:

1. Agenda to cover but not be limited to the following:

a. Anchor bolt conditions.

b. Welding procedures and welder qualifications.

c. Bolting procedures.

d. Methods, equipment, and sequencing of erection.

e. Inspection.

f. Metal deck and stud installation.

g. Corrective measures in field.

2. Pre-erection conference attendees include but are not limited to:

a. General Contractor or Construction Manager

b. Contractor's Superintendent.

c. Contractors steel assistant superintendent or equivalent.

d. Fabricator's representative.

e. Metal deck erectors representative (if different from steel erector).

f. Architect.

g. Structural Engineer of Record.

h. Inspection and Testing Agency

i. Owner's Representative.

D. General Contractor to record, type, and distribute minutes of meeting to all attendees.

E. Notify attendees at least ten days before the schedules date of the conference.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A992, ASTM A572, Grade 50, ASTM A913, and Grade 50.

B. Rolled Sections in ASTM A6 Groups 3, 4, and 5: Supply with Charpy V-notch testing in accordance with ASTM A6 Supplementary Requirement S5. Conduct impact tests in accordance with ASTM A673 Frequency (P) Piece Testing. Meet minimum average impact value of 20 ft-lbs. Absorbed energy at +70 degrees F.

C. Channels, Angles, M, S - Shapes: ASTM A36, ASTM A572, Grade 50.

D. Plate and Bar: ASTM A36, ASTM A572, Grade 50.

E. Cold-Formed Hollow Structural Sections: ASTM A500, Grade B, structural tubing.

F. Steel Pipe: ASTM A53, Type E or S, Grade B.

1. Weight Class: Standard, Extra strong, or Double-extra strong.

2. Finish: Black, except where indicated to be galvanized.

G. Welding electrodes for moment frames and all complete joint penetration welds: Innershield NR-203 Ni1, Innershield NR-232, Innershield NR-311Ni (for the corresponding application/position) as manufactured by Lincoln Electric, or approved equal with same or better notch toughness.

H. Other Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A325, Type 1, heavy hex steel structural bolts; ASTM A563 heavy hex carbon-steel nuts; and ASTM F436 hardened carbon-steel washers.

1. Finish:

a. Plain unless joining components indicated as galvanized.

b. Galvanized Finish: Hot-dip zinc coating, ASTM A153, Class C.

B. High-Strength Bolts, Nuts, and Washers: ASTM A490, Type 1, heavy hex steel structural bolts; ASTM A563 heavy hex carbon-steel nuts; and ASTM F436 hardened carbon-steel washers, plain.

C. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F1852, Type 1, heavy hex or round head steel structural bolts with splined ends; ASTM A563 heavy hex carbon-steel nuts; and ASTM F436 hardened carbon-steel washers.

1. Finish:

a. Plain unless joining components indicated as galvanized.

b. Galvanized Finish: Mechanically deposited zinc coating, ASTM B695, Class 50.

D. Shop Installed Shear Connectors: ASTM A108, Grades 1015 through 1020 headed-stud type, cold finished carbon steel; AWS D1.1, Type B.

E. Unheaded Anchor Rods: ASTM A449; ASTM A307, Grade A.

1. Configuration: Straight.

2. Nuts: ASTM A563 heavy hex carbon steel.

3. Plate Washers: ASTM A36 carbon steel.

4. Washers: ASTM F436 hardened carbon steel.

5. Finish:

a. Plain unless indicated as galvanized.

b. Galvanized Finish: Hot-dip zinc coating, ASTM A153, Class C.

F. Threaded Rods: ASTM A36; ASTM A307, Grade A.

1. Nuts: ASTM A563 heavy hex carbon steel.

2. Washers: ASTM A36 carbon steel.

3. Finish:

a. Plain unless indicated as galvanized.

b. Galvanized Finish: Hot-dip zinc coating, ASTM A153, Class C.

G. Expansion Bolts:

1. ITW Ramset/Red Head Trubolt Wedge.

2. Hilti Kwik Bolt II.

3. Approved Equal

H. Adhesive Anchors:

1. Hilti HY 150 System with Stainless Steel rods.

2. Epcon Ceramic 6 with Stainless Steel rods.

2.3 PRIMER

A. Primer: SSPC-Paint 25, Type [I] [II], iron oxide, zinc oxide, raw linseed oil, and alkyd.

B. Primer: SSPC-Paint 25 BCS, Type [I] [II], iron oxide, zinc oxide, raw linseed oil, and alkyd.

C. Primer: SSPC-Paint 23, latex primer.

D. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.

E. Galvanizing Repair Paint: ZRC Cold Galvanizing Compound by ZRC Products Company .

2.4 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Load and Resistance Factor Design Specification for Structural Steel Buildings."

1. Camber structural-steel members where indicated. Measure camber at the mid-length of member. Fabricate members without specified camber with minor camber from rolling and shop assembly set upward.

2. Identify high-strength structural steel according to ASTM A6/ A 6M and maintain markings until structural steel has been erected.

3. Mark and match-mark materials for field assembly.

4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

5. Arrange all members and connections to be shop welded and field bolted to the greatest extent possible.

B. Architecturally Exposed Structural Steel: Comply with fabrication requirements, including tolerance limits, of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel identified as architecturally exposed structural steel.

1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, seam marks, roller marks, rolled trade names, and roughness.

2. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.

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

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

2. Grind to smooth metal all thermally cut copes, weld access holes, and web penetrations on ASTM A6 Group 3, 4, and 5 sections.

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

E. Surface Preparation: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 2, "Hand Tool Cleaning," or as indicated for specific members.

F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors.

G. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural steel. Straighten as required to provide uniform, square, and true members in completed wall framing.

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

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.

2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.

3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.5 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tight, pretensioned, or slip critical as indicated.

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

1. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.

2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.

a. Grind butt welds flush.

b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

2.6 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 6 inches.

2. Surfaces to be field welded.

3. Surfaces to be high-strength bolted with slip-critical connections.

4. Surfaces to receive sprayed fire-resistive materials.

5. Galvanized surfaces.

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

1. SSPC-SP 2, "Hand Tool Cleaning" unless otherwise noted.

2. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning" for surfaces indicated as coated with intumescent paints.

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

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2. Apply two coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.

D. Painting: Apply a 1-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.

2.7 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A123.

1. Coat all items specified as galvanized on Structural Drawings and all exterior loose lintels, lintels, and shelf angles and structural steel by the hot-dip process in molten zinc, producing a continuous coating of uniform thickness weighing not less than 2 ounces per square foot of surface.

2. Galvanize bolts for connections of galvanized structural shapes and plates. Galvanize separate bolts, nuts and other fasteners after fabrication conforming to ASTM 153.

3. Galvanize components after fabrication.

4. Fill vent holes and grind smooth after galvanizing.

5. Inspection: Contractor's inspector to check coating mil thickness prior to shipment. Send a certification to the Architect stating that coating satisfies specified requirements.

6. Furnish Notarized Certificate of Compliance with ASTM Standards and Specifications listed here. The certificate must be signed by the galvanizer and contain a detailed description of the material processed. Include in the Certificate information as to the ASTM standard used for the coating.

7. Mark all material specified to be hot-dip galvanized after fabrication with a stamp similar to the "Duncan Stamp." The stamp must clearly show the name of the galvanizer, the applicable ASTM specification number and the number of ounces per square foot of zinc coating applied after fabrication.

2.8 SOURCE QUALITY CONTROL

A. Fabricator to supervise all shop work per his quality control program. Contractor's quality control personnel to supervise all fabrication work.

1. Scrutiny of the quality control and quality control procedures will be performed by the Testing Agency. The fabricator and erector shall cooperate with the Testing Agency.

2. Fabricator to coordinate with the Testing Agency the sharing of results of quality control tests and schedule for repairing defects.

3. Before shipping the completed work, consult with the Testing Agency to agree on interpretations of acceptance criteria.

B. Fabricator's work includes facilitating inspections by the Testing Agency. Furnish upon request, at no cost the following:

1. A complete set of approved erection drawings and shop drawings.

2. Cutting lists, order lists, material bills, and shipping list.

3. Full and ample means and assistance for testing materials and workmanship, and proper facilities for inspection of the work in the shop.

2.9 SOURCE QUALITY ASSURANCE

A. Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

1. Provide Testing Agency and Engineer of Record with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

2. Inspections and tests by the Testing Agency and Engineer of Record do not relieve the Contractor of responsibility for supervision and quality control of the Work.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents. Do not ship Work that does not comply with the Contract Documents unless field work correction Work is approved by Engineer of Record.

C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A325 or A 490 Bolts."

D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at Testing Agency's option:

1. Liquid Penetrant Inspection: ASTM E165.

2. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.

3. Ultrasonic Inspection: ASTM E164.

4. Radiographic Inspection: ASTM E94.

E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1 for stud welding and as follows:

1. Bend tests will be performed if visual inspections reveal either a less-than- continuous 360-degree flash or welding repairs to any shear connector.

2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.

PART 3 - EXECUTION

3.1 ENGINEERING AND SHOP DRAWINGS

A. Verify all site conditions by field measurements and elevations.

B. Design miscellaneous details not specifically shown and submit for approval.

C. Refer to Architectural details for miscellaneous items, tolerances, and provisions to be made for the attachment of other materials. Refer to structural drawings and mechanical shop drawings for coping and openings required to clear mechanical lines. Refer to approved mechanical shop drawings for exact location and size of supports required for mechanical equipment.

3.2 EXAMINATION

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

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

3.3 PREPARATION

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

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

3.4 ERECTION

A. Set structural steel accurately in locations, to elevations indicated, and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Load and Resistance Factor Design Specification for Structural Steel Buildings."

1. The limitations specified in the Code of Standard Practice for Steel Building and Bridges are applicable except for tolerances for relieving angle placement: 1/8 in. vertically and horizontally.

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

1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.

2. Weld plate washers to top of base plate.

3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.

4. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Installation of grouting is specified under Section 03300 "Cast-in-Place Concrete."

C. Maintain erection tolerances of structural steel and architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

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

1. Level and plumb individual members of structure.

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. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.

G. Do not use thermal cutting during erection without prior approval by Engineer of specific application. Finish thermally cut sections within smoothness limits in AWS D1.1.

H. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.5 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: As indicated on the drawings.

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

1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Load and Resistance Factor Design Specification for Structural Steel Buildings" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.

3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

4. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.

5. Grind butt welds flush.

6. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

3.6 FIELD QUALITY ASSURANCE

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A325 or A 490 Bolts."

1. Contractor to provide a calibrated Skidmore Wilhelm tensioning device installed at a convenient column for the purpose of calibrating wrenches. Keep device on site until all bolting operations are completed and approved.

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.

1. In addition to visual inspection, field welds will be tested according to AWS D1.1 and the following inspection procedures, at Testing Agency's option:

a. Liquid Penetrant Inspection: ASTM E165.

b. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.

c. Ultrasonic Inspection: ASTM E164.

d. Radiographic Inspection: ASTM E94.

D. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.7 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A780 and manufacturer's written instructions.

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

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

C. Touchup Painting: Cleaning and touchup painting are specified in Division 9 painting Sections.

3.8 CLEANING

A. Remove and dispose of away from the site: erection bolts, erection attachments, temporary lifting lugs, safety barrier supports, and any other auxiliary or temporary steel components that interfere with other work.

END OF SECTION 05120

SECTION 05300

METAL DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Refer to other Divisions of these specifications to determine the type and extent of work therein affecting the work of this trade, whether or not such work is specifically mentioned in this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Roof deck.

2. Composite floor deck.

3. Shear stud connectors.

4. Cutting and reinforcing of openings for predetermined holes and other holes required by other trades.

5. Furnishing and installing filler plates as noted in the drawings and as may be required to close gaps between decking and structural steel or concrete.

6. Hanger tabs.

B. Related Sections include the following:

1. Division 3, Section 03300, "Cast-in-Place Concrete" for concrete fill and reinforcing steel.

2. Division 5, Section 05120, "Structural Steel" for shop-welded shear connectors.

3. Division 9, Section 09900, "Painting" for repair painting of painted deck.

1.3 REFERENCE STANDARDS

A. Comply with the following general specifications for materials and workmanship not otherwise specified:

1. AISI Specification for the Design of Cold-Formed Steel Structural Members.

2. AWS Recommended Welding Practices.

3. SDI Code of Recommended Standard Practice.

4. SDI Specifications and Commentaries for Composite Steel Floor Deck.

5. SDI Specifications and commentaries for Steel Roof Deck.

1.4 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings:

1. Submit shop drawings per Section 01300, "Submittals."

2. Precheck the shop drawings prior to submission to the Architect for conformity of details with the Contract Documents and as coordinated with other work. The signature of a representative of the Contractor indicating that the drawings have been prechecked will be required. The Contractor shall be wholly responsible for the conformity of dimensions and details of the shop drawings with the Contract Documents

3. Show layout, types, gauges, and marking of all deck panels, anchorage details, reinforcing channels, pans, deck openings, special jointing, accessories, and attachments to other construction.

4. Show fastening methods for deck units, accessories, closure pieces, fittings, sump pans, and the type and sequence of connections, welds, or screws.

5. Indicate any single span conditions requiring shoring.

6. Show size, location, and spacing of field welded shear studs.

7. Approval of shop drawings will be for size and arrangement of units and strength of connections. The Contractor is responsible for accuracy of all dimensions shown on shop drawings.

8. Do not fabricate units prior to approval of shop drawings.

C. Product Certificates: Signed by steel deck manufacturers certifying that products furnished comply with requirements.

D. Welding Certificates: Copies of certificates for welding procedures and personnel.

E. Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:

1. Mechanical fasteners.

F. Research/Evaluation Reports: Evidence of steel deck's compliance with 1999 BOCA Building Code including MEA number.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has a minimum of three years of experience completing steel deck 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. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E329 to conduct the testing indicated, as documented according to ASTM E548.

C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code – Steel," and AWS D1.3, "Structural Welding Code – Sheet Steel."

D. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those steel deck units tested for fire resistance per ASTM E119 by a testing and inspection agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.

2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.

E. AISI Specifications: Calculate structural characteristics of steel deck according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members."

F. FM Listing: Provide steel roof deck evaluated by FM and listed in FM's "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

C. Clean metal deck and accessories of dust, grease, oils, loose materials, and any other material that impairs the adhesion of insulation and accessories, sprayed-on fireproofing, and the adhesion of concrete.

1.7 COORDINATION

A. Make installed deck finished surface compatible with requirements of sprayed-on deck fireproofing material.

B. Coordinate with General Contractor or Construction Manager for limiting access to roof deck as required for sprayed-on fireproofing to cure and adhere to the underside of deck.

C. General Contractor or Construction Manager to coordinate installation of shoring if and as required by single span conditions indicated on the deck shop drawings.

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:

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

1. Steel Deck:

a. BHP Steel Building Products USA Inc.
b. Consolidated Systems, Inc.
c. Epic Metals Corp.
d. Marlyn Steel Products, Inc.
e. Nucor Corp.; Vulcraft Div.
f. Roof Deck, Inc.
g. United Steel Deck, Inc.
h. Verco Manufacturing Co.
i. Wheeling Corrugating Co.; Div. of Wheeling-Pittsburgh Steel Corp.

C. Uncoated Thickness: Conform to SDI Specifications for minimum thickness for the gauge specified.

2.2 ROOF DECK

A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 29, and the following:

1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 33, G90 zinc coating.

2. Deck Profile: Type WR, wide rib.

3. Profile Depth: 1-1/2 inches.

4. Design Uncoated-Steel Thickness: As indicated.

5. Span Condition: Double span or more.

6. Side Laps: Overlapped.

2.3 COMPOSITE FLOOR DECK

A. Composite Steel Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 29, the minimum section properties indicated, and the following:

1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 33, G60 zinc coating.

2. Profile Depth: As indicated.

3. Design Uncoated-Steel Thickness: As indicated.

4. Span Condition: Double span or more.

2.4 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated. Design and provide galvanized sheet steel closures and cover plates as required at columns, to close panels, and at conditions where panels change direction, abut or end; including perimeters of all stair openings mechanical openings, slab depressions, and other areas where edge forms are required. Provide miscellaneous light angles to support closures wherever required.

B. Mechanical Fasteners: Corrosion-resistant, self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, minimum diameter as indicated.

D. Roof Deck Side-Lap Fasteners: Sizes as indicated.

1. Dril-Flex by Elco Industries.

2. Kwik-flex by Hilti.

3. Approved fastener with same or greater strength, toughness, resistance to embrittlement, and durability.

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. Steel Sheet Accessories: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

G. 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] [recommended by SDI Publication No. 29 for overhang and slab depth].

H. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

I. Non-Piercing Hanger Tabs: Provide integral hanger tabs where indicated.

J. Weld Washers: As required by SDI criteria for puddle weld deck fastening. Uncoated steel sheet, shaped to fit deck rib, with factory-punched hole of 3/8-inch minimum diameter.

K. Recessed Sump Pans: Single-piece steel sheet, 14 gauge minimum thickness, 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.

L. Shear Connectors: ASTM A108, Grades 1010 through 1020 headed stud type, cold-finished carbon steel, AWS D1.1, Type B, with arc shields. Length and diameter as indicated. Head dimensions to comply with AISC Specifications. Provide arch shields specifically designed for welding through hot dipped galvanized metal deck of the type specified.

1. Nelson Stud Welding Company Type S3L with Nelson welding process.

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

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.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to manufacturer's approved shop drawings, applicable specifications and commentary in SDI Publication No. 29, manufacturer's written instructions, and requirements in this Section.

B. Install temporary shoring before placing deck panels, if indicated on the shop drawings for single span conditions or if required to meet deflection limitations.

C. Locate decking 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.

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 decking.

G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking, 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. Field Welding: Perform field welding with prequalified personnel executing prequalified procedures referenced in "Quality Assurance" Section.

3.3 ROOF DECK INSTALLATION

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, but not less than 1-1/2 inches (38 mm) long, and as follows:

1. Weld Diameter: 5/8 inch, nominal.

2. Weld Spacing: Space welds as indicated.

3. Weld Washers: Install weld washers at each weld location as required.

4. Side-Lap and Perimeter Edge Fastening: As indicated.

B. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches on steel and 2 inches on concrete, with end joints as follows:

1. End Joints: Lapped 2 inches minimum or butted at Contractor's option.

C. Roof Sump Pans and Sump Plates: Install over openings provided in roof decking and weld flanges to top of deck. Space welds not more than 12 inches apart with at least 1 weld at each corner.

D. Miscellaneous Roof Deck Accessories: Install ridge and valley plates, finish strips, cover plates, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.

3.4 FLOOR DECK INSTALLATION

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: Space and locate welds as indicated.

3. Weld Washers: Install weld washers at each weld location as required.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels as indicated, 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 on steel and 2 inches on concrete, with end joints as follows:

1. End Joints: Butted.

D. Shear Connectors: Weld shear connectors through deck to supporting frame according to AWS D1.1 and manufacturer's written instructions. Butt end joints of deck panels; do not overlap. Remove and discard arc shields and related debris after welding shear connectors.

E. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.

F. Floor Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of decking. Weld cover plates at changes in direction of floor deck panels, unless otherwise indicated.

3.5 FIELD QUALITY CONTROL

A. The Owner will employ an independent Testing Agency to perform special inspections and testing, and to submit full reports of each inspection and test conducted. The Contractor will provide access to the Testing Agency, as required. Inspections and tests by the Testing Agency will not relieve the Contractor of responsibility for supervision and quality control of the Work.

B. Field welds will be subject to inspection.

C. Shear connector stud welds will be inspected and tested according to AWS D1.1 for stud welding and as follows:

1. Shear connector stud welds will be visually inspected.

2. Bend tests will be performed if visual inspections reveal less than a full 360-degree flash or welding repairs to any shear connector stud.

3. Tests will be conducted on additional shear connector studs if weld fracture occurs on shear connector studs already tested according to AWS D1.1.

D. Testing agency will report test results promptly and in writing to Contractor and Architect.

E. Remove and replace work that does not comply with specified requirements.

F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05300

SECTION 05400 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Design and provide metal studs, built-up posts and mullions, and accessories for exterior walls.

1.2 REFERENCE

A. *The BOCA® National Building Code/1999,* Fourteenth Edition, referred to herein as "BOCA 99".

1.3 DESIGN REQUIREMENTS

A. Engineering and Design: Provide the services of a Professional Engineer, registered in the State of Maine to design, engineer, and certify that the work of this section meets or exceeds the requirements specified in this section. The Engineer shall assume professional responsibility for the design of all light gage framing components and their connections. Design decisions which effect visual characteristics shall be subject to the approval and modifications of the Architect.

B. Loads: Design light gage metal framing and connections to support total loads including dead loads, live loads, earthquake loads, thermal loads, wind loads and other loads as prescribed by the governing building code by reference standards, and as described herein.

1. Pressures and loads used for design shall satisfy the building code, but shall not be less than the minimum values specified below. Where permitted by code, the sum of the dead load, live load, and wind (or earthquake) load may be multiplied by an allowable reduction factor. Other load combinations, and single loads, shall not to be reduced. An allowable stress increase of one third, or any other value, shall not be used in conjunction with a reduced load combination.
2. Wind pressures shall be assumed to act perpendicular to flat surfaces supported by light gage metal framing, regardless of the surface orientation. Wind pressures shall be assumed to act perpendicular to tangents of curved surfaces. At corners and other changes in plane, both surfaces shall be assumed to experience their inward design pressures simultaneously, and their outward design pressures simultaneously. Design for simultaneous occurrence of inward design pressure on one surface, and outward design pressure on the adjoining surface, is not required.
3. Light gage metal framing must also carry dead, wind and earthquake loads and live loads from work specified in other sections supported by light gage metal framing.
4. Wind loads to be used are based on the applicable Building Code and are as follows:
   a. Outside Salient Corners (form corner through first 13'-6"): 70 psf.

b. Inside Salient Corners (from 13'-6" of corner through 26'-6" inside of corner): 50 psf.
c. Field Area : minimum 35 psf.

5. Seismic loads shall be based on the seismic provisions contained BOCA 99

C. Allowable Connection Points: Connect light gage metal framing to building structure only at locations approved by building structural engineer and as indicated on the approved shop drawings.

D. Provide movable joints to accommodate the full range of manufacturing tolerances, field tolerances, thermal movement, wind and seismic movement, floor and beam deflections and column settlement. Joints shall accommodate the worst possible combination of effects so as to prevent internal stress, failure, deterioration or failure of weather seals.

1.4 PERFORMANCE REQUIREMENTS

A. Steel framing used to support brick or stone shall be based on wind pressure designated above for Design Requirements with allowable deflection of L/600. Stud spacing shall be 16 inches maximum on center.

B. Steel framing used to support metal panel system shall be based on governing building code wind pressure designated above for Design Requirements, with allowable deflection L/360. Stud spacing shall be 16 inches maximum on center.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
1. Marino / Ware, South Plainfield, NJ 07080 (800) 627-4661.
2. Dietrich Industries, Hammond, IN 46320 (800) 873-2443.
3. Superior Steel Studs, Inc., Astoria, NY 11102 (718) 545-7500.

B. Products: Studs shall be based on:
1. Marino Type SW
2. Dietrich Type CSJ
3. Superior Type SSJ

C. Studs, runners (track), bracing and bridging shall be manufactured per ASTM Specification C-955.
1. Stud gage: As required by design criteria, but minimum 18 gage.
2. Track gage: As required by design criteria, but minimum 18 gage.
3. Bridging gage: As required by design criteria, but minimum 16 gage. (Dietrich "U" channel, or equal.)

4. Provide 2 inches minimum deep leg deflection (slip) tracks at top of exterior wall framing. Gage shall be as required by design, but minimum of 16 gage.

D. All galvanized studs and accessories, 16 gage or heavier, shall be formed from steel that conforms to the requirements of ASTM A-446 with a yield of 50 ksi and as set forth in Section A3.1 of the AISI "Specification for the Design of Cold-formed Steel Structural Members", latest edition.

E. All galvanized studs and accessories, 18ga., shall be formed from steel that conforms to the requirements of ASTM A-446, with a yield of 33 ksi and as set forth in Section A3.1 of the AISI "Specification for the Design of Cold-formed Steel Structural Members", latest edition.

F. All galvanized studs and accessories shall have a minimum G-60 coating.

G. Physical properties and allowable load capabilities of members shall be developed in accordance with AISI "Specification for the Design of Cold-formed Steel Structural Members", latest edition.

H. In accordance with AISI Section D4, rigid collateral facing materials may be considered as adequate support of members against rotation.

I. Provide color coding or other marking designation to distinguish the installation of various gages of studs. Markings shall be applied along the full length of the member.

END OF SECTION 05400

SECTION 05450 - METAL SUPPORT SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish all material, labor and equipment to complete the installation of manufactured metal support framing system(s) as shown on the Drawings and herein specified. Installation shall include all related materials, fittings, fasteners, accessories and other devices for secure anchorage of framing system to building structure and support of the Owner furnished medical equipment.

1.2 QUALITY ASSURANCE

A. Installer's Qualifications: Installer must be a manufacturer's authorized representative/installer with not less than 5 years experience in the installation of strut systems, and shall demonstrate experience of projects of similar scope and size.

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 for metal support systems of the kind indicated.

C. Source Limitations: All strut system components shall be supplied by a single manufacturer. All materials shall be stamped and identifiable by manufacturer and part number (where appropriate).

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Acceptable Manufacturer: Metal framing support systems shall be as manufactured by Unistrut Corporation, Wayne, Michigan. No other manufacturers will be accepted.

2.2 COMPONENTS

A. Channel: Manufacturer's standard channels with flange edges returned toward web and as follows:

1. Style:
   a. Perforated with 9/16-inch diameter holes @ 1-7/8-inch o.c.
2. Width of Channels: 1-5/8-inches
3. Depth of Channels: 1-5/8-inches, unless otherwise noted or detailed.

4. Material: Hot-dipped galvanized steel complying with ASTM A653.
5. Thickness**12-gage**

B. Concrete Inserts: Provide Heavy-Duty channel inserts with welded lugs for installation under Section 03300, Cast-In-Place Concrete. Fabricated from hot-dipped galvanized steel conforming to ASTM A123 or A153. Include foam filler, or end caps and closure strips as required.

C. Fittings: Fabricated from hot-rolled steel plate, strip or coil, conforming to ASTM A575, A576, A36 or A635. Fittings shall have sufficient capacity to resist and/or transfer full design loadings imposed on them by the connected members.

1. Finish: Match finish of channel framing members.

D. Nuts, Bolts and Washers: Nuts fabricated from hot-rolled steel bar, ASTM A576; Screws, ASTM A307; Threaded Rod fabricated from hot-rolled carbon steel, ASTM A36, A575 or A576.

1. Finish: Electro-galvanized per ASTM B633, Type III SC1.

E. Wedge Type Expansion Anchors: Threaded stud bolt body with Type 18-8 stainless steel split expansion ring. Anchor body fabricated of carbon steel, zinc-plated to comply with ASTM B633, Class Fe/Zn5. Redhead "WS-G Series Trubolt" anchors as manufactured by ITW Ramset/Redhead.

F. Closure Strips: Manufacturer's standard, black plastic, snap-in closure strips in 10 ft. lengths.

2.3 FINISHES

A. Metal support system components shall be finished in accordance with the following standards:

1. Galvanized:
   a. Pregalvanized: Zinc coated by hot-dipped process prior to roll forming, conforming to ASTM A653, G90.
   b. Hot-dipped Galvanized: Zinc coated after manufacturing, conforming to ASTM A123 for steel products or A153 for steel hardware.

2.4 SUPPORT SYSTEM DESIGN

A. Design: The support structure shall be design to support a concentrated load at any point along the exposed rails, as exerted by the equipment to be purchased by the Owner along with the weights of the structure itself and any ceiling finishes attached to it. The concentrated load shall be the maximum that will be encountered by positioning the individual pieces of equipment at their extremities of travel, and/or in combination with each other to produce the maximum load configuration possible.

1. Base loads on the most severe conditions as may be encountered by any of the manufacturers producing equipment of the type of services of the rooms indicated.
2. Safety Factor: The system shall be designed with a minimum safety factor of 2.5 based on ultimate strength under static loading conditions.
3. Seismic Bracing: Medical system support framing system shall be adequately braced to meet all code requirements.
4. Deflection: No more than $1/720^{th}$ of the span maximum deflection in either plane, when maximum loading conditions are applied due to equipment operations.

END OF SECTION 05450

SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide miscellaneous metal work shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

1. Steel access ladders
2. Loose steel lintels
3. Support angles for elevator door sills
4. Elevator hoistway beams
5. Steel framing and support for operable walls
6. Steel framing and support for ceiling hung toilet partitions
7. Steel framing and support for mechanical and electrical equipment.
8. Equipment supports
9. Steel brackets for countertop support
10. Nosings
11. Mechanical room and areaway gratings including support frames
12. Floor plates and covers
13. Pipe bollards
14. Decorative exterior metal rails.
15. Miscellaneous framing and supports

B. Furnish anchor bolts, inserts and pipe sleeves required to attach items to concrete. For installation, refer to Section 03300 - Cast-In-Place Concrete.

PART 2 - PRODUCTS

2.1 MATERIALS

A. In fabricating items which will be exposed to view, limit materials to those which are free from surface blemishes, pitting, rolled trade names, and roughness. Fabricate work with uniform, hairline tight joints. Form welded joints and seams continuously and grind flush and smooth to be invisible after painting. For exposed fasteners, use hex head bolts or Phillips head machine screws.

B. Comply with the following standards, as pertinent:

1. Steel plates, shapes, and bars: ASTM A36.
2. Steel plates to be bent or cold-formed: ASTM A283, grade C.
3. Steel tubing (hot-formed, welded, or seamless): ASTM A501.
4. Steel bars and bar-size shapes: ASTM A306, grade 65, or ASTM A36.

5. Cold-finished steel bars: ASTM A108.
6. Cold-rolled carbon steel sheets: ASTM A336.
7. Galvanized carbon steel sheets: ASTM A526, with G90 zinc coating in accordance with ASTM A525.
8. Stainless steel sheets: AISI type 302 or 304, 24- gage, with number 4 finish.
9. Aluminum: Provide alloy and temper recommended by aluminum producer or finisher for the type of use and finish indicated
   a. Extruded bar and shapes: ASTM B 221, 6063-T6.
   b. Extruded pipe and tube: ASTM B 429, 6063-T6.
   c. Drawn Seamless tube: ASTM B 483, 6063-T832.
   d. Plate and sheet: ASTM B209, 6063-T6.
10. Gray iron castings: ASTM A48, class 10.
11. Malleable iron castings: ASTM A47.
12. Steel pipe: ASTM A53, grade A, schedule 40, black finish unless otherwise noted.
13. Threaded Rod: ASTM A-307, Grade C.

C. Fasteners: Provide fasteners of type, grade, and class required for the particular use. Comply with the following standards as pertinent.

1. Bolts and nuts: Provide hexagon-head regular type complying with ASTM A307, grade A.
2. Lag bolts: Provide square-head type complying with Federal Spec FF-B-561.
3. Machine screws: Provide cadmium plated steel type complying with Federal Spec FF-S-92B.
4. Wood screws: Flat head, zinc-plated steel complying with Federal Spec FF-S-111D.
5. Washers: Plain washers -- comply with Federal Spec FF-W-92, round, carbon steel; lock washers --comply with Federal Spec FF-W-84, helical spring type carbon steel.
6. Toggle bolts: Provide type, class, and style needed but complying with Federal Spec FF-B-588.
7. Anchorage devices: Provide expansion shields complying with Federal Spec FF-S-325.

D. Shop paint shall be Modified Alkyd primer equal to Tnemec No. 10-99G Green Metal Primer, Dupont 681 FD Primer, or Architect approved substitute.

1. All steel members, except galvanized items, after they are prepared, shall be prime painted before shipping. All surfaces shall be prime painted, except machined surfaces, surfaces which are to be welded and surfaces to be encased in concrete. Primer Paint shall be applied thoroughly and evenly on the surfaces and worked into the joints and other open surfaces. Surfaces inaccessible after assembly shall be given two coats. Dry film thickness per coat of prime paint shall be not less than 2.4 mils.
2. On surfaces inaccessible after assembly or erection, apply two coats of the specified primer. Change color of second coat to distinguish it from the first.

E. Galvanizing: Materials indicated to be galvanized shall be hot dipped galvanized after fabrication in a bath of molten zinc containing .05 to .09 % nickel, NiGalv by Duncan Galvanizing, or equal. Galvanizing shall be inspected for compliance with ASTM A-123 and A-153 as applicable and shall be marked with a stamp that indicates the ASTM number and the

weight in ounces of zinc coating per square foot. A notarized certificate of compliance shall be required from the galvanizer.

F. Repairing Damaged Hot Dip Galvanized Coatings: Thoroughly wire brush all damaged areas down to base metal. Apply two coats, each to a dry film thickness of 4.0 mils, of a one package 95% zinc rich paint to all damaged areas.

2.2 HIGH PERFORMANCE PAINT SYSTEM

A. Provide shop applied high performance paint system on all galvanized metal fabrications indicated to receive "high performance paint system".

B. Surface preparation shall be in accordance with "Steel Structures Painting Council Surface Preparation No. 7 Brush-Off Blast Cleaning".

C. Shop paint shall be an intermediate coat of Epoxy and top coat of Acrylic Polyurethane as follows:

1. Epoxy Intermediate Coat: Epoxy polyamide; Tnemec 27 FC TyPoxy or Dupont 25P. Dry film thickness shall be 4-6 mils.
2. Polyurethane Top Coat: Applied over epoxy intermediate coat; Acrylic Polyurethane Enamel; Tnemec Series 74 Endura Shield III or Dupont Imron 333. Dry film thickness shall be 2.0 mils. Color shall be as selected by Architect.

D. Epoxy intermediate coat and polyurethane top coat shall be applied over properly prepared primed surfaces as follows:

1. All epoxy and polyurethane coatings must be applied under conditions within the following tolerances:
   a. Air temperature: 50°F min., 90°F max.
   b. Surface Temperature: 50°F min., 100°F max.
   c. Humidity: 65% max.
2. Surfaces must be dry and free from dirt, dust, oil, grease and other contaminants.
3. Environments shall be kept free of airborne dust and dirt until paint is dry.
4. Apply epoxy intermediate coat within twelve (12) hours of completion of SSPC-SP7 Brush-Off Blast Cleaning.

E. Furnish to the Architect a certificate attesting that the coating has been applied in full compliance with all the requirements of this specification.

F. Touch-up high performance paint system, in accordance with above specifications, on any surfaces that are damaged or abraded due to handling, transport, installation, welding or other circumstances.

2.3 FABRICATION

A. Except as otherwise shown on the Drawings or the approved Shop Drawings, use materials of size, thickness, and type required to produce reasonable strength and durability in the work of this Section.

B. Fabricate with accurate angles and surfaces which are true to the required lines and levels. Form exposed connections with hairline joints, using concealed fasteners wherever possible.

C. Shear and punch metals cleanly and accurately. Remove all burrs. Ease exposed edges to a radius of approximately 1/32-inch, unless otherwise indicated. 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.

D. Prior to shop painting or priming, properly clean metal surfaces as required for the applied finish and for the proposed use of the item.

E. On surfaces inaccessible after assembly or erection, apply two coats of the specified primer. Change color of second coat to distinguish it from the first.

F. Supports:

1. Supports for TV hangers, I.V. track, cubicle curtain track and folding doors shall be as detailed on the plans.
2. Provide supports for stills, reservoirs and carboy at locations shown on the plans as required by equipment manufacturer.

G. Operable Wall Support:

1. Operable Wall Support Fabrication: Fabricate support system to carry the entire load of moveable walls and folding doors to the structure above without transferring any horizontal or vertical load to ceiling system. Provide frequently spaced holes for multiple adjustment. Provide diagonal braces. Unistrut type members are acceptable.

H. Ladders:

1. Ladders, unless otherwise noted, shall be 3" x 3/8" solid section continuous slide rails, 16" apart with 3/4" diameter solid steel bar rungs spaced 12" on centers with ends shouldered into side rails. Exterior ladders shall be galvanized. Ladders for elevators shall comply with the ANSI. A17.1-1971 Code or local code whichever is more stringent.
2. Provide extended side rails at least 42" above top rung and return to wall or structure. Securely anchor each ladder siderail with clip angles at top, bottom and intermediate points spaced not more than 5'-0" on center. Provide 7" clearance from walls to centerline of rungs.
3. Fit rungs in holes drilled in side rails. Weld and grind smooth to touch. Provide rungs with non-slip top surface.
4. Provide ladder safety cage complying with OSHA 1910.27(d)(1). Fabricate hoops from 3" x 3/8" steel flat bar spaced 4'-0" on center, and vertical bars of 2" x 3/8" steel flat bars spaced as indicated. Assemble and fasten safety cage to ladder rails by welding.

I. Elevator Sill Support:

1. Furnish and install steel angle sub sills for support of aluminum elevator sills at floor landings.
2. Fabricate angles to suit conditions. Provide straps for anchoring angles into concrete

J. Grating:

1. Grating shall be manufactured by Borden Metal Products Company, Reliance Steel Products Company, Irving Subway Grating Company or as approved equal. Grating shall be all welded construction with perimeter steel support framing.
2. Grating shall be similar to Borden Type W/B welded with 1" x 1/8" bearing bars and 5/8" x 1/8" cross bars, except as indicated otherwise on the drawings.
3. Where indicated, provide continuous steel angle frame for support of grating. Secure angle frame with anchors spaced maximum 1'-4" on centers.
4. Secure grating to angle frame with Borden Type F-9 clips with stud bolts welded to angle frame.

K. Loose Lintels:

1. Furnish loose steel lintel angles for openings in exterior and interior masonry walls for installation under the work of Sections 04210 and 04220.
2. See drawings for extent of relieving angles. Provide 1/8 inch spacing between lengths of relieving angles. Fabricate lintels for openings and recesses in walls and partitions where shown and elsewhere as needed. Provide at least 8" bearing at each end, unless otherwise shown. Weld together individual members of composite lintels made up of more than one member.
3. Lintel Schedule: Lintels shall be in accordance with the following schedule as indicated on the Structural Drawings.
4. Hot-dip galvanize loose steel lintels to be installed in exterior walls.

L. Pipe Bollards:

1. Fabricate to length indicated from extra strong pipe, nominal 8-inch diameter with wall thickness of .500 inches, shop primed.
2. Install as detailed. Concrete fill included under the work of Section 03010, Concrete.

M. Steel Brackets:

1. For use with casework shall be as detailed on the drawings, of welded "tee" construction with mitered joints and all welds ground smooth and polished to matching finish.

2.4 OTHER MATERIALS

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

B. Grout: Pre-mixed, non-staining, non-corrosive, non-shrink, non-metallic cement based grout complying with ASTM C1107 "Standard Specification for Packaged Dry Hydraulic Grout - Non Shrink"; Five Star Grout or Architect approved substitute.

END OF SECTION 05500

SECTION 05511 - METAL STAIRS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Steel framed stairs with concrete-filled treads.
2. Handrails railings and guardrail systems.
3. Handrails attached to walls adjacent to metal stairs.
4. Stair gates at level of exit discharge.

1.2 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm experienced in engineering and producing steel fabrications similar to those indicated for this Project with a record of successful in-service performance and with sufficient production capacity to produce required units without delaying the Work.

B. Structural Performance Requirements: Engineer, fabricate, and install steel stairs, and railing systems to withstand 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 steel stairs.

1. Stairs: Capable of withstanding a uniform load of not less than 100 lbf per sq. ft. or a concentrated load of 300 lbf. with deflection of stringer not to exceed 1/360 of span.
2. Railings: Capable of withstanding uniform load of not less than 50 lbf per linear foot applied horizontally and concurrently with uniform load of 100 lbf per linear foot applied vertically downward or a concentrated load of 200 lbf applied at any point and in any direction.

PART 2 - PRODUCTS

2.1 STEEL-FRAMED STAIRS

A. General: Construct stairs to conform to sizes and arrangements indicated. Join pieces together by welding, unless otherwise indicated. Provide complete assemblies, including metal framing, hangers, handrails, railing systems, balusters, struts, clips, brackets, bearing plates, or other components necessary for support, and as required to anchor on the supporting structure.

1. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM "Metal Stair Manual" for Commercial class, except where more stringent requirements are indicated

B. Framing: Fabricate stringers of structural steel channels, tubing, plates, or a combination thereof. Provide closures for exposed ends of stringers. Construct platforms of structural steel channel headers and miscellaneous framing members. Bolt or weld headers to stringers; and bolt or weld newels and framing members to stringers and headers.

C. Metal Pan Risers, Subtreads, and Subplatforms: Shape metal pans for risers and subtreads to conform to configuration shown. Provide thicknesses of structural steel sheet for metal pans for concrete fill and to support total design loading.

2.2 STEEL TUBE HANDRAILS AND RAILINGS

A. Fabricate railing systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including post spacings, and anchorage, but not less than that required to support structural loads.

B. Interconnect railing and handrail members by welding. Cope ends of intersecting members, form simple and compound curves by bending pipe in jigs to produce uniform curvature and provide wall returns at ends of wall-mounted handrails.

C. Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for attachment of handrails and railing systems to other work. Connect railing posts to stair framing by direct welding.

1. Manufacturer: R & B Wagner, Inc., Butler, WI 53007 (414) 461-2111 (800-786-2111), or as approved equal.
2. Type: Type P-3 malleable bracket with Style F-3 , with anchor plate, (1) 7/16 inch diameter hole and (3) 1/4 inch diameter tapped holes with 1/4 inch round head bolts. Dimension from wall to pipe centerline, 2-1/2 inches, unless indicated otherwise.

2.3 STAIR GATE

A. Fabricate and install as detailed on the drawings. Wire mesh shall be No. 10W & M gage. Provide hinges, latch (operable from both sides) and all appurtenances required for a complete installation.

2.4 FINISH

A. Apply shop primer to uncoated surfaces, except those to be embedded in concrete. Comply with requirements of SSPC-PA 1 "Paint Application Specification No. 1" for shop painting. Surfaces encased in concrete shall receive a coating of bituminous paint. Paint shall be applied thoroughly and evenly on the surfaces and worked into the joints and other open surfaces.

Surfaces inaccessible after assembly shall be given two coats. Dry film thickness per coat of prime paint shall be not less than 2.4 mils

END OF SECTION 05511

SECTION 05800 - EXPANSION CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Work Included The work of this section shall include, but not be limited to, the following:

1. Floor expansion joint cover assemblies.
2. Wall/ceiling expansion joint cover assemblies.
3. Exterior expansion joint seals.
4. Roof expansion joint assemblies.
5. Fire barrier systems:
   a. Behind expansion joint cover assemblies as required to provide fire-rated expansion joint system.
   b. At expansion joints in chase walls where cover assemblies are not required, but continuous fire barrier is required to ensure fire-rated joint.

1.2 QUALITY ASSURANCE

A. Fire Performance Characteristics - Where indicated, provides expansion joint cover assemblies identical to those of assemblies whose fire resistance has been determined per ANSI/UL 263, NFPA 251, U.B.C. 43-1, or ASTM E 119 and E 814 including hose stream test at full-rated period by Underwriter Laboratories, Inc.

1. Fire Rating - Not less than the rating of adjacent construction.

B. Loading Characteristics

1. Standard floor covers should be designed to withstand a minimum point load of 500 lbs. without damage or permanent deformation.
2. Heavy-duty covers should withstand a point load of 2,000 lbs.

C. Single-Source Responsibility - Obtain expansion joint cover assemblies from one source from a single manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Expansion joint cover assemblies specified herein and indicated on the drawings shall be manufactured by Construction Specialties, Inc, Muncy, PA, (800) 233-8493.

2.2 FABRICATION

A. Provide expansion joint cover assemblies of design, basic profile, materials, and operation indicated. Select units comparable to those indicated or required to accommodate joint size, variations in adjacent surfaces, and structural movement. Furnish units in longest practicable lengths to minimize number of end joints. Provide hairline mitered corners where joint changes directions or abuts other materials. Include closure materials and transition pieces, tee-joints, corner, curbs, cross-connections, and other accessories as required to provide continuous joint cover assemblies.

2.3 SEISMIC JOINT ASSEMBLIES

A. Seismic Floor-To-Floor Cover: SGR- HD Series

1. Provide with heavy-duty aluminum center plate: 1/4 inch thick.

B. Seismic Wall-To-Wall Cover: SFW- Series

C. Seismic Ceiling Cover: FWF- Series

2.4 EXTERIOR SEISMIC EXPANSION JOINT ASSEMBLIES

A. Seismic Cover Assembly For Exterior Wall-To-Wall: ESW- Series

B. Seismic Cover Assembly For Wall-To-Corner Joints: ESC- Series

2.5 ROOF EXPANSION JOINT ASSEMBLIES (SEISMIC)

A. Cover Assembly for Exterior Roof-to-Roof Joints: SRJ – Series

2.6 FIRE BARRIER SYSTEM

A. Construction Specialties Model FB-97.

B. Testing Requirements:

1. Prefabricated fire barrier assemblies tested in accordance with ANSI/UL 2079 for two-hour certification, unless otherwise detailed and in compliance with ASTM E1399 and NFPA #251 procedures. Material to carry UL label and be subject to Underwriters Laboratories follow-up system for quality assurance.

C. For joint widths up to and including 24 inches, the barrier shall be supplied in maximum lengths to eliminate field splicing. Fire barrier to consist of intumescent blankets layered to provide a heat shield and to accommodate the dynamic movement of expansion/seismic joint assembly.

2.1 FINISHES

D. Metal Finishes

1. Comply with NAAM "Metal Finishes Manual" for finish designations and application recommendations, except as otherwise indicated. Apply finishes in factory after products are fabricated. Protect finishes on exposed surfaces with protective covering before shipment.

E. Aluminum Finishes

1. Clear Anodized Finish - AA-C22A41; medium matte etched finish with 0.7 mil minimum thick anodic coating.

END OF SECTION 05800

SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide wood, nails, bolts, screws, framing anchors and other rough hardware, and other items needed, and perform rough carpentry for the construction shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Furnish and install wood furring.

C. Furnish and install blocking for:

1. Cubicle curtain track.
2. Toilet accessories furnished by other Sections.
3. Wood blocking in conjunction with drywall partitions.
4. At heads of exterior windows and aluminum storefront for the installation of window treatment which includes, but is not limited to window blinds and window draperies.
5. Other locations where wood blocking is indicated on the Drawings.

D. Furnish and install all wood nailers in connection with roofing work.

E. Furnish and install wood blocking and plywood for TV wall brackets.

F. Furnish and install wood spreaders at bottoms of door openings of steel door frames.

PART 2 - PRODUCTS

2.1 GRADES OF LUMBER AND SPECIES

Grounds for plaster work	Redwood B and better
Wood bucks, blocking	Eastern Spruce No. 2 common; Southern Pine No. 2 common; Douglas Fir No. 2 common
Plywood substools	APA Rated Underlayment; Group 1, Exposure 1; 3/4 inch thickness, unless otherwise noted
Plywood panels for electrical and telecommunications panels	APA Graded BD INT, (touch sanded), 3/4 inch thick
Exterior plywood sheathing for parapet walls, plywood risers for wood stairs	APA Rated Sheathing, 32/16, Exposure 1

Plywood for TV wall bracket	APA Rated B-D, Group 2, Exposure 1, thickness as required

2.2 MATERIALS

A. Wood Preservative

1. General: Where lumber or plywood is indicated as preservative treated or is specified to be treated, comply with applicable requirements of AWPA C2 (lumber) and AWPA C9 (plywood). Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.
2. Pressure treat aboveground items with waterborne preservatives to a minimum retention of 0.25 lb./cu. ft. After treatment, kiln-dry lumber and plywood to a maximum moisture content of 19 and 15 percent, respectively. Treat indicated items and the following:
   a. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
   b. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
   c. Wood framing members less than 18 inches above grade.
   d. Wood floor plates installed over concrete slabs directly in contact with earth.
3. Complete fabrication of treated items before treatment, where possible. If cut after treatment, apply field treatment complying with AWPA M4 to cut surfaces. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

B. Fire-Retardant – Treated Materials

1. General: Provide fire-retardant-treated wood for all interior wood blocking, furring, framing and elsewhere that fire retardant treatment is indicated on Contract Drawings. Comply with applicable requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL; U.S. Testing; Timber Products Inspection, Inc.; or another testing and inspecting agency acceptable to authorities having jurisdiction.
   a. Inspect each piece of treated lumber or plywood after drying and discard damaged or defective pieces.
2. Manufacturers:
   a. Fire-Retardant-Treated Materials, Interior:
      1) Baxter: J. H. Baxter Co.
      2) Chemical Specialties, Inc.
      3) Continental Wood Preservers, Inc.
      4) Hickson Corp.
      5) Hoover Treated Wood Products, Inc.
   b. Fire-Retardant-Treated Materials, Exterior:
      1) American Wood Treaters, Inc.
      2) Hoover Treated Wood Products, Inc.
3. Interior: For interior locations, use chemical formulation that produces treated lumber and plywood with the following properties under conditions present after installation:

a. Bending strength, stiffness, and fastener-holding capacities are not reduced below values published by manufacturer of chemical formulation under elevated temperature and humidity conditions simulating installed conditions when tested by a qualified independent testing agency.
b. No form of degradation occurs due to acid hydrolysis or other causes related to treatment.
c. Contact with treated wood does not promote corrosion of metal fasteners.

4. Exterior: Use for exterior locations and where indicated.

C. Rough hardware:

1. General: Furnish and install all rough hardware such as threaded rods for support of curtain cubicle tracks.
2. Steel items: Comply with ASTM A7 or ASTM A36. Use galvanized at exterior locations.
3. Machine bolts: Comply with ASTM A307.
4. Lag bolts: Comply with Fed Spec FF-B-561.
5. Nails: Use common except as otherwise noted. Comply with Fed Spec FF-N-1.

2.3 OTHER MATERIALS

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

PART 3 - EXECUTION

3.1 INSTALLATION – ROOF NAILERS AND BLOCKING

A. General: Provide anchorage for nailers as required for roof and edging to obtain FM Class A/I-120 rating, coordinate requirements with Section 07565- Adhered Membrane Roofing System.

END OF SECTION 06100

SECTION 06200 - FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Interior standing and running trim.
2. Wood handrails.
3. Interior hardwood paneling.
4. Interior wood frames and jambs.
5. Built-in seating units.

1.2 REFERENCES

A. Architectural Woodwork Quality Standards, 7th Edition, published by the Architectural Woodwork Institute, Reston Virginia.

1.3 QUALITY ASSURANCE

A. Mock-ups:

1. At location determined by the Architect provide a full height (floor to ceiling) mock-up of one vertical section of hardwood panel system.

PART 2 - PRODUCTS

2.1 INTERIOR STANDING AND RUNNING TRIM, RAILINGS, AND RELATED ITEMS

A. Interior trim, railings, and related items shall be of solid stock matching wood, Premium grade, according to the Seventh Edition of Architectural Woodwork Institute Quality Standards, unless otherwise specified,. All stock shall be free of wormholes, brash grain, checks or shakes.

A. Wood species and grade for transparent finish:

1. Hardwood - Select White Maple, Plain Sawn, Grade I.

B. Wood species and grade for opaque finish: Yellow Poplar, Southern Yellow Pine, Plain Sawn, Grade II.

C. Moisture Content: 6-8 percent.

2.2 PANELWORK

A. Panelwork shall conform to the Architectural Woodwork Quality Standards and Guide Specification, premium grade, according to the Seventh Edition of Architectural Woodwork Institute Quality Standards; for transparent finish, and to the design and details shown. Work shall be finished smooth and free from machine or tool marks that will show through the finish. All nail heads shall be set to receive putty.

B. Veneered Hardwood Panels: A.W.I. Premium Grade, Quarter Sliced, White Maple, Grade AA for transparent finish. Veneers shall be 1/24 inch thick or less. Cores shall be fire retardant (Class A - with flame spread rating of 0 - 25) particle board with matching hardwood edge banding on exposed edges

1. Moisture Content: 6-8 percent.
2. Matching Between Adjacent Veneer Leaves: Slip matching.
3. Matching Within Individual Panels: Balance match.
   a. Wood grain applied vertically to panel core.
4. Matching of Panels Within an Area: Sequence matched uniform size set and numbered.
5. Panel veneers shall be book matched with wood grain applied vertically to panel cores.
6. Panel Joints: As detailed on the Drawings.

C. Install panels with articulated joints between panels, and at outside and inside corners. Install panels using SeriesMF 625 Panel "Z" Clips manufactured by Monarch Metal Fabrication, Inc., Bohemia, New York; (631) 563-8967.

2.3 INTERIOR DOOR AND SIDELIGHT FRAMES

A. Frames, complete with casings, fabricated from solid wood. Connect jambs, heads and sills with dadoes or rabbeted joints. Route frames as required for glazing requirements. Attach glazing beads loosely to framing members for installation of glass under the work of Section 08800 - Glazing

1. Comply with AWI Section 900B, Premium Grade.
2. Species: White Maple.

2.4 BUILT-IN SEATING

A. Fabricate complete with upholstered back and seat cushions as indicated and detailed on the Drawings.

1. Comply with AWI Section 400 for wood veneer cabinets, Premium Grade.
2. Wood Species: White Maple.
3. Fabric:

4. Foam: Molded high-density polyurethane foam padding complying with requirements of Boston Fire Marshall's office and local codes.

2.5 FABRICATION

A. Wood Moisture Content: Comply with requirements of specified inspection agencies and with manufacturer's written recommendations for moisture content of finish carpentry at relative humidity conditions existing during time of fabrication and in installation areas.

B. Back out or kerf backs of the following members, except members with ends exposed in finished work:

1. Interior standing and running trim.

C. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

END OF SECTION 06200

SECTION 06402 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Plastic laminated casework
2. Wood veneered casework.
3. Plastic laminated countertops.
4. Wood countertops.
5. Shop finishing.

1.2 REFERENCES

A. Architectural Woodwork Quality Standards of the Architectural Woodwork Institute (AWI), Seventh Edition, referred to herein as "AWI Quality Standards".

B. ANSI/BHMA A156.9 – Cabinet hardware.

C. NEMA LD3 – High Pressure decorative laminate.

1.3 QUALITY ASSURANCE

A. General

1. Perform all work in accordance with AWI Quality Standards, Section 400 Architectural Cabinets, for Premium Grade and this specification.
2. Casework construction not manufactured in accordance with the above referenced quality standards and these specifications is not acceptable.

B. Qualifications

1. Casework shall be constructed by member firms of the Architectural Woodwork Institute.

C. Field Mockup

1. Prior to start of casework fabrication, provide a cabinet sample(s) as follows:
   a. Complete base cabinet fabricated with high pressure decorative laminate in colors and pattern as directed by the Architect.
   b. Complete base cabinet fabricated with wood veneer as directed by the Architect.
2. Sample shall show full construction of all joints in both casework, laminate and veneer.

PART 2 - PRODUCTS

2.1 GENERAL

A. Casework design shall conform to the flush overlay design as indicated in the AWI Quality Standards. Horizontal and vertical reveals between all doors and drawers shall be 1/8" unless otherwise detail.

B. High pressure laminates shall be adhered to cores with adhesives in such manner that when tested in accordance with the Shear Strength Test set forth in the above mentioned quality standards of the Architectural Woodwork Institute, the shear strength shall be not less than 200 pounds per square inch at room temperature and not less than 15 pounds per square inch at 240 degrees.

C. Identification of Parts:

1. Plastic laminate casework:
   a. All surfaces, exterior or interior, of cabinets and cases exposed to view, and doors and drawer fronts of same shall be veneered with high pressure decorative laminate.
   b. Exposed to view applies equally to tops and bottoms of cabinets and cases, cabinet shelving and interior of cabinets and cases exposed when doors are open.
2. Wood veneer casework:
   a. Conform to requirements of AWI standards, Premium Grade.

D. Backing sheets shall be used on all unexposed cabinet surfaces and on the underside of all countertops.

E. Shop made joints in counter are allowed only when required length exceeds laminate length obtainable. Such a joint shall touch throughout its length and be flush within a tolerance of .005". Joints between adjoining tops which must be field assembled shall be shop prepared with bolt up type fasteners.

F. Apply plastic laminate to core edges prior to application of laminate to faces. Individually cut edges and face laminate material and apply in their final or near final sizes. All edges shall be eased.

G. Provide all cutouts for sinks, fixtures and fittings located in plastic laminate casework. See casework, plumbing, mechanical and electrical drawings.

2.2 MATERIALS

A. Plastic Laminate: High pressure decorative laminate (HPDL) for casework and countertops, conforming to NEMA LD3.1 –,General Purpose: Grade HGS, nominal 0.048-inch thickness.

B. Backing Sheets:

1. Plastic Laminate Clad Casework and Countertops: Provide unfinished plastic laminate balancing (backer) sheet, conforming to NEMA LD3 undecorated laminate, Grade BKL, 0.020-inch nominal thickness.

C. Furnish only laminates by the manufacturers listed herein. Laminates shall be as follows:

1. The Architect reserves the right to select from any of the products listed and designate the locations for their installation.
   a. Wilsonart International, Temple, TX (800) 433-3222.
   b. Nevamar Company LLC, Odenton, MD (800) 638-4380.
   c. Formica Corporation, Cincinnati, OH (800) 367-6422.
   d. ChemMetal, East Hampton, MA (800) 807-7341

D. Cores: All cores shall be of particleboard, except cores for countertops in which sinks are located shall be plywood constructed with veneer core and hardwood veneers, fabricated with Type I waterproof adhesive, suitable for receiving plastic laminate.

1. High Performance Particleboard Core:
   a. Particleboard to be of 47 lb. density, and balanced construction with moisture content not to exceed 8%. All particleboards shall meet or exceed the requirements for general use grade per ANSI A208.1,
   b. Particleboard shall meet the following Performance Requirements. Submit compliance data from the manufacturer prior to fabrication:
      1) Screw Holding, Face: 371 lbs.
      2) Modulus of Rupture: 2,400 psi.
      3) Modulus of Elasticity: 450,000 psi.
      4) Internal Bond: 90 psi.
      5) Surface Hardness: 900 lbs.
      6) In addition, particleboard shall be manufactured with Phenol Formaldehyde resins only (Urea Formaldehyde will not be accepted).
         a) Formaldehyde Emission Levels: Conform with HUD 24 CFR Part 3280 with emission less than 0.3 PPM
2. Plywood Core: EWA C-C Plugged EXT, fir plywood, sanded.

E. Veneered Hardwood Panels: AWI Premium Grade. Cores shall be particleboard or fiberboard with 1/8 inch thick hardwood edge banding on exposed edges. Edge banding shall match veneer face for species, color and finish.

1. Veneer Face Grade: AA.
2. Species: White Maple.
3. Cut: Quarter Cut
4. Matching Between Individual Pieces of Veneer: Slip matched with wood grain applied vertically to panel cores.
5. Assembly of Panel Faces: Center balanced match, with wood grain applied vertically to panel cores, minimum 6 inch widths.
6. Select veneers so that all panels are similar in color and grain.
7. Panels shall be end matched flipped veneer at horizontal joints when panels are stacked.

F. Solid Stock Wood: All solid stock wood exposed to view shall be White Maple, AWI Premium Grade.

G. Glazing: For sliding and framed doors shall be 1/4" tempered glass.

H. Hardware: Shall be as manufactured by Knape and Vogt, Garcy, Stanley Hardware or approved equal.

1. Hinges:
   a. For 1-3/8" thick doors, pivot set Stanley No. 327.
   b. For 3/4" thick core doors concealed type hinges, self-closing by Blum. Hinges shall be all metal, with screw-on type boss for 165 degree opening. Install one pair of hinges for door up to 36": one and half pairs for doors over 36". Finish shall be US26D.
2. Locks: Solid brass, US26D cylinder type pin tumbler. All doors and drawers where indicated on the drawings shall be provided with locks and shall be keyed as directed.
3. Drawer and Door Pulls: Shall be brass, US26D finish, round bar type 4" long with 1-5/16" projection, secured with machine screws from inside.
4. Drawer Slides: Full extension, ball-bearing slides with positive stop and rubber hold-in bumpers, zinc-finish, manufactured by Accuride International, Inc., Santa Fe Springs CA (310) 903-0200. :
   a. Drawers up to 24" wide: No. 7432
   b. File drawers and drawers greater than 24" No. 4032
   c. Pencil drawers No. 2006
   d. Sliding medical gas panels: No. 3640
   e. Sliding art work No. 3832
5. Flipper Door Slides: Accuride Model No. 1432. Complete with hinges as recommended by Accuride.
6. Shelf Supports for Adjustable Shelving in Casework: Right-angle shelf rests, .060 inch steel; 1/2 inch wide by 1/2 inch high by 13/16 inch long, with hole to fasten to underside of shelf with wood screw; #X-73 as manufactured by Selby, or approved equal.
   a. Finish: Nickel
   b. Provide screw fasteners to fasten supports to underside of shelf.
7. Shelf Standards: For wall mounting, shall be heavy-duty type, 12 gauge, satin anochrome finish steel providing 2" adjustment, 7/8" wide by 11/16" high, complete with end caps and heavy-duty 12 gauge steel brackets with matching finish in sizes to suit shelving. KV #85ANO standards with #185 brackets.
8. Sliding Glass Door Track Assembly: Shall consist of upper track, shoe, carrier and lower track. All parts to be zinc plated steel. Steel ball rollers in carriers to be spaced not more than 3 inch on center.
9. Sliding Door Track: For laminated plastic doors shall be formed zinc plated steel overhead track, door mounted brackets with nylon ball bearing rollers and concealed nylon door bottom guide and stops.
10. Adjustable End Flanges: Shall be 8 inch high, 1-7/16 inch width, three position with 3-1/4 inch and 6-1/2 inch adjustment, bright chrome finish, to accept 1-1/16 inch diameter hanger rod tubing.
11. Hanger Rod Tubing: Shall be 1-1/16 inch diameter, .120 wall thickness polished chrome finish steel tubing, lengths as required.
12. Sliding All Glass Door Locks: Shall be similar and equal to K&V N. 965.

13. Finger Pulls: For all glass sliding doors shall be similar and equal to K&V No. 836.
14. Label Holders: Shall be brass, bright nickel finish, 3" x 5/8" similar and equal to Garcy No. 863.
15. Continuous Hinges: Shall be 1-1/16 inch wide by .046 inch thick steel, bright nickel finish, lengths as required with .089 inch electrofilmed steel pin, 1/2 inch loop length and with screw holes 2 inch on center.
16. Support Hinges: Shall be 10 inch long, steel, bright nickel finish.
17. Metal Glazing Stops: Shall be 16 gauge stainless steel, edges ground smooth, drilled 3 inch on center for screw application. Provide continuous neoprene glazing strips.
18. Wall Desk Hardware: Provide manufacturer's recommended fasteners in matching finish.
    a. Flap Stay: Metal flap stay with brake, 325 mm (13 inches nom.) ling, nickel-plated; Hafele #372.17.762 or approved equal.
    b. Flap Hinge: Nickel-plated, steel flap hinge; Hafele #342.62.701 or approved equal.
    c. Magnetic Catch: Metal, double magnet catch with metal strikes; Stanley #41 or approved equal.
19. Grommets: 2-1/2 -inch diameter TG Series, plastic, color selected by Architect. Manufactured by Doug Mockett & Co., Inc., Manhattan Beach, CA (1-800-523-1269).
20. Overhead Door Stop: Selby No. S-214N, nickel finish, 7-3/4 inches or 10 inches as required to suit condition.

2.3 CONSTRUCTION

A. Drawers:

1. Connections between backs, sides and front of drawer body shall be regular multiple drawer dovetails with joints glued.
2. Connection between drawer front and drawer body shall be with not less than 4 countersunk wood screws.
3. Drawer body shall be of 1/2 inch thick hardwood. Drawer bottoms shall be of 1/4 inch plywood.
4. Drawer fronts:
    a. Plastic laminate casework: shall have plastic laminate applied to both inside and outside of drawer fronts and to all edges. Install hardwood veneer where hardwood veneer casework is indicated.
5. Drawers shall slide on metal drawer slides.

B. Doors:

1. All cabinet doors shall have a core of particleboard of 3/4 inch thickness minimum.
2. Doors over 60 inch high shall be 1-3/8 inch thick, solid particleboard core, constructed in accordance with type PC-HPDL, Section 1300, Architectural Flush Doors, of AWI Quality Standards.
3. All surfaces of doors shall be laminated plastic. Install hardwood veneer where hardwood veneer casework is indicated.

C. Sliding Glazed Doors: Glass shall be 1/4 inch thick tempered glass with a two-piece, screw type, chrome finger full in each door.

D. Cabinet Tops, Bottoms, Ends and Backs: Shall be of 3/4 inch thick core minimum, except open face cabinets shall have tops and bottoms minimum 1 inch thick core.

E. Shelves:

1. In cabinets shall be of 3/4 inch thick core minimum to 27 inches wide. One inch shelving at 30 inch wide cabinet and over.
2. Thickness at all widths of open cabinets and wall mounted shelves shall be one inch.
3. All removable or adjustable shelves shall have all surfaces veneered with laminated plastic.

F. Wall Cabinet Dimensions: As indicated on Contract Drawings. Construct to permit alignment of adjacent cabinets, of full variety of types in one grouping.

G. Base and Full Height Cabinets: Construct to dimensions indicated to permit alignment of adjacent units of full variety of types in one grouping.

H. Recessed Toe Space: Toe space and all exposed to view surfaces shall be faced with resilient base furnished and installed under other sections, as noted.

I. Countertops and Splash Backs:

1. High pressure laminated plastic countertops and splash backs shall be of 3/4-inch thick plywood core minimum surfaced with plastic laminate, with backing sheet on the underside of countertop, self-edged unless otherwise indicated.
2. Height of back splash shall be 4 inches unless otherwise indicated. Provide end splashes wherever countertops abut end walls.
3. Wherever sinks occur in countertops, apply sealant at joint between backsplash and countertop. Sealant shall be G.E. SCS 1000. Color shall be Translucent.

J. Stainless Steel Brackets: For use with casework shall be as detailed on the drawings, of Type 304, 18-8 ornamental grade, of welded construction with all welds ground and polished to matching finish.

K. Drop Flap Writing Top: Secure flap support to drop flap using Selby slotted assembly nuts, Type HM, chrome plated.

L. Provide access panels in casework where indicated, or where required to access equipment or utilities. Use Selby propeller nuts with oval head screws and cup washers.

M. Install overhead door stops wherever cabinet doors or door pulls will engage or hit abutting wall surfaces.

N. Provide a grommet wherever the Owner's equipment wiring is required to penetrate countertops.

O. Scribes to walls: Provide scribes to allow 3/4 inch between the edge of the doors and adjacent walls, and to trim the countertops to the wall as indicated.

2.4 FACTORY FINISHING OF WOOD AND HARDWOOD VENEER CASEWORK

A. Finish:

1. Factory finish in accordance with AWI Finish System No. TR-6 Catalyzed Polyurethane, Premium Grade, with 2 top coats.
2. Sheen: satin.
3. Stain shall be custom color.

END OF SECTION 06402

SECTION 06450 - SOLID POLYMER FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Work described in this section:

1. Countertops and transaction tops.
2. Window stools.
3. Other items indicated as "Solid Surfacing Material" or "SSM".

PART 2 - PRODUCTS

2.1 MATERIAL

A. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with material and performance requirements in ANSI Z124.3, for Type 6, without a precoated finish.

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

a. "Corian" by DuPont Polymers, Wilmington, DE 19898; (800) 426-7426.
b. "Gibraltar" by WilsonArt Intl., Temple, TX 76503 (800) 433-3222.
c. "Avonite" by Avonite Inc., Belen, NM 87002 (800) 428-6648.
d. "Fountainhead" by Nevamar Decorative Surfaces, Odenton, MD 21113 (800) 838-4380.

2. Pattern, Style and Color: As indicated on the Materials Distribution Index.

B. Joint adhesive: Manufacturer's standard two-part adhesive kit to create inconspicuous, non-porous joints.

2.2 FABRICATION

A. Factory fabricate components to greatest extent practicable to sizes and shapes indicated, and in accordance with approved shop drawings.

B. Provide factory cutouts for plumbing fittings and HVAC grilles.

C. Form joints between components using manufacturer's standard joint adhesive without conscious joints.

D. Cut and finish component edges with clean, sharp return. Route radii and contours to template. Repair or reject defective and inaccurate work.

E. Countertops and Transaction Tops: Fabricate tops in one piece with shop-applied backsplashes and edges, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.

F. Window Stools: Fabricate as detailed in longest lengths possible.

END OF SECTION 06450

SECTION 07115 - DAMPPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. The work to be performed shall include:

1. Applying dampproofing to the following areas:
   a. Exterior face of steel columns, bearing plates and fastening hardware attached to concrete footings in locations where columns extend under concrete slab-on-grade.
   b. Exterior surface of gypsum sheathing board in conjunction with exterior walls of face brick backed with light gage metal stud.
   c. The exterior face of concrete masonry unit backup in conjunction with face brick.
   d. Exterior face of foundation walls of spaces to be occupied.
   e. In areas noted on the drawings to receive dampproofing other than those described above.
2. Tape all joints in exterior sheathing board over which dampproofing is applied.

PART 2 - PRODUCTS

2.1 MATERIALS

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. Karnak Corp., Clark, NJ 07066; (800) 526-4236
2. W.R. Meadows, Hampshire, IL 60140; (800) 342-5976

B. Dampproofing:

1. Shall be asbestos free, emulsion type fibrated asphalt compound, conforming to 4ASTM D1227, Type IV, Karnak 920, W. R. Meadows, Type 3, as approved equal.
2. When application is to be performed when temperatures are below those recommended by manufacturer, use solvent type Karnak 86, W. R. Meadows Spray-Mastic, or as approved equal. Apply manufacturer's recommended primer to surfaces as required by manufacturer's instructions.
3. All material shall be certified by manufacturer to be asbestos free.

C. Joint tape for exterior sheathing joints:

1. Georgia Pacific 2 inches wide 10 by 10 glass mesh tape.

END OF SECTION 07115

SECTION 07131 - SHEET MEMBRANE WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Installation of hot-applied membrane waterproofing on surfaces indicated on drawings, consisting of preparation of existing and repaired concrete surfaces, sealing of cracks and joints, and application of membrane waterproofing to horizontal concrete surface over occupied space below.
2. Plaza deck pavers.

1.2 WARRANTY

A. Special Manufacturer's Warranty: Written warranty, signed by waterproofing manufacturer agreeing to replace waterproofing material that does not comply with requirements or that does not remain watertight during specified warranty period.

1. Warranty does not include failure of waterproofing due to failure of substrate prepared and treated according to requirements or formation of new joints and cracks in substrate exceeding 1/16 inch in width.
2. Warranty Period: **Five** years after date of Substantial Completion.
3. Warranty includes removing and reinstalling protection board, drainage panels, insulation, pedestals, and pavers on plaza decks.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Carlisle Coatings and Waterproofing Inc., Sapulpa, OK 74067; (800) 338-8701.
2. Henry Company, Huntington Park, CA 90255; (800)-486-1278.
3. Sarnafil, Canton, MA 02021; (781) 828-5400.

B. Basis-of-Design: The single source system design for the membrane waterproofing is based on the product specified by Carlisle Coatings and Waterproofing. Subject to compliance with requirements, provide either the named products or a comparable product by one of the other manufacturers specified.

2.2 PRODUCTS

A. Waterproofing Membrane: Hot applied liquid membrane: Shall be CCW-500 Hot Applied Membrane, rubberized asphalt compound, and shall meet or exceed the requirements of CGSB-37.50-M89.

1. Product consists of a 215 mil thick, reinforced, hot-applied rubberized asphalt membrane system, consisting of two layers of rubberized asphalt membrane reinforced with polyester fabric

B. Reinforcing fabric: Shall be CCW Reinforcing Cloth, spunbonded polyester fabric.

C. Protection Course: Shall be CCW Protection Board-H for horizontal surfaces or CCW Protection Board-V for vertical surfaces.

D. Insulation: Shall be Foamular® [#400 series, 40 psi] or [#600 series, 60 psi] as manufactured by UCI Industries, Inc., Parsippany, N.J.

E. Plaza Deck Pavers: Precast concrete pavers specified in Section 02780 - Unit Pavers.

2.3 ACCESSORY PRODUCTS

A. Flashings: Shall be CCW-711-90 90 Mil Sheet Membrane and Flashing or CCW 60 mil uncured neoprene for non-exposed areas and Sure-Seal® EPDM Flashing for exposed areas.

B. Surface Primer: Shall be CCW-550 Primer.

C. Mastic: Shall be CCW-704 Mastic.

D. Sealants: Shall be CCW-703 Vertical Grade Liquiseal® Membrane or CCW-201 two component Polyurethane Sealant.

E. Backing Rod: Shall be closed-cell polyethylene foam rod.

END OF SECTION 07110

SECTION 07160 - CEMENTITIOUS MEMBRANE WATERPROOFING

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Apply cementitious membrane waterproofing to negative side of walls and floors of elevator pits.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Acceptable Manufacturer: Five Star Products, Inc., Fairfield , CT 06430. Tel: 203-336-7900.

1. Similar systems by other manufacturers may be considered for approval by the Architect providing that such systems meet or exceed all of the requirements of the specified product. The Architect will be the sole judge in determining the equivalency of the proposed system.

B. Product: Cementitious Membrane Waterproofing System shall consist of a self curing, nonshrink, single coat cementitious membrane.

1. Color: As selected by the Architect.

C. All waterproofing materials must be formulated with a true waterproof cement and must not be based on Portland Cement with chemical additives.

D. Materials shipped to the job site must show the following properties when applied in a single, self curing coat:

PROPERTY	TEST METHOD	TEST VALUE
1. PERMEABILITY	CRD-C-48	
Positive Side - 692 foot head		7.96×10^{-14} cm/sec
Negative Side - 230 foot head		7.16×10^{-13} cm/sec
2. SALT WATER PERMEABILITY AND CHLORIDE INTRUSION		
15% Salt Water Solution • Positive Side - 115 foot head		
Permeability Coefficient	CRD-C-48	6.39×10^{-12} cm/sec
% Chloride Ion Intrusion Into Concrete	NCHRP 244 (For Concrete & Chloride	0.000-0.005% CI

	Determination)	
3. BOND STRENGTH 6,000 psi concrete surface	ASTM C-321	85 psi minimum
4. SHRINKAGE Plastic State Hardened State - Moist Hardened State - Dry	 ASTM C-827 ASTM C-157 ASTM C-596	 0.0% 0.0% 300 millionths max.
5. COMPRESSIVE STRENGTH 4 Hours 1 Day 28 Days	 ASTM C-109 ASTM C-109	 2,000 psi minimum 4,000 psi minimum 8,000 psi minimum
6. Acceptable for drinking water contact by U.S. Environmental Protection Agency		

END OF SECTION 07130

SECTION 07210 - BUILDING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Provide rigid insulation.

1. Type "A" rigid insulation at interior of foundation walls; rigid insulation on underside of floor slabs.
2. Type "B" rigid insulation on underside of steel deck, where indicated on the Drawings.
3. Type "D" rigid insulation on the interior side of exterior walls in areas furred with Z-furring channels.
4. Elsewhere that rigid insulation is indicated and not specified in other specification sections.

B. Provide batt insulation:

1. Exterior wall constructed with metal studs.
2. Interior partitions and shaft walls.
3. Exterior ceilings and soffits.
4. Walls furred with metal studs.
5. Elsewhere that batt insulation is indicated and not specified in other specification sections.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Owens-Corning, Toledo, OH 43659; (800) 438-7465
2. Johns Manville Corp., Denver, CO 80217-5108; (800) 654-3103.
3. Dow Chemical Co., Midland, MI 48674; (800) 441-4369.

2.2 MATERIALS

A. Type "A" Rigid Insulation:

1. Insulation shall be Styrofoam SM brand insulation as manufactured by Dow Chemical Co. or Foamular 250. Provide material in thickness as indicated, but not less than the following:

a. Inside face of foundation walls: 2-inch.
b. Underside of floor slabs: 1-inch.

B. Type "B" Rigid Insulation:

1. Insulation shall be 3 inches thick, rigid foil-faced, fiberglass, Owens Corning 705 or equal.
2. Insulation Hanger:
   a. Manufacturer: GEMCO, Danville, IL 61834, (800) 331-1164.
   b. Type: 2 inch x 2 inch Perforated hanger for adhesive application.
      1) Nail: Low carbon steel, galvanized.
      2) Base Plate: Low carbon steel, galvanized.
      3) Length: minimum ½ inch longer than insulation to be installed
      4) Washer: S-125, mild steel galvanized
   c. Adhesive: Tuff-Bond Hanger Adhesive, or as required by manufacturer for adhering to substrate.
3. Miscellaneous Products:
   a. Foil faced pressure sensitive tape: As recommended by insulation manufacturer.

C. Type "C": Not Used

D. Type "D" Rigid Insulation:

1. Exterior wall areas furred with Z-furring channels: Type 703, unfaced fiberglass, thickness as indicated; manufacturer: Owens-Corning; Type I/S 300 manufactured by Johns Manville.

2.3 BATT INSULATION

A. Insulation for steel stud partitions and furred walls shall be any of the following:

1. U. S. Gypsum SAFB blanket insulation, minimum of 3-inch thick, unfaced.
2. Glass fiber batts, unfaced, minimum of 3-1/2 inch thick, conforming with ASTM C665-84, Type 1, manufactured by Owens-Corning Fiberglass Corp. or Johns Manville.

B. Where fire rated partitions occur, provide type insulation required by indicated fire tests.

C. Insulation for exterior walls constructed of face brick with metal stud backup shall be unfaced glass fiber batts or blankets, 6-1/4 inches or 6-1/2 inches thick, (R=19), conforming with ASTM C665-84, Type 1, manufactured by Owens-Corning Fiberglass Corp. or Johns Manville.

D. Insulation for wall areas furred with studs: unfaced glass fiber batts or blankets, conforming with ASTM C665-84, Type 1, thicknesses as indicated on the drawings. Manufacturers: Owens-Corning Fiberglass Corp. or Johns Manville.

E. Exterior Gypsum Wallboard Soffit Insulation: Unfaced glass fiber batts or blankets, 6-1/4 inch or 6-1/2 inch thick (R=19), ASTM C665-84, Type 1, Owens-Corning Fiberglass Corp. or Johns Manville.

F. Batt Insulation Accessories: Where batt insulation is installed between exterior metal studs greater than 6-inches deep, provide the following installation accessories:

1. Insulation Hanger, complete with adhesive and washers.

END OF SECTION 07210

SECTION 07265 - WATER VAPOR EMISSION CONTROL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the application of systems for the reduction of moisture vapor transmission and alkalinity control for interior concrete slabs requiring the installation of resilient sheet vinyl and rubber flooring.

B. Section 01210 – Allowances: For procedural requirements of work under this Section.

1.2 SCHEDULING

A. Before installation of the receiving resilient sheet flooring materials over the interior concrete slabs, anhydrous calcium chloride testing shall be performed as per ASTM F 1869-98 by the Owner's Special Inspector to determine the level of water vapor transmission in the slab and the type of moisture vapor reduction system required.

1.3 WARRANTY

A. Warranty: Provide manufacturer's written warranty signed by water vapor emission control system manufacturer and installer covering work of this Section, including removing and reinstalling flooring system and all related labor charges, for a period of 10 years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Water vapor reduction system shall be the product of a single manufacturer, no substitutions.

B. Acceptable Manufacturer: Koester VAP 1® 2000 System by Koester American Corporation; Corporate Headquarters: (757) 425-1206.

C. Terminology hereafter is based upon the products of Koester American Corporation.

2.2 MATERIALS

A. General: Use materials of one manufacturer throughout the project as hereinafter specified.

B. Water-based primer/curing agent, 100% solids VAP 1® 2000 coating, containing specifically formulated chemicals and resins to provide the following characteristics and properties.

1. ASTM E 96, Water Vapor Transmission (dry and wet methods) Performance shall be documented by an independent testing laboratory at a minimum 90% for Koester VAP 1® 2000 System water vapor transmission reduction compared to untreated ACI Committee 201 durable concrete.
2. Certify acceptance and exposure to continuous topical water exposure after final cure.

2.3 KOESTER VAP 1® 2000 SYSTEM

A. This one (1) coat system consists of one (1) coat of VAP 1® 2000 applied to a properly prepared concrete surface. The water vapor reduction system shall be required to reduce vapor emissions by a minimum of 90% after final cure.

B. Verify water vapor emission by anhydrous calcium chloride testing according to ASTM F 1869-98 prior to proceeding with any floor covering installation. Anhydrous calcium chloride testing performed by the Owner's Special Inspector resulting in water vapor transmission levels greater than 3 lbs/24hrs. per 1000/sf. and less than 25 lbs/24 hrs per 1,000/sf. (depending on individual conditions) shall determine where this system is utilized and the coverage rates required.

2.4 AREAS NOT REQUIRING VAPOR REDUCTION SYSTEM

A. Anhydrous calcium chloride testing performed by the Owner's Special Inspector for interior concrete slab areas receiving resilient sheet flooring material will determine where these systems might be required. Water vapor reduction system might be required on concrete floors with water vapor transmission level less than 3 lbs/24 hrs per 1,000 sf or 5 lbs for some specific flooring systems, verify with flooring system manufacturer.

B. Water vapor reduction system is not required on interior concrete slabs without floor finishes.

2.5 MIX DESIGNS

A. Use clean containers and mix thoroughly as per manufacturer's requirements to obtain a homogeneous mixture. Use a low speed motor less than 400 rpm and a two bladed Jiffy mixing blade only. DO NOT AERATE. Mix ratios are measured by volume.

B. VAP 1® 2000 Mix Ratio: Mix Component A and B at a ratio of 2.4:1.

END OF SECTION 07265

SECTION 07411 - METAL ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish all material, labor and equipment to complete the installation of metal roof panel system(s) of the following types as shown on the Drawings and herein specified. Installation shall include all related clips, fasteners, trim, closures and other devices for secure anchorage of panels to substructure and to ensure weathertight installation.

1. Factory-formed and field-assembled, standing-seam metal roof panels.

1.2 REFERENCES

A. *The BOCA® National Building Code/1999,* Fourteenth Edition, referred to herein as "BOCA 99":

1. The above building code is the reference standard for determining the performance requirements for design wind uplift loads, and other designated or applicable loads for metal roof panel system as it pertains to exterior cladding of the building.

1.3 SYSTEM DESCRIPTION

A. Metal Roof Panel System: consists of metal roof panels of size, type and profile indicated, and includes all attachment system components, miscellaneous framing, related trim, flashings, sealants and accessories necessary for a complete system meeting the specified requirements for wind loading, air infiltration and water penetration.

B. The anchorage system shall be designed so that the panels are secure and accommodate expansion and contraction.

1.4 DESIGN CRITERIA

A. General: Provide metal roof panel systems that comply with performance requirements as specified. If system tests are not available, mock-ups shall be constructed and tests performed under the direction of an independent third party laboratory acceptable to authorities having jurisdiction which show compliance to the following minimum standards.

B. Panels shall be thermal cycle tested a minimum of 100,000 cycles with a minimum of 2-inches of movement relative to the clip anchor. Panels and clips shall demonstrate that wear will not adversely affect the structural performance or weathertightness of the system.

C. Air Infiltration: Air infiltration of the panel assembly shall be no more than 0.0156 cfm/lin. ft. of joint at 6.24 psf static test pressure differential, when tested in accordance with ASTM Test Procedure E283.

D. Water Penetration: Water penetration of panel joint assembly shall be 0 when exposed to water spray of five gallons per hour per square foot at static test pressure differential of 20.0 psf when tested for not less than fifteen minutes duration in accordance with ASTM Test Procedure E331.

E. Structural-uniform uplift load capacity of the panel system shall be determined in accordance with test procedures defined in ASTM E1592, "Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform static Air Pressure Difference" as follows:

1. The factor of Safety on the test results shall be 1.65 for the panel, batten or clip ultimate loads, with no increase for wind.
2. The Factor of Safety for fasteners shall be 3.0 for one single fastener per clip, 2.25 for two fasteners per clip.
3. Design uplift capacity for conditions of gage, span or loading other than those tested may be determined by interpolation of test results. Extrapolation for conditions outside test range is not acceptable.
4. Deflection shall be L/180 for positive loading.

F. Roof system shall be classified as Class UL 90, as defined by UL 580 for wind uplift resistance, by Underwriter's Laboratories, Inc.

G. The panels shall withstand a 250 lb. Concentrated load applied to a four (4) square inch area at the center of the panel at mid-span between supports with no panel deformation, rib buckling, or panel sidelap separation which will adversely affect the weathertightness of the system.

H. Seismic Requirements

1. General Seismic Requirements: Architectural components and their attachments shall comply with seismic design requirements of the referenced building code for a project in Seismic Hazard Exposure Group III, with a Seismic Performance Category of C:
2. Architectural Components Design: The metal roof panels and attachments shall be designed in accordance with the requirements of Section 1610.6.3 of BOCA 1999, in its entirety, and for seismic forces (F_p) in accordance with the formula $F_p = A_v C_c P W_c$ where the following values are used:
   a. The coefficient representing effective peak velocity-related acceleration (A_v) = 0.10g.
   b. The seismic coefficient for architectural components (C_c):
      1) Component(C_c) = 0.9.
      2) Attachments(C_c) = 0.3.
   c. Performance criteria factor from Table 1610.6.3 of BOCA 99 (P) = 1.5.
   d. W_c = weight of architectural component.

PART 2 - PRODUCTS

2.1 STANDING-SEAM METAL ROOF PANEL

A. General: Provide factory-formed metal roof panels for field assembly by mechanically attaching panels to supports using concealed clips and fasteners, and interlocking side edges of adjacent panels. Include accessories required for weathertight installation.

B. Products:

1. Standing Seam Panels: Manufacturer's standard 20 gauge, factory-formed panel system designed for mechanical attachment of panels to substrate using concealed clips and fasteners; nominal 2-inch deep ribs, spaced 18-inches on center.
   a. Basis of Design Product: "SRS 2-1.5" Mechanically Seamed Standing Seam Roof System as manufactured by Centria, Moon Township, PA (800) 759-7474.

C. Materials:

1. Sheet Steel: G90 galvanized steel conforming to ASTM A653 Structural Quality Grade 504, and ASTM A924 hot dipped galvanized steel sheet.

D. Miscellaneous Materials:

1. Clips: Panel manufacturer's concealed clip/fastener system designed for UL 90 requirements fabricated from 16 gage, Type 300 stainless steel, 5 inch long double fastener type. Clip shall be designed to meet positive and negative pressure load requirements.
2. Fasteners:
   a. Standard Fasteners: Manufacturer's standard self-drilling, self-tapping hex head, stainless steel screws with neoprene sealing washers. Provide #14-10, Type 'A' screws for attaching to material no thicker than 16 gage, and #14-14, Type 'AB' screws for attaching to material 14 gage and thicker.
   b. Color: Provide exposed fasteners with heads matching color of metal panel.
3. Accessories:
   a. General: Provide manufacturer's standard accessories and other items essential to completeness of standing seam roof installation.
   b. Closures: Provide manufacturer's pre-cut closed cell foam; comply with ASTM D3575, for a cross-linked polyolefin foam. Enclose in metal channel fabrications when used at ridge.
   c. Tape Sealant: Manufacturer's standard pressure-sensitive polymeric butyl sealing tape with realease paper backing.
   d. Sealants: Manufacturer's standard non-curing butyl sealant at all hidden locations including side laps, end laps and flashing details Exposed sealants provided under the work of Section 07920, Sealants and Calking and acceptable to panel manufacturer.

4. Formed Trim: Fabricated from the same material, gage, finish and color as the adjacent roof panels.

E. Fabrication: Factory form metal roof panels with 18-inch width, 2-inch high standing seams, ready for field assembly. Products shall be in compliance with manufacturer's dimensions, profiles, gages and details as specified herein.
   1. Provide panels in full length from eave to ridge.
   2. Panel seams shall interlock entire length of seam. Fabricate female leg with pressure equalized capillary break to prevent water siphoning through joint.
   3. Provide factory installed elastomeric sealant on bottom edge of female seam leg to provide panel-to-panel seal while allowing expansion and contraction movement.
   4. Clips: Panel manufacturer's UL listed concealed clip designed to allow panels to thermally expand and contract. Clips shall be fabricated to raise underside of panels above purlins to prevent distortion due to wind uplift forces.

2.2 FINISHES

A. High-Performance Organic-Coating 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 Two-Coat Coating System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin (Kynar 500) by weight; complying with AAMA 2605.
   2. Approved Manufacturer: PPG Industries, Inc.
      a. Color and Gloss: Custom color to match Architect's sample.

END OF SECTION 07411

SECTION 07412 - METAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish all material, labor and equipment to complete the installation of exterior metal wall panel system(s) of the following types as shown on the Drawings and herein specified. Installation shall include all related trim, fasteners and other devices for secure anchorage of panels to substructure provided for this purpose.

1. Metal faced composite wall panels.

1.2 REFERENCES

A. *The BOCA® National Building Code/1999,* Fourteenth Edition, referred to herein as "BOCA 99":

1. The above building code is the reference standard for determining the performance requirements for design wind loads, seismic requirements and other designated or applicable loads for metal wall panel system as it pertains to exterior cladding of the building.

1.3 SYSTEM DESCRIPTION

A. Metal Wall Panel System: consists of metal wall panels of size, type and profile indicated, and includes all attachment system components, miscellaneous framing, related trim, flashings, sealants and accessories necessary for a complete system meeting the specified requirements for wind loading, air infiltration and water penetration.

B. The anchorage system shall be designed so that the panels are secure and accommodate expansion and contraction.

1.4 DESIGN CRITERIA

A. General: Provide metal wall panel systems that comply with performance requirements as specified. If system tests are not available, mock-ups shall be constructed and tests performed under the direction of an independent third party laboratory acceptable to authorities having jurisdiction which show compliance to the following minimum standards.

B. Bond Integrity: When tested for bond integrity, in accordance with ASTM D1781 (simulating resistance to panel delamination), there shall be no adhesive failure of the bond (a) between the core and the skin nor (b) cohesive failure of the core itself below the following values:

1. Bond Strength: 214 psi (vertical pull).
2. Peel Strength: 22.5 in. lb./in. as manufactured.
3. 22.5 in. lb./in. after 8 hours in water at 200 degrees F.
4. 22.5 in. lb./ in. after 21 days soaking in water at 70 degrees F.

C. Fire Performance: Provide metal wall panels identical to those of assemblies tested for fire resistance per ASTM E 119.

1. Surface-Burning Characteristics: Provide wall panel system with foamed core and interior surface with the following surface-burning characteristics per ASTM E 84.
   a. Flame Spread: 25 or less.
   b. Smoke Developed: 450 or less.
2. ASTM E162; No surface flaming.
3. UBC 17-5; No flame spread along interior face or penetration through the wall assembly.

D. Structural Performance:

1. Structural Performance – Implied Loads: Design and construct metal wall panel system to withstand minimum loading requirements as specified herein.
   a. Design and engineer metal wall panel system in accordance with procedures for determining design wind loads for components and cladding for building height **[<60 feet] <insert value>**, pursuant to §1609.8.1 of BOCA '99, incorporating the following project-specific values:
      1) Basic Wind Speed: **[100 mph] <insert value>**
      2) Exposure Category: **[C] <insert value>**.
      3) Basic Velocity Pressure: (P_v): **[25.6] <insert value>**
      4) Wind Load Importance Factor (I): **[1.1] <insert value>**
      5) Product of Internal Pressure Coefficient and Gust Response Factor (GC_{pi}): **[Condition (+0.25 and –0.25)]**.
   b. Deflection Limit: Engineer metal wall panels with a deflection limit of 1/180 applied to positive load, per ASTM E72 Chamber Method. Ultimate structural values shall be achieved without the use of backside mechanical attachments to the structure.
      1) There shall be no evidence of delamination, or permanent deformation after two million cycles of positive and negative L/180 deflection.

E. Seismic Requirements

1. General Seismic Requirements: Architectural components and their attachments shall comply with seismic design requirements of the referenced building code for a project in Seismic Hazard Exposure Group **III**, with a Seismic Performance Category of **C**:
2. Architectural Components Design: The metal wall panels and attachments shall be designed in accordance with the requirements of **Section 1610.6.3 of BOCA 1999**, in its entirety, and for seismic forces (F_p) in accordance with the formula $F_p = A_v C_c P W_c$ where the following values are used:
   a. The coefficient representing effective peak velocity-related acceleration (A_v) = **0.10g**.
   b. The seismic coefficient for architectural components (C_c):

1) Component(C_c) = 0.9.
2) Attachments(C_c) = 0.3.

c. Performance criteria factor from **Table 1610.6.3 of BOCA 99** (P) = 1.5.

d. W_c = weight of architectural component.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Products: The design for each metal wall panel 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 other manufacturers specified.

B. Manufacturers: Subject to compliance with requirements; provide products by the manufacturer specified, alternate manufacturer's will not be accepted.

2.2 METAL FACED COMPOSITE WALL PANEL (MP-1)

A. General: Provide factory-formed and -assembled metal-faced composite wall panels composed of a solid core of thermoplastic compound sandwiched between two metal sheet facings. Include attachment system components and accessories required for weathertight system.

B. Products:

1. Manufacturer and Type:
   a. Alusuisse Composites, Inc., "Alucobond".
   b. Reynolds Metal Company, "Reynobond PE".
2. Panel Thickness: **6mm**.

C. Materials:

1. Aluminum Sheet: Smooth coil-coated sheet, of alloy and temper as standard with panel manufacturer to suit forming and performance requirements, not than 0.020-inch thick.
2. Core: Manufacturer's standard solid extruded thermoplastic core.

D. Miscellaneous Materials:

1. Fasteners: Non-corrosive fasteners of size and type as recommended by the panel manufacturer for the application and substrate conditions. Provide concealed fasteners, except where unavoidable.
   a. Color: Fasteners, where exposed shall be provided with heads matching color of metal panel.
2. Accessories:
   a. Extrusions, formed members, sheet, and plate shall conform with ASTM B209 and the recommendations of the manufacturer.

b. Sealants: Sealants and gaskets as per panel manufacturer's standards and as required to comply with performance requirements.

E. Fabrication: Panels shall be formed in a continuous process with no glues or adhesives between dissimilar materials. Core material shall be free of voids and/or air spaces. Fabricate composite wall panels to the greatest extent possible in the factory, formed into profile for installation method indicated. Panel lines, breaks and angles shall be sharp, true, and surfaces free from warp and buckle.

1. Panel stiffeners, where required as internal reinforcing to composite panels, shall be structurally fastened or restrained at the ends and shall be secured to the rear face of the composite panel with compatible silicone of sufficient size and strength to maintain panel flatness.
2. Field fabrication shall be allowed where necessary, but shall be kept to an absolute minimum
3. Provide factory applied continuous strippable polyethylene film to protect panel finish from damage.

F. Formed Trim: Fabricated trim and flashing materials from 0.030-inch thick aluminum sheet with finish to match adjacent wall panel system.

G. Sub-Framing: Metal furring channels, 7/8-inch deep fabricated of 20 gage hot-dipped galvanized steel.

2.3 FINISHES

A. High-Performance Organic-Coating 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 Two-Coat Coating System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin (Kynar 500) by weight; complying with AAMA 2605.
2. Approved Manufacturer: PPG Industries, Inc.
   a. Color and Gloss: As selected by Architect from coating manufacturer's full range of non-exotic colors..

Change the finish system
Colors - MP1 Birch B2000-D
MP2 Cadet Grey A2003-D

END OF SECTION 07412

SECTION 07531 - EPDM MEMBRANE ROOFING - ADHERED

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide adhered membrane roofing system where indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Install black roofing membrane.

C. Remove existing roof system in areas indicated to receive new roofing system and in other areas as required to complete the Work.

D. Installation and removal of temporary roofing.

1.2 References

A. Factory Mutual

1. Factory Mutual System *Approval Guide*, 1999 edition.
2. Factory Mutual Property Loss Prevention Data Sheets 1-28 (FM 1-28), *Wind Loads to Roof Systems*, dated April 1998.
3. Factory Mutual Property Loss Prevention Data Sheets 1-29 (FM 1-29), *Above Deck Roof Components*, dated April 1998 and revised September 1998.

B. Underwriter's Laboratories Inc.

1. Fire Resistance Directory, 1999 edition
2. Roofing Materials & Systems Directory, 1999 edition.

1.3 SYSTEM DESCRIPTION

A. Performance Requirements
1. Design roofing system for peak wind speed of 90-miles per hour.

B. Underwriter's Laboratory Inc., Requirements

1. UL Listing: Provide labeled materials that have been tested and listed by UL in *Building Materials Directory*, January 1999 or by other nationally recognized testing laboratory for Class A rated materials/system.
2. Except as specified otherwise, materials and installation for roof assembly shall be in strict accordance with UL design(s) detailed on the Drawings and all pertinent data as indicated in Underwriters Laboratories, Inc. *Fire Resistance Directory*, January 1999.

C. Factory Mutual Requirements

1. FM listing: Provide EPDM sheet roofing system and component materials that have been evaluated by Factory Mutual System for fire, wind up lift and hail damage and that are listed in *Factory Mutual System Approval Guide* for Class I construction.
2. Wind Uplift Rating: Membrane roofing system shall be secured to decking in accordance with requirements of FM 1-28 for Roof System Approval Rating of FM I-105 for the main roof and FM I-120 for the elevator penthouse roof, based on a Basic Wind Speed of 90 miles per hour.
3. Above-deck roof components shall be designed and installed in accordance with requirements of FM 1-29 for performance requirements specified above.
4. Provide roof-covering materials that bear FM approval markings on the packaging.
5. Indicate that materials have been subjected to FM's examination and follow-up inspection services.

1.4 WARRANTY

A. Upon Substantial Completion of the Project and as a condition of its acceptance, deliver to the Owner a copy of the manufacturer's written 10 year Total System Warranty, guaranteeing to maintain the specified roof in a watertight condition

1. Warranty shall cover product quality, performance, and workmanship for a period of 10 years.
2. Warranty shall cover total roofing system, including roofing membrane, adhesives, sealant, fasteners, membrane flashings, perimeter flashing, and other related materials.
3. Warranty shall provide coverage for uplift created by peak wind speed of 90 miles per hour.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Carlisle SynTec Systems (800) 479-6832
2. . Johns Manville, Inc. SPM Systems (800) 654-3103
3. Versigard by Versico Inc. (800) 992-7663

B. Basis of Design: The specifications included herein are those of Carlisle SynTec Roofing System "Design "A" for an adhered roof membrane assembly. Provide specified product or "SPM Systems" by Johns Manville, or "Versigard" by Versico. No other manufacturers will be considered.

2.2 MATERIALS

A. Roof Membrane: .060 inches thick, 20 feet x 100 feet or the longest sheet possible as determined by the job condition, EPDM (Ethylene Propylene Diene Monomer) compounded elastomer, meeting the requirements of ASTM D3235.

B. Membrane Flashings: Where membrane flashings are indicated on the drawings, they shall be .060" thick Elastoform.

C. Fascia System: Where perimeter flashing is indicated on the drawings, provide manufacturer's FM-approved, two-piece "SecurEdge" roof edge fascia system consisting of 0.050-inch thick aluminum retainer bar and 0.040-inch thick snap-on aluminum cover.

1. Finish: Kynar coated aluminum, color as selected by the Architect.

D. Roof Drains: Are included under Division 15. The Plumbing Subcontractor shall furnish and install the roof drains, and make the caulking joint connection with the piping system. Flashing for roof drains shall be furnished and installed under the work of this Section.

E. Rubber Fastening Strips: Extruded rubber fastening strips furnished by membrane manufacturer, shall be indicated on the Drawings for the various locations shown and recommended by membrane manufacturer.

F. Reinforced Universal Securement Strip (RUSS): 6 inch wide reinforced EPDM membrane installed in conjunction with seam fastening plates.

G. Bonding Adhesive: Compatible with materials to which the membrane is to be bonded, furnished by membrane manufacturer.

H. In-Seam Sealant: Shall be siliconized type recommended by manufacturer.

I. Splicing Cement: As recommended by membrane manufacturer.

J. Splice Cleaner: As recommended by membrane manufacturer.

K. Lap Sealant: Butyl base, compatible with materials with which it is used, shall be trowel or gun consistency, furnished by membrane manufacturer.

L. Water Cut Off Mastic: Compatible with materials with which it is used, furnished by membrane manufacturer.

M. Molded Pipe Flashing: Compatible with materials with which it is used, furnished by membrane manufacturer.

N. Nite Seal: Compatible with materials with which it is used, furnished by membrane manufacturer.

O. Pourable Sealer: Compatible with material with which it is used, furnished by membrane manufacturer.

P. Insulation:
   1. Tapered insulation systems:
      a. "Styrofoam SM", Dow chemical Company.
      b. "Foamular 250", U.C. Industries.
   2. Taper system with minimum 3-inch at low point, tapering 1/4-inch per foot to high points.

Q. Membrane Underlayment: Oriented Strand Board (OSB): 7/16 inch thick APA rated OSB with phenolic resin binder.

R. Fasteners:

   1. Concrete deck: Sure-Seal Fasteners as recommended by roofing manufacturer that shall provide a minimum pull out resistance of 800 pounds, and shall penetrate concrete deck a minimum of 1-1/4 inches

S. Fastening Plates:

   1. Carlisle Sure-Seal Fastening Plates as recommended by roofing manufacturer to secure insulation or membrane underlayment. Fastening plates, by others, must be accepted by Carlisle prior to project bid and installation.

T. Walkway Pavers: Manufacturer's molded rubber walkway pads, 30-inch by 30-inch by 3/16-inch thick.

U. Precast Concrete Paver System: Where indicated, provide precast concrete roof pavers designed for high wind conditions.

   1. Manufacturer and Type: "The Guardian" paver system by Hanover Architectural Products, Hanover, PA (717) 637-0500.
   2. Size: 23 ½ inches by 23 ½ inches by 2 ½ inches thick, with recessed groove to receive manufacturer's locking pedestal system.
   3. Pedestal: Three-piece locking pedestal consisting of a 6-inch square top plate, 3/4-inch bolt and 7-1/2 –inch square base of high-density polyethylene. Provide manufacturer's standard leveling plates as required for a level finished surface.
   4. Color: Natural
   5. Finish: Smooth

END OF SECTION 07531

SECTION 07620 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide flashing and sheet metal not specifically described in other Sections of these Specifications but required to prevent penetration of water through the exterior shell of the building.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Sheet: Alloy and temper recommended by manufacturer for use intended and as required for proper application of finish indicated but with not less than the strength and durability properties specified in ASTM B209 for 5005-H15.

B. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A526, hot dipped galvanized in accordance with ASTM A525, with G90 coating designation, mill phosphatized.

C. Sheet Copper: 16 ounce. cold-rolled copper sheet conforming to ASTM B370, Temper H00 or H01, except as otherwise indicated.

D. Lead-Coated Copper: 16 ounce cold-rolled copper sheet with 15 pounds lead coating per 100 square feet, conforming to ASTM B101, Temper H00 and H01, except as otherwise indicated.

E. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, No. 2D (dull, cold rolled) finish.

F. All sheet metal flashing, unless otherwise indicated shall be 16 ounce sheet copper, flashing exposed to view shall be lead-coated copper.

2.2 MISCELLANEOUS MATERIALS

A. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.

1. Fasteners for copper shall be copper or hardware bronze of Stronghold type, or equal, with large flat head. Not smaller than No. 12 stubs gauge (0.109 inch) and of sufficient length to penetrate wood roof nailers not less than 7/8 inch.

2. Fasteners for aluminum sheet metal work shall be made of aluminum alloys 6061 or 5056 conforming to Federal specification FF-N-105, Type 2, Style 20.
3. Fasteners for fastening galvanized sheet metal work shall be made of stainless steel, non-magnetic of type.

C. Solder:

1. Composed of 50% pig lead and 50% block tin for plain copper; 40% pig lead and 60% block tin for lead-coated copper. Shall comply with ASTM B32.
2. Flux: Muriatic acid killed with zinc or an approved brand of soldering flux, shall be used. Acid shall be thoroughly washed off after soldering is completed.

D. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coat.

E. Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, nondrying, non-migrating sealant.

F. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealants."

G. Epoxy Seam Sealer: 2-part, non-corrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for nonmoving joints, including riveted joints.

H. Adhesives: Type recommended by sheet metal manufacturer for waterproof and weather-resistant seaming and adhesive application of flashing sheet metal.

I. Paper Slip Sheet: 15-lb/square red rosin, sized building paper conforming to FS UU-B-790, Type I, Style 1b.

J. Polyethylene Underlayment: ASTM D4397, minimum 6-mil thick black polyethylene film, resistant to decay when tested according to ASTM E 154.

K. Roofing Cement: ASTM D 4586, Type I, asbestos free, asphalt based.

2.3 FABRICATION, GENERAL

A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.

B. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.

D. Seams: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

E. Expansion Provisions: Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inchdeep, filled with mastic sealant (concealed within joints).

F. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

G. Separate metal from non-compatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

H. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.

I. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, non-corrosive metal recommended by sheet metal manufacturer.

1. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

2.4 ALUMINUM FINISH

A. High-Performance Organic-Coating 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 Two-Coat Coating System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin (Kynar 500) by weight; complying with AAMA 2605.
2. Approved Manufacturer: PPG Industries, Inc.
   a. Color and Gloss: Custom color as selected by Architect to match adjacent metal panel system.

END OF SECTION 07620

SECTION 07650 - THROUGH-WALL FLASHING

PART 1 - GENERAL

1.1 SUMMARY

A. Provide flexible rubberized asphalt, self-sealing through-wall flashing, self-adhered flashing strips and wall flashing accessories.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Manufacturer: Provide products as manufactured by Grace Construction Products, Cambridge, MA 02140; (866) 333-3726.

2.2 MATERIALS

A. Flashing Description: .32 mils of self-adhesive rubberized asphalt integrally bonded to 8 mils of cross-laminated, high-density polyethylene film to provide a minimum 40 mils thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed.

B. Self-adhered flashing strips shall be same product as flashing. Strip widths shall be as indicated on drawings, but in no case less than width required to provide a minimum 2-inch overlap at joint to be covered.

C. Product: Perm-A-Barrier Wall Flashing manufactured by Grace Construction Products.

D. Wall Flashing Accessories:

1. Termination Mastic: Rubberized asphalt-based mastic for sealing top edge, seams, cuts and penetrations of flexible flashings.
   a. Product: Bituthene Mastic
2. Primer:
   a. At locations where flashing is adhered to dampproofing, provide rubber-based primer in solvent.
      1) Product: Bituthene B2 Primer.
3. Metal flashing edging in conjunction with through wall flashing:
   a. Lead-Coated Copper, 16 ounce cold-rolled copper with 15 pounds lead coating per 100 square feet.

END OF SECTION 07650

SECTION 07720 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Roof hatches.
2. Hoistway exhaust vents.

1.2 WARRANTY

A. Manufacturer shall guarantee against defects in material or workmanship for a period of five years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products as specified herein, from one of the following manufacturers:

1. Bilco Co., New Haven, CT (203) 934-6363.
2. Babcock-Davis, a Cierra Products Co., Minneapolis, MN (888) 412-3726.
3. Milcor, a Gibraltar Co., Lima, OH (800) 528-1411.

2.2 MATERIALS

A. Aluminum Sheets: ASTM B 209 for Alclad alloy 3005H25 or alloy and temper required to suit forming operations.

B. Extruded Aluminum: ASTM B 221 alloy 6063-T52 or alloy and temper required to suit structural and finish requirements. Mill finish, unless indicated otherwise.

C. Insulation: Manufacturer's standard rigid or semi-rigid glass-fiber board of thickness indicated.

D. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other non-corrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.

E. Gaskets: Manufacturer's standard tubular or fingered design of neoprene or polyvinyl chloride, or block design of sponge neoprene.

F. Bituminous Coating: SSPC-Paint 12, solvent-type bituminous mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coating.

G. Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, nondrying, non-migrating sealant.

H. Elastomeric Sealant: Generic type recommended by unit manufacturer that is compatible with joint surfaces; ASTM C 920, Type S, Grade NS, Class 25, and Uses NT, G, and, A.

I. Roofing Cement: ASTM D 4586, non-asbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

2.3 ROOF HATCH FABRICATION

A. Fabricate units to withstand 40-lbf/sq. ft. external loading and 20-lbf/sq. ft. internal loading pressure. Frame with 12-inch high, integral-curb with 3-1/2 inch flange, with welded corner joints, 1-inch thick insulation, and cap flashing (roofing counterflashing). Provide gasketing and equip corrosion-resistant hardware including pintle hinges, hold-open devices, interior padlock hasps, and both interior and exterior latch handles.

B. Cover and Curb Material: Aluminum, sheets and extrusions.

1. 11 gage aluminum cover and curb with 18 gage aluminum cover liner.

C. Hardware: Zinc plated and chromate sealed.

D. Type: Single-leaf personnel access.

1. For Ladder Access: 48 x 48-inches.
   a. Bilco model "F-50" Roof scuttle.
   b. Babcock-Davis model "B-RHA".
   c. Milcor model RD-1.

2.4 HOISTWAY EXHAUST HATCH

A. General: Automatically operated roof vents for heat and smoke constructed to operate (open) without power source that could be interrupted during a fire. Custom fabricate units only to extent necessary to comply with indicated dimensions and other special requirements.

B. Heat-and-Smoke Vent Compliance: Provide units that have been tested, listed, or approved by UL for construction/operation, and provide UL Class A fire resistance rating. Comply with the following regulatory requirements.

1. UL 793, for construction and performance of automatically operated roof vents for heat and smoke.
2. NFPA 204M, for heat-and-smoke vent design constraints, operation, size, and location.

C. Framing: Fabricate from formed sheet or extruded aluminum, with manufacturer's standard welded or sealed mechanical corner joints, including cap flashing (roofing counterflashing):

1. Unit Support: Double-wall curb construction with 1-inch insulation, of height indicated or, if not indicated, for mounting with height minimum 9 inches above roof membrane.

D. Hatch-Type Units: Equip units with unit support, single leaf insulated lid, lid gaskets, automatic self-lifting mechanisms, UL-listed fusible links rated at 160 deg F or other heat- or smoke-sensitive release devices, as indicated, and hardware including hinges, hold-open devices, and independent manual-release devices for inside and outside operation of covers.

1. Bilco Type "SV"
2. Babcock-Davis Model "B-SVA".
3. Milcor Model "U-LP".

2.5 FINISH

A. Class I, Clear-Anodized Finish: AA-C22A41 (Chemical Finish: etched, medium matte; Anodic Coating: Class I Architectural, clear film thicker than 0.7 mil) complying with AAMA 607.1.

END OF SECTION 07720

SECTION 07810 - SPRAYED-ON FIREPROOFING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide all labor, materials, equipment and services necessary for, and incidental to, the complete and proper installation of all sprayed fireproofing and related work as shown on the drawings or where specified herein, and in accordance with all applicable requirements of the Contract Documents.

B. At existing buildings, patch fireproofing disturbed as a result of construction and demolition work.

C. The material and installation shall conform to the applicable building code requirements and the requirements of all authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturers: Provide products by one of the following. No other manufacturers will be approved.

1. Isolatek International, Cafco [800] 631-9600.
2. W. R. Grace Construction Products [800] 242-4476.

2.2 SYSTEM MATERIALS

A. Type A: For built-up trusses, steel deck and beams, and all other concealed applications except as indicated on the drawings:
1. Isolatek Blaze-Shield® II, Isolatek International
2. Monokote MK-6, W. R. Grace

B. Type B: Steel columns which are exposed to view and steel framing and steel decking located within elevator shafts:
1. Isolatek Blaze Shield HP , Isolatek International
2. Monokote 106, W. R. Grace

C. Type C: For truss cross braces, and steel columns, beams and crossbraces adjacent to louvers:
1. Isolatek Cafco® Fendolite® M-II, Isolatek International.
2. Monokote MK-146, W. R. Grace.

D. Potable water shall be used for the application of sprayed fireproofing materials.

E. Adhesive and Sealer: Isolatek Bond-Seal.

F. Mold Inhibitor: Mold inhibitor shall be added to fireproofing materials in accordance with manufacturer's instructions.

2.3 SYSTEM REQUIREMENTS

A. The sprayed fireproofing material shall have been tested by accredited laboratories to meet required ratings and performance, and shall conform to the applicable requirements of the building code and all authorities having jurisdiction. All materials and installation shall be in conformance with the Underwriters Laboratories, Inc., design numbers listed on the Drawings and all manufacturers shall be as listed by Underwriters Laboratories for the design numbers indicated.

B. Materials shall be applied to conform to the drawings, specifications and following test criteria:
   1. Deflection: When tested in accordance with ASTM E759, the material shall not crack or delaminate when the non-concrete topped galvanized deck to which it is applied is subjected to a one time vertical center load resulting in a downward deflection of 1/120th of the span.
   2. Bond Impact: When tested in accordance with ASTM E760, the material shall not crack or delaminate from the concrete topped galvanized deck to which it is applied.
   3. Cohesion/Adhesion (bond strength): When tested in accordance with ASTM E736, the material applied over uncoated or galvanized steel shall have an average bond strength of 200 psf (9.5 kPa).
   4. Air Erosion: When tested in accordance with ASTM E859, the material shall not be subject to losses from the finished application greater than 0.025 grams per sq. ft. (0.27 grams per square meter).
   5. Compressive Strength: When tested in accordance with ASTM E761, the material shall not deform more than 10 percent when subjected to a crushing force of 500 psf (23.9 kPa).
   6. Corrosion Resistance: When tested in accordance with ASTM E937, the material shall not promote corrosion of steel.
   7. Surface Burning Characteristics: When tested in accordance with ASTM E84, the material shall exhibit the following surface burning characteristics:
      a. Flame Spread 0
      b. Smoke Developed 0
   8. Density: When tested in accordance with ASTM E605, the material shall meet the minimum individual and average density values as listed in the appropriate UL design or as required by the authority having jurisdiction, but in no case shall be less than 15 pcf, minimum.

C. The material shall have been tested and reported by Underwriters Laboratories, Inc. (UL) in accordance with the procedures of UL 263 (ASTM E119).

D. Sprayed fireproofing materials shall be free of all forms of asbestos, including actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite. Material manufacturer shall provide certification of such upon request.

2.4 DESIGNS - FIRE RESISTANCE RATINGS

A. All sprayed fireproofing shall be applied at the required thickness and density to achieve the ratings listed and shall conform to the Underwriters Laboratories, Inc. design numbers, listed on the Drawings.

B. Where size of a structural steel framing member is smaller than the size indicated in the specified Fire resistance Rating Design, adjust the thickness of the sprayed-on material in accordance with the requirements of Underwriters Laboratories, Inc.

C. Sprayed fireproofing ratings are based on the products of Isolatek International. If products of the other listed manufacturers are used, revise the accessories and application procedures to meet requirements of the corresponding laboratory test numbers.

END OF SECTION 07810

SECTION 07840 - FIRESTOPS AND SMOKESEALS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Install firestops and smoke seals at:
   a. All penetrations through fire-resistive and smoke assemblies including, floors, fire rated partitions, smoke barriers, smoke partitions; and temporary partitions and barriers separating work areas from Owner's facilities.
   b. At expansion joints in chase walls where expansion joints are not exposed to view.
   c. Elsewhere that such firestopping and smoke seals are indicated, required by codes, regulations or governmental authorities having jurisdiction.
   d. At construction joints (perimeter openings) between floor construction and exterior walls or exterior aluminum curtain wall construction.
   e. At construction joints (perimeter openings) between floor or roof construction and aluminum curtain wall system in which a continuous horizontal mullion does not occur at the floor or roof line

B. Firestop and smokeseal systems in the work of this Section includes all labor, materials, equipment, and services necessary to complete the installation of Firestops and Smokeseals as required by code, as indicated on the Drawings, as specified herein and including, but not limited to, the following:

1. Single component, Non-Combustible, Silicone Firestop Sealant, Intumescent firestop calk (which remains flexible after curing), spray applied intumescent firestop mastic, or Putty for use in the following fire-rated and/or smoke barrier construction:
   a. With penetrations subject to movement including conduit, cable, bundles, buss duct, and non-combustible pipe.
   b. In control joints, in head of wall/floor assemblies, in floor edge wall voids, etc.
   c. As a sealant or caulking for smoke barrier construction, fire and smoke dampers, fire door frames in walls.
   d. In conjunction with mineral wool for open areas between floor/roof assembly and metal stud or aluminum framed curtain wall systems.
2. Cementitious Firestop Mortars for use:
   a. In static (non-moving) penetrations such as cable trays, electrical and communication cable bundles, conduit, and non-combustible sleeves and pipes.
   b. In filling cavities (openings) in fire rated assemblies.
3. Firestop collars for use with through penetrations involving combustible plastic pipe or conduit.
4. Firestop pillows for use for temporary sealing of openings and penetrations of any kind which need to be re-opened and re-sealed in a fast and safe manner.

5. Mineral fiber, non-combustible insulation (safing) for use as damming material for tested and rated firestop system per manufacturer's requirements; .
6. Clips and closures as required for support and containment of dams and insulation materials.
7. Firestopping sealant/mastic for construction joints between floor and exterior walls; and tops of partitions as specified above.

1.2 QUALITY ASSURANCE

A. Single source:

1. All work of this Section shall be produced by a single manufacturer except in the event there are penetrations or other requirements for fire/smoke stopping for which the proposed manufacturer has no listed Design System tests by Underwriters Laboratories, Inc., or other laboratories acceptable to authorities having jurisdiction, provide products by any of the specified manufacturer's for which Design Systems are listed.
2. Where penetrations occur for which no listed Design System tests exists, obtain from the firestop system manufacturer an engineered system acceptable to the authorities having jurisdiction for firestopping such penetrations. Engineered system from manufacturer shall include a detail drawing showing the engineered system and shall contain no disclaimers .

B. Comply with pertinent codes and regulations of governmental authorities having jurisdiction.

C. Labeling firestop systems:

1. Provide labels at all penetrations and joints where firestop systems have been applied.
2. Labels shall be self-adhering, minimum 3 inches by 5 inches, containing the following information:
   a. Printed message stating:

WARNING
FIRESTOP SYSTEM
DO NOT DISTURB
SYSTEM #_____
CONTRACTOR_____
DATE_____

Manufacturer's name, address and telephone number

3. Where application occurs at joints at partition tops, apply one label at 30 foot centers, on one side of partition.

1.3 PERFORMANCE CRITERIA

A. Provide firestop systems and work to conform to Building Code Requirements in fire resistant wall and floor assemblies.

B. Testing Requirements:

1. All firestop/smokeseal systems shall be tested by a recognized, independent testing agency and shall conform to both Flame (F) and Temperature (T) requirements of ASTM E-814.
2. Conform to UL Fire Hazard Classification Requirements.

C. Firestops in place shall be of sufficient thickness, width, and density to provide a fire resistance rating at least equal to the floor, wall, or partition construction into which it is installed.

D. Non-combustible dams shall be constructed:

1. As necessary to achieve fire rating as tested and rated.
2. In conformance with installation requirements for type of floor, wall, and partition construction.
3. As recommended by firestop/smokeseal manufacturer.

E. Combustible damming materials, if used, must be removed after proper curing.

F. Provide firestop materials that are free of solvents, lead, ethylene glycol, PCB's and asbestos.

G. In construction joints use only firestops that remain flexible after curing.

H. Do not use firestop materials which re-emulsify.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. For convenience to describe the quality level required, Bio Fireshield, Inc. [800] 233-6656, specifications are included.

B. Products manufactured by the following manufactures meeting all the requirements of this Section will be considered as equal to the specified products:

1. Hevi-Duty/Nelson, [800] 331-7325.
2. 3M Ceramic Materials Department, [800] 328-1687.
3. Tremco, [800] 551-7087.
4. Hilti Construction Chemicals, Inc.
5. Specified Technologies, Inc. (STI), [800] 992-1180.
6. Metacaulk, manufactured by Rectorseal Corporation [800] 231-3345.
7. Isolatek International, [201] 347-1200.

C. Products manufactured by Thermafiber LLC (888 834-2371), for firestopping perimeter openings between floor or roof construction and aluminum glazed curtain wall systems as described herein.

2.2 FIRESTOP SEALANTS, PUTTY AND SPRAYABLE MASTIC

A. Provide single component, non-combustible silicone elastomer firestop sealant, Biotherm 100 (Gun Grade), Biotherm 200 (Self Leveling), BioSTOP 500 and Biostop 700..

B. Sealant system shall have U.L. Classification as a "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM E-814/UL1479.

C. Sealant for sealing joints between underside of decks and tops of fire rated partitions, smoke barriers, smoke barriers.

2.3 CEMENTITIOUS FIRESTOP MORTAR

A. Provide cementitious firestop mortar Novasit K-10.

B. Firestop mortar shall have U.L. Classification as a "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM/UL1479.

C. Cementitious mortar shall be asbestos free.

2.4 FIRESTOP COLLAR (FOR USE WITH PLASTIC PIPE)

A. Provide pre-manufactured fire protective pipe sleeve, Bio Fireshield Firestop Collar.

B. Provide separated (two piece) firestop collar for application when plastic pipe system is already in place. Provide non-separated firestop collar for application prior to installation of plastic pipe system.

C. Firestop collars shall have UL Classification as "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM E-814/UL1479.

2.5 FIRESTOP PILLOWS

A. Provide Bio Fireshield Firestop Pillows.

B. Firestop pillows shall have UL Classification as "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM E-814/UL1479.

2.6 MINERAL FIBER INSTALLATION (FIRE SAFING)

A. Provide minimum 4 PCF Thermafiber as manufactured by Thermafiber LLC, minimum 4 PCF FBX Safing Insulation as manufactured by Fibrex, or approved equal to suit conditions and to comply with fire resistance and firestop manufacturer's requirements; galvanized steel safing clips as required for installation of safing insulation.

B. Material shall be classified non-combustible per ASTM E-136.

C. Use in conjunction with Biotherm 100 or Biotherm 200 Sealant for application for curtain wall construction.

D. At construction joints (perimeter openings) between floor construction and aluminum curtain wall system in which a continuous horizontal mullion does not occur at the floor line, install Thermafiber LLC, Firespan Curtain Wall Insulation, UL Perimeter Fire Containment System No. **CW-S-2001**.

END OF SECTION 07270

SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Throughout the Work, calk and seal all joints where shown on the Drawings and elsewhere as required to provide a positive barrier against passage of air and moisture.

B. Calking the following areas with sealant compound.

1. Interior and exterior perimeter of openings in exterior walls, including but not limited to:
   a. Aluminum curtain wall
   b. Aluminum entrance door systems
   c. Metal-clad fixed wood windows
   d. Door frames
   e. Louvers
2. Interior and exterior surfaces of expansion joints and control joints in masonry walls and partitions.
3. Joints between plumbing fixtures and abutting surfaces.
4. At sheathing for exterior masonry walls:
   a. In joints where sheathing abuts dissimilar surfaces or materials.
   b. Perimeter of penetrations through gypsum sheathing.
   c. Elsewhere that sealant is indicated in conjunction with sheathing.
5. Sealant "Soft Joints" in exterior masonry veneer walls where indicated on the Drawings.
6. Joints between stone cladding and abutting dissimilar materials.
7. Both sides of door frames and view windows located in interior partitions.
8. Perimeter of all casework.
9. Wood bases: at joint between wood base and floor; at joint between wood base and walls.
10. Wood wall trim: at joints between wood wall trim and walls.
11. Acoustical ceilings: at joint between acoustical ceiling wall molding and walls
12. Perimeter of prefabricated acrylic shower units.
13. Control and construction joints in cast-in-place concrete slabs.
14. Wherever sealant is indicated on the drawings and where such sealant is not specified to be installed under other sections of the specifications

C. Installing foam sealing strips at exterior expansion joints where new concrete foundations walls abut existing foundation walls; at expansion joints in exterior masonry walls, at foundation perimeter joint where floor slab abuts foundation walls, and elsewhere as indicated on the drawings.

1.2 PERFORMANCE

A. Performance and Design Requirements for Sealants: Provide sealants to maintain long term [20 year minimum] air tight and water tight seals. No cohesive or adhesive failures, nor cracking or bubbling of sealant surfaces are permitted.

PART 2 - PRODUCTS

2.1 SEALANTS

A. General: Use only the types of sealants described herein.

2.2 SILICONE SEALANTS

A. Silicone Sealant: Provide a one component, neutral cure, silicone sealant conforming to the requirements ASTM C719, FS TT-S 00230C, Type II, Class A and FS TT-S- 001543A, Class A. The sealant shall be compatible with the specified application's substrates and have a minimum movement capability of ± 50% and a shore A hardness of ±25.

B. Type "A": Provide silicone sealant for all joints in building skin not indicated to be sealed with another type of sealant.

1. Provide one of the following products.
   a. Silpruf by G.E. Silicones
   b. DC-791 or 795 by Dow Corning.
   c. Spectrem 2 by Tremco.
2. For high movement joints where + 100% -50% movement is required: One part Ultra – Low Modules, Dow Corning 790 Silicone Building Sealant, Spectrem 1 or equal system by G.E.

C. Type "B" for sealing joints between plumbing fixtures and abutting surfaces:

1. Dow Corning 786.
2. G.E. Sanitary 1700

D. Type "C" for sealing joints between all casework and abutting wall surfaces and gypsum soffit; for sealing joints between wood bases and floors and wood bases and walls; for sealing joints between wood wall trim with transparent finish and walls:

1. Dow Corning 799.
2. G.E. 1000

2.3 ACRYLIC SEALANTS

A. Type "E": For interior applications for sealing joints at perimeter of door frames, view windows, exterior windows, exterior louvers, wood wall trim with opaque finish , acoustical ceiling wall molding and walls, perimeter of prefabricated acrylic shower units.
   1. "Acrylic Latex 834" manufactured by Tremco

2.4 SEALANT COLORS

A. Colors: Provide custom colors to match the various abutting surfaces as follows:

   1. Horizontal joints in exterior brick: Color to match mortar.
   2. Vertical joints in exterior brick: Color to match brick.
   3. Perimeter joints at aluminum windows, aluminum curtain wall, aluminum entrances, exterior louvers and other such items: Color to match aluminum.
   4. Precast concrete joints as specified: Color to match limestone.
   5. Type "B": White or manufacturer's standard color, selected by Architect.
   6. Type "C": Clear.
   7. In concealed installation, standard gray or black sealant may be used.
   8. Architect shall approve all colors for matching.

2.5 PRIMERS

A. Use only those primers which are non-staining, have been tested for durability on the surfaces to be sealed, and are specifically recommended for this installation by the manufacturer of the sealant used.

2.6 BACKUP MATERIALS

A. Backer seal for exterior sealant application shall be a secondary seal, "Backerseal" manufactured by Emseal Joint Systems, LTD., Westborough, MA (508) 836-0280.

B. Backer rod for interior sealant applications, and elsewhere where "Backer Rod" is indicated on the Drawings, shall be non-absorbing, non-staining, extruded from a blend of polyolefin. Sof-Rod as manufactured by Applied Extrusion Technologies or Sof-Type, manufactured by I.T.P. Corp.

2.7 BOND-PREVENTIVE MATERIALS

A. Use one of the materials described in the following paragraphs, as best suited for the application and as recommended by the manufacturer of the sealant used.

B. Polyethylene tape: Pressure sensitive adhesive, with the adhesive required only to hold tape to the construction materials as indicated.

C. Aluminum foil: Conform to MIL-SPEC-MIL-A-148E.

D. Wax paper: Conform to Federal Specification UU-P-270.

2.8 MASKING TAPE

A. For masking around joints, provide masking tape conforming to Federal Specification UU-T-106C.

2.9 FOAM SEALING STRIP

A. Premolded Filler for Exterior Application: Emseal Precompressed (PC), as manufactured by Emseal Joint Systems, Inc., Westborough, MA (800) 526-8386, or as approved equal.

B. Premolded Filler for Interior Horizontal and Foundation Perimeter Joint Application: Preformed expanding open cell polyurethane foam impregnated with an acrylic polymer-modified water-based asphalt emulsion; 20H System as manufactured by Emseal Joint Systems, Inc., Westborough, MA (800) 526-8386.

1. Primer: Manufacturer's standard two component, high-modulus, high-strength, structural epoxy paste adhesive; Emseal 820.
2. Topcoat: Manufacturer's standard rubberized asphalt emulsion topcoat; Miter / Topcoat 200.

END OF SECTION 07920

SECTION 08110 - STANDARD STEEL DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Standard and fire-rated steel doors.

1.2 QUALITY ASSURANCE

A. Single source: All work of this Section shall be produced by a single manufacturer unless otherwise approved by the Architect.

B. Test reports and compliance:
   1. All labeled fire doors shall be of a type which has been investigated and tested in accordance with NFPA 80.
   2. Underwriters Laboratories labeled doors shall be manufactured under the UL factory inspection program and in strict compliance with UL procedure R-3791, and shall provide the degree of fire protection, heat transmission and panic loading capability indicated by the opening class. Appropriate steel label shall be mechanically attached to each door. Non steel labels will not be accepted.
   3. Labels shall be affixed to all classified doors for the class of opening indicated
   4. When listed in the door schedule or shown on the plans furnish hollow metal doors with a temperature rise core material that would provide a 250 degree in 30 minute rating. The fire label attached to the door shall state this temperature rise rating in addition to the regular fire door rating.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

   1. Ceco Door Products. Milan, TN 38358; (888) 232-6366.
   2. Curries Company, Inc., Mason City, IA 50401; 641-423-1334.
   3. Republic Builders Products Corp. McKenzie, TN 38201; (800) 733-3667.
   4. Steelcraft Mfg. Co., Cincinnati, OH; (800) 243-9780
   5. Fleming Door Products, Ltd., Ajax, ON; (800) 263-7515
   6. De La Fontaine, Sherbrooke, PQ; 819-821-9230.

2.2 CONSTRUCTION - FLUSH DOORS

A. General: Provide metal doors of the types and styles indicated on the Drawings and in Schedules.

B. Doors shall be 1-3/4" thick, of hollow metal construction.

C. Exterior doors and interior doors located in wet areas shall be fabricated of two 16-gage, roller-leveled, prime quality, G90 hot-dipped galvanized steel sheets.

D. Interior doors, except as indicated above, shall be fabricated of two 18-gage, roller-leveled, prime quality cold-rolled steel sheets.

E. Cores: Polystyrene core providing a "U" factor of 0.26 and an "R" value of 3.75 or better.

F. The vertical door edges shall be continuously fully welded and ground smooth. The vertical edge joint between the face sheets shall be ground smooth to provide a door with no exposed seams. Body fillers on vertical edges and faces will not be acceptable.

G. The top and bottom of the doors shall be closed flush with 16-gage steel channels. Provide weep holes on bottom channels.

H. Doors swinging in pairs and double egress doors:

1. Except for Class A doors, bevel the meeting stiles of pairs of fire rated labeled doors. Such doors with astragals will not be accepted.
2. Pairs of Class A labeled doors shall be provided with an astragal.
3. Meeting stiles of double egress doors in smoke barriers shall be rabbeted.

I. Glazing requirements:

1. Glass panels, as called for on the drawings, shall be held in place with moldings or shapes of 16 gauge steel in stock design.
2. The approved manufacturer's fire rated doors shall be capable of receiving fire rated wireless glass as specified in Section 08800 - Glazing.

2.3 FINISH HARDWARE PREPARATION

A. Prepare doors to receive mortised and concealed finish hardware, including cutouts, reinforcing, drilling and tapping in accordance with final Finish Hardware Schedule and templates provided by hardware suppliers. Comply with applicable requirements of ANSI A115.

B. Reinforce doors to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at site.

C. Except as otherwise indicated on the Drawings, or as required to comply with governing regulations, install finish hardware as indicated in "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the Door and Hardware Institute.

2.4 SHOP PAINTING

A. Clean, treat and paint exposed surfaces, including galvanized surfaces, of all steel doors.

B. Clean steel surfaces of mill scale, rust, oil, grease, dirt and other foreign materials before the application of the shop coat of paint.

C. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive field-applied paint.

D. In lieu of prime coated paint indicated above, products manufactured by S. W. Fleming with hot-dipped galvanized finish will be acceptable without prime paint.

END OF SECTION 08110

SECTION 08113 - STEEL FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Custom steel frames for the following:

1. Doors
2. Borrowed lights
3. Interior view windows

1.2 QUALITY ASSURANCE

A. Single source: All work of this Section shall be produced by a single manufacturer .

B. Test reports and compliance

1. All labeled frames shall be of a type which has been investigated and tested in accordance with UL-10(b), ASTM E-152, NFPA 80, ANSI A2.2 and, when required, UL-305.
2. Underwriters Laboratories labeled frames shall be manufactured under the UL factory inspection program in strict compliance with UL procedure R-3821 and UL-63 Standard for Safety. They shall provide the degree of fire protection, heat transmission and panic loading capability indicated by the opening class. Appropriate steel label shall be mechanically attached to each frame. Non steel labels will not be accepted.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Ceco Door Products. Milan, TN 38358; (888) 232-6366.
2. Curries Company, Inc., Mason City, IA 50401; 641-423-1334.
3. Republic Builders Products Corp. McKenzie, TN 38201; (800) 733-3667.
4. Steelcraft Mfg. Co., Cincinnati, OH; (800) 243-9780
5. Fleming Door Products, Ltd., Ajax, ON; (800) 263-7515
6. De La Fontaine, Sherbrooke, PQ; 819-821-9230.

B. Basis of Design: Provide metal frames of the types and styles indicated on the Drawings and in Schedules. Comply with applicable S.D.I. standard for minimum materials and construction requirements except as otherwise specified herein.

2.2 CUSTOM STEEL FRAMES

A. Materials:

1. Interior Openings: Frames shall be either commercial grade cold-rolled steel conforming to ASTM A366 or commercial grade hot-rolled and pickled steel conforming to ASTM A569, except frames manufactured by S. W. Fleming shall have a zinc coating supplied by the hot-dip process .
2. Exterior Openings: Frames shall be either commercial grade cold-rolled steel conforming to ASTM A366 or commercial grade hot-rolled and pickled steel conforming to ASTM A569, and shall have a zinc coating supplied by the hot-dip process conforming to ASTM A526 with designation ZF275 (G90).

B. Frames shall be saw mitered and continuously welded. Fabricate frame units to be rigid, neat in appearance and free from defects, warp or buckle. Form metal accurately to required profiles. Gages shall be as follows:

1. Interior frames: 16 gage up to but not including 3–6"; 14 gage for 3'–6" and over in width, and for all lead-lined door frames.
2. Exterior frames: 14 gage.

C. Frame Reinforcing

1. Where door frame openings exceed 4' – 0", reinforce frames with 1/8 inch thick steel channel extending full length of frame head and welded thereto.

D. Wherever practicable, fit and assemble units in the manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at the site.

E. Drill stops to receive three silencers on strike jambs of single-swing frames; two at heads of double-swing frames.

F. Provide 26-gage steel plaster guards or mortar boxes, welded to frame at back of all finish hardware cutouts where mortar or other materials might obstruct hardware operation.

G. Frames for interior borrowed lights shall be 16 gage, fabricated similar to door frames and be furnished with glazing stops. Provide loose, channel-shaped stops, prepared for screw application to frames.

H. Fabricate frames with the proper depth between flanges to receive the full thickness of the finished partition.

I. Provide door frames with a shipping bar welded to the base (bottom) of each frame for in-transit support.

2.3 FINISH HARDWARE PREPARATION

A. Prepare units to receive mortised and concealed finish hardware, including cutouts, reinforcing, drilling and tapping, in accordance with final Finish Hardware Schedule and templates provided by hardware suppliers. Comply with applicable requirements of ANSI A115.

B. Reinforce units to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at site.

C. Except as otherwise indicated on the Drawings, or as required to comply with governing regulations, install finish hardware as indicated in "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the Door and Hardware Institute.

2.4 SHOP FINISHING

A. Clean, treat and paint exposed surfaces of interior fabricated hollow metal units. Clean surfaces of mill scale, rust, oil, grease, dirt and other foreign materials before the application of the shop coat of paint.

B. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive field-applied paint.

C. In lieu of prime coated paint indicated above, products manufactured by S. W. Fleming with hot-dipped galvanized finish will be acceptable.

END OF SECTION 08113

SECTION 08211 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Standard and fire rated wood doors

B. Flush wood full glass doors.

C. Factory machining.

D. Factory glazing.

E. Factory finishing.

1.2 PERFORMANCE REQUIREMENTS

A. Comply with applicable requirements of the following standards unless otherwise indicated:

1. All doors shall be, at a minimum, in accordance with Architectural Woodwork Institute Quality Standards Guide Specifications and Quality Certification Program, Seventh Edition, Section 1300 Architectural Flush Doors, except as modified herein.
2. Non-Fire-Rated Wood Doors: All solid core flush wood doors shall be in accordance with Architectural Woodwork Institute "Quality Standards" Section 1300 Architectural Flush Doors and be PC-5ME Particle Core Door type construction, or SCL-5ME Structural Composite Lumber Core, for premium grade doors, with core, stile and rail components all glued together with no voids permitted.
3. Fire-rated wood doors: Where fire-resistance classifications are shown or scheduled for door assemblies, provide doors which comply with the appropriate parts of the above AWI standards, premium grade, with the requirements of NFPA No. 80 "Standard for Fire Doors and Windows". Fire-rated doors shall bear the label of an independent testing agency having approval of the local building authorities.

1.3 WARRANTY

A. All door shall be warranted by the manufacturer to be free of manufacturing defects for the life of the original installation. Warranty shall provide for replacement of the door as originally furnished. Manufacturer shall pay a reasonable charge to remove a defective door, refinish and replace with a new door providing the defect was not apparent prior to its installation.

B. Warranty shall include replacement of glass and glazing if defective door has vision lite.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to complaince with requirements, provide products of one of the following: No other manufacturers will be accepted.

1. Algoma Hardwoods, Inc., Algoma, Wisconsin (800) 678-8910.
2. Marshfield Door Systems, Inc, Marshfield, Wisconsin (800) 869-3667.

2.2 FIRE-RATED FLUSH WOOD DOORS- 45, 60, AND 90 MINUTE FIRE RATED DOORS

A. Type:

1. Algoma Superfire Door.
2. Marshfield DFM Series.

B. Doors shall be 1-3/4" thick unless noted otherwise.

C. Provide balanced construction by furnishing stile edge screw holding reinforcement to both vertical stiles on all 45, 60, and 90 minute rated doors.

D. Provide all mineral core doors with full length untreated solid lumber vertical stiles, matching face veneers for species and for color.

E. Provide 45, 60, and 90 minute doors with special heavy duty reinforcement, as required, to allow surface mounted hardware to be attached with screws. Through bolting will not be accepted.

F. Stiles:

1. Single doors:
   a. Algoma: Superstile with outer stile of same specie as face veneer.
   b. Marshfield: Triple-Ply with veneer edge band of same specie as face on 45, 60 and 90 minute doors.
2. Pairs of doors:
   a. Algoma:
      1) 45 and 60 minute doors: Superstile with outer stile of same specie as face veneer
      2) 90 minute doors:
         a) Pairs of doors with listed vertical rod exit devices: Superstile with outer stile of same specie as face veneer.
         b) Pairs of doors with listed cylindrical, mortise or hospital latch: Standard Edge Guard set #208 with applied veneer of same specie as face veneers..
   b. Marshfield
      1) 45 and 60 minute doors: PairGuard System. Stiles shall be edgebanded with veneer of same specie as face veneers
      2) 90 minute doors:

a) Pairs of doors with listed vertical rod exit devices: PairGuard System. Stiles shall be edgebanded with veneer of same specie as face veneers.
b) Pairs of doors with listed cylindrical, mortise or hospital latch: Metal Edge series 208 with applied veneer of same specie as face veneers.

G. Wood reinforcing blocking:

1. Fire rated mineral and particle core doors with surface mounted closers or automatic operators, provide adequate top rail blocking (minimum 5-1/2 inches high).
2. Surface mounted fire exit devices and vertical rods on mineral core doors, provide 5-1/2 inch high top, intermediate and bottom rail blocking for screw mounting.

H. Furnish written statement on 60 and 90 minute labels that construction provides the heat transmission rating of a maximum of 250 degrees F. in 30 minutes.

I. Exposed top rails fabricated to produce a smooth finish:

1. Algoma: Maple, birch or basswood.

2.3 FLUSH WOOD DOOR - 20 MINUTE RATED DOORS

A. Type:

1. Algoma PC-5.
   a. Core: Particleboard conforming to ANSI A208.1, Grade LD-2.
   b. Stile: 2 ply 1-3/8 inch nominal prior to factory trimming, glued to core, outer stile of same species as face veneer.
2. Marshfield DFP-20 Series.
   a. Core: Particleboard conforming to ANSI A208.1-LD-2.
   b. Stile: 1 ply 1-3/8 inch nominal TimberStrand Laminated Strand Lumber prior to factory trimming, glued to core, veneer banded in same specie as face veneer

B. Doors shall be 1-3/4" thick except where indicated otherwise.

C. Exposed top rails fabricated to produce a smooth finish:
   a. Algoma: Maple, birch or basswood.

D. Wood reinforcing blocking:

1. Fire rated particle core doors with surface mounted closers or automatic operators, provide adequate top rail blocking (minimum 5-1/2 inches high).
2. Surface mounted fire exit devices with vertical rods, provide 5-1/2 inch high bottom rail blocking for screw mounting.

2.4 NON-FIRE-RATED FLUSH WOOD DOORS

A. Construct using 5 ply hot-press method. Wood used shall be thoroughly seasoned, kiln dried with a moisture content of not less than 5% and not greater than 8%.

B. Thickness: 1-3/4 inches, except provide 2-1/4 inch thick doors for double-acting doors with concealed overhead closers.

C. Particle Core Doors

1. Algoma Novodor:
   a. Core: Particleboard conforming to ANSI A208.1, Grade LD-2.
   b. Stile: 2 ply 1-3/8 inch nominal prior to factory trimming, glued to core, outer stile of same species as face veneer.
2. Marshfield DPC-1 Series.
   a. Core: Particleboard conforming to ANSI A208.1-LD-2.
   b. Stile: 1 ply 1-3/8 inch nominal TimberStrand Laminated Strand Lumber prior to factory trimming, glued to core, veneer banded in same specie as face veneer
3. Exposed top rails fabricated to produce a smooth finish:
   a. Algoma: Maple, birch or basswood.
4. Wood reinforcing blocking:
   a. Doors with surface mounted closers or automatic operators, provide adequate top rail blocking (minimum 5-1/2 inches high).
   b. Surface mounted exit devices with vertical rods, provide 5-1/2 inch high bottom rail blocking for screw mounting.

2.5 FLUSH WOOD FULL GLASS DOORS

A. Algoma FGFW Full Glass Door with Life Time Warranty.

1. Thickness: 1-3/4 inches, unless indicated otherwise.
2. Cores: Core: Structural composite lumber core.
3. Stiles: 7/8 inch prior to factory trimming, glued to core of same species as face.
4. Top and bottom rails: 5/8 inch high top and 1-3/8 inch high bottom prior to factory trimming, glued to core, mill option hardwood species. Top rail fabricated to produce a smooth finish; Maple, birch or basswood.
5. Veneer matching: Book matched.

B. Marshfield full glass door with horizontal mullion with Life Time Warranty.

1. Thickness: 1-3/4 inches, unless indicated otherwise.
2. Core: DCL-1.
3. Stile edges: Veneer edge bands of same specie as face veneers.
4. Veneer matching: Book matched.
5. Exposed top rails fabricated to produce a smooth finish:
   a. TimberStrand Laminated Strand Lumber.

2.6 DOOR FACINGS

A. Veneered doors for transparent finish:

1. Veneer Grade: A
2. Veneer Species: White Maple
3. Veneer Cut: Quarter sliced
4. Matching Between Individual Pieces of Veneer: Slip matched grain for transparent finish.
5. Assembly of Door Faces: Center Balanced match, minimum 6 inch widths.
6. Pairs: Provide pair matching for pairs of doors.

2.7 GLAZING BEADS FOR VISION PANELS

A. Non-fire rated doors:

1. Algoma: Doors with transparent finish: No. W-4 hardwood matching face veneers for species and color.
2. Marshfield: Doors with transparent finish: No. W-6 hardwood matching face veneers for species and color.

B. Fire rated doors:

1. Algoma: Doors with transparent finish: W-9 Fire Rated Wood Veneered Lite Beading, matching face veneers for species and color
2. Marshfield: Doors with transparent finish: Fire Rated Wood Veneered Lite Beading, matching profile of W-6 and matching face veneers for species and color
3. Exceptions: 20 minute fire rated doors in smoke barriers shall have metal frames, style 115.

C. Glazing beads for doors with transparent finish: Each section of the glazing bead comprising the glazing frame shall be compatible for color. Heartwood species shall have no sapwood; sapwood species shall have no heartwood.

2.8 GLASS

A. Transparent, Wireless, Fire Rated Glass, laminated ceramic glazing material as manufactured by Nippon Electric Glass Co., Ltd. and distributed by Technical Glass Products (800) 426-0279.:

1. 5/16 inch thick FireLite®Plus , Premium (polished surfaces) .
   a. Install in fire rated door assemblies. Conform with latest edition of ASTM E152, ASTM E163, NFPA-80, NFPA 252, NFPA 257.
   b. Permanently identify each individual glazing unit with a listing mark visible after installation.
   c. Install in accordance with manufacturer's specifications, shall be glazed into frames with a similar rating, using silicone glazing compound which shall be supplied with the Firelite material.

B. Clear wire glass:

1. Doors in smoke barriers: Install 1/4 inch thick polished glass with wires running diagonally.
2. Each individual glazing unit shall be permanently identified with a listing mark which shall be visible after installation.

C. Clear tempered glass:

1. Install in non-rated wood doors.
2. Glass shall comply with:
   a. Federal Specification DD-G-001403B covering heat strengthened and fully tempered flat glass.
   b. ANSI Z97.1-1975 Standard for Safety Glass.
3. Each individual glazing unit shall be permanently identified with a listing mark which shall be visible after installation.

2.9 FABRICATION

A. Fabricate doors in strict accordance with the above specified standards, the manufacturer's specifications, including the specified options as listed herein.

B. Factory prefit and premachine doors including properly sized and spaced pilot holes for all mortise butt hinges and mortise lock fronts. Request the following information to be received:

1. Approved metal buck schedule and shop details.
2. Approved hardware schedule and templates.

C. Finish Hardware Locations

1. Coordinate finish hardware locations with the work of Section 08113 - Steel Frames.
2. Except as otherwise indicated on the Drawings, or as required to comply with governing regulations, install finish hardware as indicated in NWWDA Industry Standard I.S.1.7, "Hardware Locations for Flush Wood Doors".

D. Clearance:

1. For non-fire rated doors provide clearances of 1/8 inch at each jamb, 1/8 inch at head, 1/8 inch at meeting stiles for pairs of doors and 1/4 inch from bottom of door to top of decorative floor finish or covering.
2. Where thresholds occur provide 1/4 inch clearance from bottom of door to top of threshold, unless otherwise noted.
3. For fire-rated doors, provide clearances complying with the limitations of the authority having jurisdiction.
4. Where floor conditions required additional vertical trimming, trim within the limits of the bottom rail and to the specified clearance. Seal bottom edge of rail after trimming.

E. Provide all cut-outs.

F. Rabbet meeting stiles of pairs of doors located in smoke barriers.

2.10 GLAZING

A. Install glass in strict accordance with manufacturer's printed instructions.

B. Install glazing bead with mitered corners.

C. Countersink nails and fill holes with color matched putty.

2.11 FINISHING

A. Factory finish doors faced with wood veneers in accordance with AWI Finish System No. TR-6 Catalyzed Polyurethane, Premium Grade, with 2 top coats. Sheen: satin.

1. Stain shall be custom color. Architect will furnish color sample for matching.

2.12 TOUCH-UP FINISHES

A. Field touch-up of doors, scheduled for transparent finishes, will be performed by an authorized representative of the door fabricator.

B. Field touch up includes the filling, repair, touch-up and refinishing of exposed job-made nail or screw holes, raw surfaces resulting from job fitting, job-inflicted scratches and mars, and final cleaning of the finished surfaces. Use materials as furnished by the door fabricator that blend in color and sheen and are compatible for field applications.

END OF SECTION 08211

SECTION 08311 - ACCESS PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Access panels are include herein for information relative to the specifications for the types of access panels to be included in the project. Access panels are specified to be furnished under Division 15 - MECHANICAL and Division 16 - ELECTRICAL.

1.2 QUALITY ASSURANCE

A. Source Limitations: Obtain doors and frames through one source from a single manufacturer.

B. 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 per the following test method and that are labeled and listed by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction:

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Milcor Inc., Holland, OH 43528 (800) 861-6452.
2. Karp Associates Inc., Maspeth, NY 11378 (800) 888-4212.
3. Elmdor / Stoneman, City of Industry, CA 91744 (800) 488-8999.

2.2 ACCESS PANELS

A. Products: Products listed below are those of Milcor, Inc. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

1. Plaster walls and ceilings - Milcor Style K.
2. Tile and masonry - Milcor Style M.
3. Gypsum Wallboard walls and ceilings - Milcor Style DW

B. Provide fire rated access panels in rated partitions and ceilings. Fire rated access panels shall carry Underwriters Laboratories, Inc., 1-1/2 hour label in walls and Warnock-Hersey, 3 hour

label in ceilings. Fire rated access panels shall be provided with a 20 gauge insulated door panel operated by a knurled knob.

C. Access panels shall be supported on invisible hinges and shall be fitted with standard cams to be operated by screwdriver. All panels shall be finished with one coat gray rust inhibitive paint.

END OF SECTION 08311

SECTION 08355 - HORIZONTAL SLIDING FIRE DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish and install all horizontal sliding, accordion-type fire doors.

1.2 QUALITY ASSURANCE

A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to ASTM 152 and UL 10B.

B. Installer Qualifications: Installation shall be performed by factory trained personnel.

PART 2 - PRODUCTS

2.1 MANUFACTURER

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

1. Won-Door Corporation, Salt Lake City, UT 84104, (800) 453-8494.

2.2 HORIZONTAL SLIDING ACCORDION-TYPE FIRE DOORS

A. Basis of Design Product: "FireGuard Model 90" as manufactured by Won-Door Corp.

1. Fire Protection Rating: Fire doors shall be UL listing as a special purpose fire doors having a 90 minute fire-resistive rating.
2. Color: As selected by the Architect from manufacturer's full range of options.

B. Construction: Shall consist of two parallel, accordion-type walls of panels independently suspended with no pantographs or interconnections except at the lead-post.

C. Panels shall be formed of 24-gauge enamel coated steel V-grooved for strength and resilience. Panels shall be connected by full height 24-gauge enamel coated steel hinges.

D. Suspension System: shall consist of two 14-gauge cold rolled steel (or .125 aluminum) tracks on 8" (.203) centers attached to the overhead structural support. Each lead post shall be suspended by a 8-wheel ball bearing trolley. Each panel shall be suspended by a steel hanger pin and a ball bearing roller.

E. Lead-posts: shall be of 24-gauge cold rolled steel and shall be connected by specially formed steel panels. An internally mounted stabilizer bar shall keep lead-posts plumb and in proper alignment during operation and insure a tight fitting closure.

F. Perimeter Seals: shall consist of continuous extruded vinyl sweeps attached to the top and bottom of the fire door to form a smoke and draft seal.

2.3 OPERATION

A. Automatic Closing System Operation: Closing system shall consist of an electronic control box, motor operator assembly and leading edge obstruction detector. In case of fire, closing system shall be activated by the building's fire/smoke detection equipment and automatically close the Won-Door FireGuard doors. Motors shall be operated by DC power supplied from a 12-volt maintenance-free battery located in the electronic control box. Batteries shall be continuously charged by the building's electrical service and be automatically maintained at capacity. Fire doors may be operated manually in either the conventional or emergency mode.

B. Electronic Control Box: Shall house the microprocessor logic board, interconnect board, 12-volt maintenance-free battery, power supply charger, and motor control relays. The microprocessor shall initiate a loud audible signal should any of the following conditions arise:

1. High or low AC voltage
2. High or low DC voltage
3. Drive train malfunction
4. Limit switch malfunction
5. Key switch malfunction
6. ROM or RAM check-sum error

C. Motor Operator Assembly: Shall consist of a DC gear-motor, limit switch, drive sprocket and clutch. The motor shall drive the fire door by means of a chain attached to the stabilizer bar trolley. Motor operator assembly shall be located within a one (1) hour fire rated enclosure.

D. Key Switch Module: Shall consist of a key switch and high decibel alarm.

E. Leading Edge Obstruction Detector: fire doors shall be equipped with a pressure sensitive leading edge such that each contact with an obstruction shall cause the door to stop and pause before attempting to re-close. Fire doors can be manually opened at any time by pushing against the leading edge.

F. Exit Hardware shall be located on both sides of each fire door. In emergency mode a slight pressure on the hardware will cause the door to open a minimum of 32 inches, pause for 3 seconds, then automatically close. The hardware shall be field programmable to allow automatic opening distances of up to the entire opening width. In the conventional mode, the hardware is used to open the door and move it back into the storage pocket.

END OF SECTION 08355

SECTION 08461 – SLIDING AUTOMATIC ENTRANCE DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Exterior and interior biparting-sliding, automatic entrance door assemblies.

1.2 QUALITY ASSURANCE

A. Installer Qualifications: Installer experienced to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.

B. Manufacturer Qualifications: Manufacturer shall have minimum (5) five years successful experience in the fabrication of automatic doors of the type required for this project. Manufacturer capable of providing field service representation during installation, approving acceptable installer and approving application method.

C. Emergency-Exit Door Requirements: Comply with requirements of authorities having jurisdiction for automatic entrance doors serving as a required means of egress.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Horton Automatics; Div. of Overhead Door Corporation, Corpus Christie, TX 78405, (800) 531-5591.

2.2 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.

1. Sliding Automatic Entrance Door : Horton Type 310
   a. Configuration: Biparting-sliding doors, with two sliding leaves and breakaway sidelites on each side.

B. Operator: The Electric Operating Mechanism shall be Series 2003 Belt Drive. The operator shall be mounted and concealed within the header. Operating force shall be accomplished through a 1/8 HP DC permanent magnet motor with worm gear transmission and 1800 RPM working with drive belt, attached door hangers, and idler pulley. Drive belt to be Neoprene reinforced nylon, 3/4" (19 mm) wide. Idler pulley to be reinforced, non-metallic material.

1. The Microprocessor Master Control shall have Horton Version 2 software and have programmable speed values for: Open Speed, Close Speed, Open Check, Close Check, and Open Cushion; however, Close Speed not to exceed 12" (305 mm) per second.
2. The control shall also have programmable time values for: Full-Open Time Delay and Partial-Open Time Delay. Partial-Opening to be adjustable in increments of 1" (25 mm). Modes of operation shall be: Auto-seal mode with self-close approximately every 11 seconds, Self-cycle test mode (operates door during tune-in process), Night mode power fail operation, Day mode autolock prevention, Day 1-way and 2-way, Night 1-way and 2-way. Diagnostics shall be accomplished via a digital display.
3. Control to have dedicated interface connection.
4. A Revolution Encoder shall instruct the control on sliding panel's speed and position. An Adjustable Reversing Circuit will reopen door unit if closing path is obstructed. Maximum force required to prevent sliding panel from closing = 28 lbf.
5. Finger Safety: When unit slides open, strike rail of sliding panel will stop 3 ½ inches short of adjacent sidelite; resulting opening is net slide.
6. Power On/Off Switch: Shall be located inside header and when switched OFF, unit reverts to free manual operation (likewise during electrical power failure).

C. Header: Shall be aluminum with removable face plate and capable of self-support up to length of 16 feet (4877 mm) on standard door size and glazing. Optional transom of size and type indicated mounted on header. Header size to be 6 inches deep by 6" inches high.

D. Track: Shall be be aluminum, 5/8" (8 mm) wide and replaceable. Door-hanger Rollers will be non-metallic, sealed ball bearing wheels 1-3/4 inch diameter. Anti-Derailing shall be accomplished by means of a separate adjustable roller.

E. Sliding Panels and Sidelites: Shall be aluminum, 1-3/4 inches deep with "medium stile" horizontal and vertical rails. Weather-stripping to be along perimeter of sliding panel(s) and swingout sidelite(s). Concealed guides to stabilize bottom of sliding panel. Standard glazing prep to be for ¼ inch glass

1. Emergency Egress: Slide-swing panels can swing out 90° from any position of slide movement and require no more than 50 lbf. (222 N) of force applied at the lock stile to open. Swing-slide panels and swing-out sidelites have torsion spring designed to re-close panel if pushed open in the direction of egress; also, include intermediate horizontal rail. Units with emergency egress feature are UL listed as an exit way and are compliant with NFPA 101.

F. Threshold: Shall be aluminum, ½ inches (25 mm) tall by 4 inches (102 mm) wide or optional threshold 7 inches (178 mm) wide.

G. Actuating and Safety Devices: Provide actuating and safety devices as specified in Section 08717 – Automatic Door Sensing Systems.

H. Glass: 1-inch thick insulating units. Refer to Section 08800 – Glazing, for glass type and performance requirements.

I. Hardware: 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, unless otherwise indicated.

2.3 MATERIALS AND FABRICATION

A. Extruded Aluminum: ASTM B221, 6063-T5 alloy and temper, anodized:

1. Structural Header Sections: Minimum 3/16 inches (5 mm) thickness.
2. Structural Frame Sections: Minimum 1/8 inches (3 mm) thickness.
3. Structural Panel Sections: Commercial grade.

B. Panel Construction: Mortise and tenon type joints, neatly and mechanically secured. Sash consists of snap-in glass stops, snap-in glazing beads and vinyl gaskets.

C. Frame Construction: Butt joints, neatly and mechanically secured by means of screws and formed aluminum corner brackets.

D. Operator Construction: Electromechanical, modular type construction.

2.4 FINISHES

A. High-Performance Organic-Coating 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 Two-Coat Coating System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin (Kynar 500) by weight; complying with AAMA 2605.
2. Approved Manufacturer: PPG Industries, Inc.
   a. Color and Gloss: Custom color as selected by Architect to match curtainwall system.

END OF SECTION 08461

SECTION 08470 - REVOLVING ENTRANCE DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes conventional, circular, revolving entrance doors of the following configurations and operations:

1. Two wing, automatic.

1.2 PERFORMANCE REQUIREMENTS

A. General: Provide revolving entrance door assemblies that have the following capability based on testing manufacturer's standard units similar to those indicated for this Project:

B. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 1.25 cfm/sq. ft. of fixed entrance system area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft..

C. Thermal Movements: Provide revolving entrance doors 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, ambient; 180 deg F, material surfaces.

D. Operating Range: Minus 20 to plus 130 deg F.

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Manufacturer to have minimum (5) five years successful experience in the fabrication of automatic doors of the type required for this project. Manufacturer capable of providing field service representation during installation, approving acceptable installer and approving application method.

B. Installer Qualifications: Installer experienced to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.

C. Means-of-Egress Requirements: Comply with requirements of authorities having jurisdiction for revolving entrance doors serving as a component of a means of egress, including capability

of collapsing into a book-fold position, minimum exit width, maximum turning speed, and maximum force required to collapse door wings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Horton Automatics; Div. of Overhead Door Corporation, Corpus Christie, TX 78405, (800) 531-5591.
2. Boon Edam, Inc., Salt Lake City, UT 84123, (800) 658-8776.

2.2 REVOLVING ENTRANCE DOOR ASSEMBLIES

A. General: Provide manufacturer's standard revolving entrance door assembly, complete with door wings, enclosure walls, ceiling, hardware, glass, and controls.

1. Activation devices and safety devices, shall be as specified in Section 08717 – Automatic Door Sensing Systems.

B. Revolving Entrance Door Assembly : Two-wing construction with prismatically shaped display cases and collapsible emergency egress doors in the center for evacuation purposes

1. Basis of Design Product: "Grand Revolving Door, Series 9620" as manufactured by Horton Automatics.

2.3 COMPONENTS

A. Framing Members: Manufacturer's standard 1-3/4-inch thick, glazed framing with tubular members. Match material and finish of revolving entrance door, unless otherwise indicated.

B. Enclosure Walls: The round enclosure shall be constructed of eight (8) curved sections. The display case enclosure shall be round and composed of three (3) curved sections

C. Stile-and-Rail Door Wings: Manufacturer's standard, 1-3/4-inch- thick, glazed doors constructed of extruded aluminum with "medium stile" tubular stile-and-rail members.

D. Canopy: Provide canopy to match contour of enclosure Canopy sides to be furnished in aluminum panel. Provide aluminum clad material (.062" -1.5mm) for interior ceiling. Exterior roof fabrication from .125" (3 mm) anodized aluminum

E. Glazing: Segmented door wings and drum enclosure shall have 1-inch thick insulating units utilizing 1/4-inch tempered outer and inner lites. Refer to Section 08800 - Glazing for glass type and performance requirements.

F. Hardware / Weatherstripping: Provide muntin bar on wings and five (5) pin locks with manual bolts on two wings. A sweep shall be affixed to each wing and centershaft core to provide adequate weatherseal. Stopping position shall be selectable in either the open or closed position

G. Floors: Extend adjacent recessed foot grilles, specified in Section 12485 – Foot Grilles, into enclosure as indicated on Drawings.

H. Ceiling Lights: Manufacturer's standard consisting of twelve recessed light fixtures within the revolving entrance door enclosure ceiling, complete with lamps and translucent lenses.

2.4 EQUIPMENT

A. Operator: The operator shall be supplied complete with a positive control, twin perimeter-drive 1/4 HP high torque, 90 VDC motor and gear boxes and control panel. Control panel shall provide speed control. An onboard UPS system shall provide a minimum of one half (1/2) hour full operation should power failure occur. Control logic shall activate the UPS system to move the door to the emergency egress position, stop and unlock. The control shall have a display showing door status and condition of all door functions. Each safety sensor group shall have an LED display showing its status and alarm condition. The door shall also be capable of changing adjustments by means of a wired remote control unit. The user shall be able to change door speeds, braking, safety sensor function, system time delays, and environment conditions (lighting, etc.)

B. Automatic Operation:

1. Two microwave Motion Detectors shall be placed at each entrance to the revolving door to detect someone approaching the door. This actuation shall cause the door to accelerate to the rate of 2-4 RPM for one complete turn after the actuating signal is removed, then slow for 1/2 revolution and stop.
2. A momentary contact switch with 1" round pushbutton shall be placed at the entrance to the door. The switch mounting plate shall read "PUSH BUTTON TO SLOW DOOR". Pushing this button will cause the door to revolve at 1-2 RPM for a selected amount of time. A voice annunciator will say "DOOR IN SLOW SPEED, DO NOT PUSH." After the selectable time-delay expires the door will ramp back up to normal speed and operation.
3. The door is capable of stopping in the "open" or "closed" position. Even in the closed position, access through the leading edge will allow entrance into the door and access to the display areas from the interior side.

2.5 ACTIVATION AND SAFETY DEVICES

A. Electronic Safety and Collapsing Mechanism: The door system shall be equipped with VistaStop™, a field-adjustable, infrared sensing device to detect an object in its path and stop the door along with a sender/receiver active infrared system. Activation shall turn on a voice annunciator that says, "PLEASE STEP FORWARD." When the object is clear, the door ramps back up to normal speed. Sensing zones shall be adjustable from the face of the wing and

display case up to 36-inches away The two center wings shall be hydraulically cushioned upon collapsing and electronically sense any obstruction that would cause the wing to be moved from its centered position. This sensing causes the door to stop. After clearing the obstruction, the wing shall return to its normal position and the door will begin to rotate again. Wings can also be held open to allow free movement in and out of the building for large objects

B. EntryGuard: An infrared device will be tied to door rotation and stop the door any time an object is detected when the display case is within 24-inches of the entrance throat post. This distance shall be adjustable within software and its function selectable to slow or stop depending on customer choice

2.6 FINISHES

A. High-Performance Organic-Coating 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 Two-Coat Coating System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin (Kynar 500) by weight; complying with AAMA 2605.
2. Approved Manufacturer: PPG Industries, Inc.
   a. Color and Gloss: Custom color as selected by Architect to match curtainwall system.

END OF SECTION 08470

SECTION 08710 - FINISH HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Provide finish hardware throughout the Work as shown on the Drawings, specified herein, and as needed for a complete and proper installation.

1.2 GENERAL REQUIREMENTS

A. All hardware, as far as practical, shall be one manufacturer's make. The Contractor shall submit to the Architect a list of all finish and operating hardware, listing all items by the manufacturer's name, catalog number and description.

B. Provide hardware by specified manufacturers only, except where the words "or approved equal" are indicated. The Architect will be the sole judge in determining the equality of products proposed for substitution from specified manufacturers.

PART 2 - PRODUCTS

2.1 MATERIALS AND FINISH

A. Materials and finishes shall be:

1. Interior butts: Steel US26D
2. Exterior butts: Bronze US26D
3. Door closers:
   a. Finishes based on LCN-Powdered Coatings.
   b. Where US26D occurs - LCN No. 1
4. Exit Devices:
   a. Von Duprin
      1) Where US26D occurs, all parts US26D except aluminum US28 at housing and US32D stainless steel touchbar.
   b. Sargent
      1) Where US26D occurs: stainless steel US32D with US26D exterior trim.
5. All other hardware shall be bronze with US26D finish.

2.2 KEYED INSTRUCTIONS

A. Construction cores and keys shall be provided during the construction period. When directed by the Owner, remove the cores and install the new cores keyed into the existing Grand Master Key System.

B. Cylinders and Key System: Interchangeable-core pin tumble lock cylinders and nickel silver keys: Medico.

C. Keys:

1. Furnish three (3) keys for each cylinder keyed differently, six (6) keys for each set keyed alike, and in sets where only two (2) cylinders are keyed alike, four (4) keys will be required.
2. Privacy sets: Furnish (2) emergency keys for each privacy set.

2.3 BUTTS

A. Butts: Shall be Stanley as specified in the following schedule. Butts manufactured by Hager, Soss or McKinney will be accepted.

B. Hinge pins: Except as otherwise indicated, provide hinge pins as follows:

1. Steel hinges: steel pins.
2. Non-corrosive hinges: stainless steel pins.
3. Exterior doors: non-removable pins.
4. Interior doors: non-rising pins.
5. Tips: flat button and matching plug, finished to match leaves.

C. Butt hinges required per door:

1. Doors 60 inches or less in height: 2 butts
2. Doors over 60 inches and not over 90 inches: 3 butts
3. Door over 90 inches high: 4 butts
4. Dutch type doors: 4 butts

INTERIOR DOORS

Type	Frame	Width	Thickness	Type and Size Butts
WD	WDF	3'–4" and less	1-3/8	FBB179-4x4
WD	PMF	3'–4" and less	1-3/8	FBB179-4x4
WD	WDF	3'–4" and less	1-3/4	FBB179-4-1/2x4
WD or HM	CIF	3'–4" and less	1-3/4	FBB167-4-1/2
WD or HM	PMF	3'–4" and less	1-3/4	FBB179-4-1/2x4
WD	WDF	3'–6" and over	1-3/4	FBB168-5x4-1/2
WD or HM	CIF	3'–6" and over	1-3/4	FBB138-5x4-1/2

WD or HM	PMF	3'–6" and over	1-3/4	FBB168-5x4-1/2

EXTERIOR DOORS

Type	Frame	Width	Thickness	Type and Size Butts
WD	WDF	3'–0" and less	1-3/4	FBB191-5x5
WD or HM	WDF	3'–2" and over	1-3/4	FBB222 -5x4-1/2
WD or HM	PMF	3'–0" and less	1-3/4	FBB191-5x5
WD or HM	CIF	3'–0" and less	1-3/4	FBB108-5
WD or HM	CIF	3'–2" and over	1-3/4	FBB98-5
WD or HM	PMF	3'–2" and over	1-3/4	FBB199-5x5

2.4 SWING CLEAR HINGES

A. Wherever swing clear butts are indicated provide the following:

1. Stanley FBB268-5

2.5 ELECTRIFIED HINGES

A. Where electrified hinges are indicated provide the following:

1. Hager BB1262-5 x ETW-8 [Select when using Stanley FBB268-5]

2.6 SPRING HINGES

A. Bommer: 4310-4-1/2 x 4-1/2

B. Hager: 1250-4-1/2 x 4-1/2

C. McKinney: 1502-4-1/2 X 4-1/2

2.7 DOOR CLOSERS

A. All door closers shall be manufactured by LCN or Sargent. They shall have fully hydraulic, full rack and pinion action with a high strength cast cylinder. Hydraulic fluid shall be a type requiring no seasonal closer adjustment for temperatures ranging from 120 degrees Fahrenheit (49 degrees Centigrade) to -30 degrees Fahrenheit (-35 degrees Centigrade). All closers shall be sized at factory for size and location of door. Spring power for each closer shall be adjustable. Hydraulic regulation shall be by tamperproof, non-critical screw valves. Closers shall have separate adjustments for latch speed, general speed and hydraulic back-check. Closers with delayed action shall have back-check set at factory. Back-check shall be properly located for protection of door frame and hardware. All parallel arm closers shall have solid forged steel arms. All closers shall be of one manufacture and carry a manufacturer's five year warranty.

B. Except for exterior doors and as noted otherwise, all surface closers shall be provided with zero to two minute delayed action feature, manually adjusted after installation.

C. Provide drop brackets where required.

D. Do not locate closers on the side of doors facing corridors, passageways or similar type areas. Where it is necessary, due to certain conditions, and with the approval of the Architect, to have closers in corridors, provide such closers with parallel arms.

E. All door closers shall be adjusted by the installer in accordance with the manufacturer's templates and written instructions. All closers shall have back-check features adjusted at the time of installation.

F. Closers shall conform to all applicable code requirements relative to setting closing speed for closers and maximum pressure for operating interior and exterior doors. Where requested by the Architect, test doors for compliance with the above requirements using a Chatillion No. 719-20 gauge or a similar device capable of measuring such forces.

G. Closers shall have full covers.

H. Sargent closers shall be provided without pressure relief valves (PRV)

I. Closers shall be as follows:

1. Exterior Doors
   a. LCN 4111S Cush, except as otherwise indicated in hardware sets, template for 110 degrees, except where doors indicated on drawings to swing 180 degrees use standard arm.
   b. Sargent 281- CPS.
2. Interior Doors
   a. LCN 4011, except as otherwise indicated in hardware sets. Where parallel arm required, provide 4111.
   b. Sargent 281-O. Where parallel arm required, provide 281-P10 Arm.
3. Concealed overhead door closers shall be Rixson. Provide mounting hardware and wood door end caps.

2.8 DOOR HOLDERS

A. Door holders shall be Glynn Johnson or Sargent.

2.9 EXIT DEVICES

A. Exit devices shall be one of the following:

1. Von Duprin 98 Series and 35 Series as indicated.
   a. Lever design:

2. Sargent 80 Series.
   a. Lever design:

B. Exit Device-Electric Latch Retraction:

1. Limited to Von Duprin and Sargent only and used in conjunction with automatic door operators.
2. Each door assembly shall consist of:
   a. Von Duprin:
      1) Pairs of doors:
         a) EL-9827L-F x EL-9827L-F
      2) Double egress doors:
         a) EL-9827EO-F x EL-9827EO-F
      3) (1) - PS873 x 2-FA (power supply)
      4) (1) - PS873 x 2-FA (power supply) [IF LATCHES ARE REQUIRED TO BE EXTENDED USE PS873 x 2-AO-FA]
   b. Sargent:
      1) Pair of doors:
         a) 56-12-8713 x ET Trim x 56-12-8713 x ET Trim
      2) Double egress doors:
         a) 56-12-8710 x 56-12-8710
      3) (1) 3510 Power Supply

C. Provide cylinder dogging at exterior doors. Floor strikes shall be flush with finish floor or tops of thresholds. Furnish master keyed cylinders where keyed function is indicated. Vertical functions shall be provided with retracting bottom latch bolt feature.

D. Functions indicated in hardware schedule are Von Duprin.

2.10 AUTOMATIC COORDINATING DEVICE

A. Provide automatic coordinating devices at all pairs of doors where latching would interfere with proper operating of doors. Coordinators shall be Ives Series "COR" or Rockwood 1600 Series. Furnish filler pieces to close opening between coordinator and jamb of frame. Provide mounting brackets and carry bars.

2.11 FLUSH BOLTS

A. Flush bolts at top and bottom of doors shall be automatic type, except where manual or self latching flush bolts are indicated, with dust-proof floor strikes, as manufactured by Ives or Rockwood. Units shall be as follows:

1. Automatic Flush Bolts
   a. Metal doors: Rockwood - 1842 Ives - FB31P
   b. Wood doors: Rockwood - 1942 Ives - FB41P
2. Manual Flush Bolts

a.	Metal doors:	Rockwood - 555	Ives – FB458
b.	Wood doors:	Rockwood - 557	Ives – FB358

3. Self Latching Flush Bolts

a.	Metal doors:	Rockwood - 1845	Ives- FB51P
b.	Wood doors:	Rockwood - 1945	Ives- FB61P

2.12 LOCKS, LATCHES AND BATH SETS

A. Lock sets, latch sets, and bath sets shall be heavy-duty cylindrical type, 2-3/4" backset, six pin tumbler cylinder with lever handles.

B. Heavy-duty lock set, latch sets, and bath sets shall be one of the following:

Manufacturer	Series	Design
Sargent	10-Line	LL

C. All hardware for fire-rated (labeled) doors shall be Underwriters Laboratories approved.

2.13 MORTISE DEADLOCKS

A. Mortise deadlocks shall be: Sargent:4875

2.14 CYLINDERS

A. Provide Medeco, high security, pick-resistant cylinders and keys for this project. The cylinders for all locksets shall be supplied in the Medeco restricted keyway. No other keyway by Medeco or any other lock manufacturer shall be accepted.

B. Wherever cylinders are required to be furnished, provide collars or rings necessary for proper fit of cylinder in lock. The hardware supplier shall be responsible for furnishing the proper cylinder to fit the various hardware items which required cylinders.

C. In addition to providing cylinders for products of this Section; furnish cylinders for the following:

1. Elevator key switches, Sections 14211.

2.15 MECHANICAL PUSH BUTTON LOCKS

A. Manufacturer: Simplex Access Controls, Winston Salem, NC (800) 346-9640.

B. Features:

1. Interchangeable core.
2. 2-3/4 inch backset

3. Finish: US26D.

C. Model:

1. L1000 2M Medeco

2.16 ELECTRIC COMMUNICATING BATHROOM SYSTEM

A. Delt–Rex Door Controls, LLC, 593 New Park Avenue, West Hartford, CT 06110, TEL: (860) 233-8201

B. Provide complete wiring diagrams with delatching release feature.

C. Application:

1. System shall provide privacy and convenience to occupants sharing a common bathroom between two rooms and shall feature a lockout protection or "delatching" circuit to prevent inadvertently locking the bathroom doors from the outside.
2. System shall tie into the Fire Alarm System which, when actuated, will release both doors instantly by deactivating the system and interrupting power to both electromagnetic locks.

D. Features:

1. Since the system cannot be put into the "locked" mode unless both doors are already closed, the use of the facilities while only one door is closed, and then closing the second door upon leaving the bathroom cannot result in both doors becoming locked. Forcing either door open will drop system out of "locked" mode and unlock both doors.
2. The system cannot be put in the lock mode with only one door closed, and whereupon the occupant returning to bedroom cannot inadvertently lock both doors when closing the second door.
3. The system includes Fire Alarm System interfacing to release both doors instantly when the alarm is actuated.

E. Description:

1. Each door shall be equipped with an 806/24 surface mounted electromagnetic lock with a semi-concealed door switch and red LED indicator light.
2. Install inside the bathroom a wall mounted 130-RG92 switch assembly with two large rectangular push buttons on a standard 1-gang stainless steel switch plate. Over the top red button engrave "PUSH TO LOCK" and over the bottom green button engrave "PUSH TO UNLOCK".
3. Mount an auxiliary sign, 920-BWS-, 2" high x 6" wide above the bathroom wall switch assembly reading "BOTH DOORS MUST BE CLOSED TO OPERATE" in black filled engraved letters on a white background.
4. Install outside each door, in each room, a manually operated 131-92 Series Emergency Release switch and "OCCUPIED" indicator light on a stainless steel switch plate also

engraved "PUSH TO UNLOCK". This assembly shall be available in one of three ways and shall be selected by the Architect:

a. The 131-92's are on a standard 1-gang box mounted switch plate for wall mounting approximately 6 feet above finished floor. These are furnished with the 9231-2SD system.

b. The N131-92's are on a narrow 1-3/4" wide switch plate for flush mounting into a hollow metal or aluminum door frame, also 6 feet above finished floor. These are furnished with the 9232-2SD system.

c. The H131-92's are on a narrow 1-3/4" wide switch plate, assembled and engraved horizontally for flush mounting to the top jamb. These are furnished with the 9233-2SD system.

5. Install a 551-RCM x ER1 Low Voltage DC Power Supply and Systems Controller concealed from general view but readily accessible. Power Supply will include circuitry to properly operate the Communicating Bathroom System, interface with the Fire Alarm System for positive emergency release and facilities for adding Battery Back-up. It shall be housed in a 12x12x4 electrical box with hinged cover and hold down screws.

F. Operation:

1. A person entering the bathroom closes both doors. Pushing the top red button marked "PUSH TO LOCK" shall lock both doors, and shall illuminate the red LED on each lock and the "OCCUPIED" light on each Emergency Release. If either door is not properly closed, the system shall not operate and neither door shall lock. To lock both doors, they must both be properly closed when the "PUSH TO LOCK" button is pushed.
2. Pushing the "PUSH TO UNLOCK" button de-energizes both locks, unlocking both doors, and turns off both magnetic lock LED's and "OCCUPIED" lights.
3. Emergency access is always available to attendants by activating either of the illuminated "EMERGENCY RELEASE" buttons which will instantly deactivate the system, releasing both doors.
4. The electromagnetic locking device system is fail-safe. Both doors shall release upon loss of power.

G. Materials:

1. Each 9231-2SD two-door system shall include:

(2) 806/24xDSxL1 ..... Magnetic Lock with Door Position Switch and red LED

(1) 130-RG92 ..... LOCK/UNLOCK Wall Switch Assembly

(1) 920-BWS ..... 2"x6" black and white sign

(2) 131-92 ..... Illuminated P/B Emergency Release for wall box mounting

(1) 551-RCM x ER1 ..... System Controller with low voltage Power Supply and Fire Alarm interface

2. Each 9232-2SD two-door system shall include (2) N131-92 Illuminated P/B Emergency Release on narrow 1-3/4" wide switch plates for flush mounting to hollow metal or aluminum door frame.

3. Each 9233-2SD two-door system shall include (2) H131-92 Illuminated P/B Emergency Release assembled and engraved horizontally on a narrow 1-3/4" wide switch plate for flush mounting to the top jamb of a hollow metal or aluminum frame.

2.17 HOSPITAL LATCH

A. Hospital latches shall be Sargent, Series 115P, Trimco 1380, or Glynn-Johnson HL-6E with brass base. Paddle configuration shall be push paddle up with pull paddle down, unless otherwise indicated in the finish hardware set listing. Backset shall be 5 inch unless noted otherwise. Inscribe Push/Pull, vertical lettering.

2.18 MORTISE LOCK COMBINATION

A. Glynn-Johnson HL6-9000 Series, brass base, 2-3/4 inch backset unless noted otherwise. . Inscribe Push/Pull, vertical lettering, except when horizontal handles are required.

B. When cylinders are used, handle on cylinder side shall be mounted in down position, if vertical mounting is utilized.

C. Where thumb turn operations are required, unit shall be mounted in horizontal position.

2.19 BORED AUXILIARY DEADLOCK

A. Heavy-duty type, 2-3/4 inch backset, 1 inch bolt, operated by key outside, by thumb turn inside, except as indicated otherwise.

1. Sargent: 485

2.20 PULLS

A. Interior pulls shall be as manufactured by Rockwood BF107, Baldwin 902, Ives 8102-8 or approved equal, unless otherwise specified. Exterior pulls shall be Rockwood BF111, Burns BF426C or approved equal, unless otherwise specified.

2.21 COMBINATION PUSH PULL PLATES

A. Combination push pulls shall be Rockwood 91, Baldwin 2590 or as approved equal, with corners of projecting lip cut to 1/2" radius and edges rounded. Plate shall be engraved with letters not less than 1/2" high, reading "PUSH" or "PULL" as required.

2.22 PUSH PLATES

A. Push plates shall be .050" thick, 4" x 16" stainless steel with satin finish, US32D and all edges beveled.

1. Rockwood No. 70 Series.
2. Burns: 50 Series.
3. Quality: 40 Series.

2.23 PUSH BAR/PULL SET

A. One inch diameter bars:

1. Rockwood: BF11147 x template T1004
2. Burns: BF26C x 422
3. Quality: BF482

2.24 BUMPERS

A. Wall bumpers shall be installed wherever an opened door or any item of hardware thereon strikes a wall, column, casework or other part of the building construction. Where wall bumpers cannot be effectively used, a floor stop shall be installed.

	Manufacturer	Masonry	Steel Stud Partition
Wall Bumpers:	Rockwood	408	409
	Ives	WS406CCV	WS407CCV

Floor Bumpers:

Rockwood: 440, 442
Ives: FS436, FS438

B. Roller Bumpers: Provide roller bumpers, Rockwood 455, Ives RB470 or approved equal, for each door where two doors interfere with each other in swinging.

2.25 AUTOMATIC RELEASE CLOSING DEVICE

A. TYPE "A":

1. LCN Series 4310 ME-SF. Closers shall have cast iron cylinders and noncritical regulation of closing speed and back-check. The closer arm shall be swing free type with track and low friction roller assembly, shall be attached to the door at all times and shall incorporate a "no drift" feature. Unit shall be able to be converted to nonswing free function, if so desired, without changing components. Off/on switch in the unit shall be

provided to isolate the closer from the system and make the door self-closing without hold open.

2. Provide each unit with 24VAC. Devices shall be listed by Underwriters Laboratories and meet requirements of NFPA-101 Life Safety Code.
   a. Transformer: Provide 4040SE-3210 transformer to reduce line voltage from 120VAC to 24VAC with each unit for mounting on cover of electrical junction box provided under Division 16 – Electrical.
3. Finish shall beALUM [Aluminum]
4. Where 1-1/2 inch wide door frames occur, prepare units with template No. 4310 MESF x ST1761.

B. TYPE "B"

1. LCN Series 4040-SE. Closers shall have cast iron cylinders and two separately adjustable noncritical closing speed valves plus adjustable back-check and adjustable spring power as standard equipment. Arm shall connect to track with low friction roller assembly.
2. Closers shall be mounted on push side of door unless indicated otherwise. Telescope adjustment in lever arm shall locate hold open at points from 85 degrees to 110 degrees in 3 degree increments. Doors indicated on the drawings to hold open between 110 degrees to 120 degrees shall be provided with Model SEL closers.
3. Provide each unit with 24VAC. Devices shall be listed by Underwriters Laboratories and meet requirements of NFPA-101 Life Safety Code.
   a. Transformer: Provide 4040SE-3210 transformer to reduce line voltage from 120VAC to 24VAC with each unit for mounting on cover of electrical junction box provided under Division 16 – Electrical.
4. Finish shall ALUM [Aluminum]
5. Where 1-1/2 inch wide frames occur, prepare units with template No. 4040 SEDE x ST18.

C. Wall Magnets: LCN SEM 7800 Series, low profile recessed wall mount, SEM 7840 magnet, 24 volts, aluminum finish.

2.26 SIGHT BAFFLES

A. Provide sight baffles for installation on both vertical stiles of wood doors where indicated in hardware schedule. Products shall be manufactured by Pemko or as approved equal.

1. Hinge side: 369AP
2. Strike side: 18062CP
3. Strike side: 18062DP

2.27 SILENCERS

A. Silencers shall be Ives SR64, Rockwood 608, Corbin 33, Yale 890 or approved equal. Except for "A" labeled doors, provide four (4) for each Dutch door, three (3) for each single door, two (2) for each pair of doors. Silencers shall be omitted for exterior, lightproof and stair hall doors.

2.28 EMERGENCY DOOR STOP/DOUBLE LIPPED STRIKE

A. Emergency Door Stop: Stanley ES-1

B. Double Lipped Strike: Stanley DLS-2 x 5-3/4 inch width

2.29 ELECTRONIC LOCKING SYSTEM

A. Manufacturer: Von Duprin, division of Ingersoll-Rand.

B. Electronic Locking System Description-Double Door Assembly:

(1) DD4010 magnetic lock x Alum x 12/24VDC
(1) PS861-FA Power Supply

C. Operation:

1. Door assembly shall have free egress at all times by means of wall mounted push plate which activates automatic operator.
2. Loss of power shall unlock the doors until such time as emergency power is activated.
3. Fire protection system shall automatically unlock doors and the doors shall remain unlocked until the fire protection system is manually reset.
4. Ingress shall be by means of Owner Furnished card reader which shall unlock doors.
5. Pair of doors shall operate in conjunction with automatic door operator system wherein a request to enter or egress from any of the above specified sources shall deactivate the magnetic lock, and after a predetermined time activate the automatic door operators

2.30 KEY CABINET

A. Furnish one (1) "Dupli-Key" Two Tag" wall cabinet as manufactured by MMF Industries, or equal wall cabinet by Lund or Telkee, Inc. Furnish hooks, file tags, duplicate tags, key collection envelopes, key receipt holders/ slips and complete 3 way cross index binder to provide a complete Dual Key Tag System.

B. Cabinet size shall be sufficient to accommodate all locks related to this Contract, based on two keys per lock, with an allowance for expansion of not less than 50%.

C. Key systems which are construction keyed shall have all permanent keys affixed to hooks with all index cards filled out for the complete cross references. The cabinet shall be delivered to the Contractor only when requested and shall be completely set up.

END OF SECTION

SECTION 08711 - DOOR PROTECTION PLATES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide door protection plates in locations indicated.

PART 2 - PRODUCTS

2.1 ARMOR PLATES, KICK PLATES, PUSH PLATES

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

1. Rockwood
2. Baldwin
3. Or approved equal.

B. Armor plates, kick plates and push plates shall be .050" thick, stainless steel with satin finish, US32D.

C. Push plates shall be 4" x 16" high; kick plates shall be 12" high armor plates shall be 34" high.

D. Armor and kick plates shall be 1" less the width of the door for double acting doors; 1-1/2" less the width of the door for pairs of doors; and 2" less the width of the door for single doors.

1. Provide custom shape units where indicated on the Drawings.

E. Edge guards shall be 36-inch high, 0.050-inch thick, stainless steel formed into angle shape with 7/8-inch leg on face of door.

F. Bevel all edges.

G. Adhesive: as recommended by door protection manufacturer for installation on the specified door surfaces and finishes. Coordinate with door manufacturers to determine compatibility between adhesive and door finishes.

PART 3 - EXECUTION

3.1 SCHEDULE

A. Armor plates, kick plates, and push plates shall be furnished and installed in the quantities listed below for each of the following Door Protection Set numbers in locations indicated by subscript on the drawings.

DP-1 1 Kick Plate	DP-2 2 Kick Plates
DP-3 1 Push Plate 1 Kick Plate	DP-4 2 Push Plates 2 Kick Plates
DP-5 2 Push Plates 2 Armor Plates	DP-6 4 Push Plates 4 Kick Plates
DP-7 1 Armor Plate	DP-8 2 Armor Plates
DP-9 1 Armor Plate 1 Push Plate	DP-10 4 Armor Plates

END OF SECTION 08711

SECTION 08712 - DOOR FRAME PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Provide plastic door frame protective coverings where shown on the Drawings, in Finish Schedules, as specified herein, and as needed for a complete and proper installation.

1.2 EXTRA MATERIALS

A. Prior to Substantial Completion of the work, furnish and deliver the following materials to the Owner's representative for future maintenance:

1. Door Frame Covers: Full-size plastic covers of maximum length equal to **2** percent of each type, color, and texture of units installed, but no fewer than **two** full height units.
2. Include mounting and accessory components. Replacement materials shall be from same production run as installed units.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Construction Specialties, Inc. (C/S), Cranford, NJ 07016; (201) 272-5200.
2. Balco, Inc., Wichita, KS 67217; (316) 945-9328.
3. Pawling Corporation, Wassaic, NY 12592; (914) 373-9300.

2.2 MATERIALS

A. Extruded Rigid Plastic: ASTM D 1784, Class 1, textured, chemical- and stain-resistant, high-impact-resistant PVC or acrylic-modified vinyl plastic with integral color throughout; thickness as indicated.

1. Impact Resistance: Minimum **25.4 ft-lbf/in.** of notch when tested according to ASTM D 256, Test Method A.
2. Chemical and Stain Resistance: Tested according to ASTM D 543.
3. Self-extinguishing when tested according to ASTM D 635.
4. Flame-Spread Index: 25 or less.
5. Smoke-Developed Index: 450 or less.

2.3 FRAME GUARDS

A. Acceptable Products: Design is based on use of standard products manufactured by Construction Specialties, Inc.. Provide specified product, or a comparable product by one of the listed manufacturers.

B. Frame Guards: Vacuum formed, single-piece door frame protector, "Acrovyn Type B-DFP" by Construction Specialties, consisting of semi-rigid vinyl/acrylic with a nominal thickness of 0.050-inch.

1. Finish: As selected by the Architect from manufacturers full range of options.
2. Size of units shall be custom sized to match existing, except where plaster fabric wall covering is indicated. At plaster fabric wall covering, provide units with larger face width to cover edge of wall covering as detailed on Drawings.
3. Provide full height units.

C. Adhesives and sealers: adhesive and sealer types as recommended by the wall covering manufacturers for the wall substrate over which the material is to be installed.

D. Fire Hazard Classification shall be as tested by Underwriters' Laboratories Tunnel Test ASTM E-84 and shall meet all requirements for Class 1 construction

2.4 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation.

END OF SECTION 08712

SECTION 08716 - AUTOMATIC DOOR OPERATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide automatic door operators, complete, with all necessary accessories and controls, where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. The work of this Section shall include, but not necessarily be limited to:

1. Electro-mechanical swinging door operators for:
   a. Type 1: Automatic operator tied into fire alarm system for fire rated and non-fire rated requiring positive latching.
   b. Type 2: Automatic operator tied into fire alarm system, non-fire rated assembly, no positive latching required.
   c. Type 3: Automatic operator, non-fire rated assembly, no tie-in to fire alarm, no positive latching.
   d. Type 4: Low-energy automatic operator, non-fire rated assembly, no tie-in to fire alarm.

1.2 QUALITY ASSURANCE

A. All work in this section shall be done in compliance with all applicable Federal, State and local codes including but not limited to Americans with Disabilities Act (ADA) and ANSI/BHMA A156.10-1985

B. Source Limitations: Obtain automatic door operators through one source from a single manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide electro-maechanical door operators as manufactured by of one of the following:

1. Stanley Access Technologies, Farmington, CT 06032 (800) 722-2377
2. Horton Automatics, Corpus Christi, TX78405 (800) 531-3111.

2.2 AUTOMATIC OPERATORS

A. Each system shall consist of electro-mechanical door operator, aluminum header, actuating controls, and keyed power on/off switches.

B. The operator shall be an electro-mechanical system, sealed against dust, dirt, and corrosion in a cast aluminum case, and fully lubricated to minimize wear and friction of moving parts between temperature extremes of -20 degrees F and 140 degrees F. The entire operator shall be removable from the header as a unit.

C. The operator shall open the door with a 1/8 HP, DC motor reduction gears, ball screw actuator, forged steel rack and pinion, and linkage assembly. Opening time to backcheck (approximately 75 degrees) shall be 1.25-1.6 seconds and from backcheck to fully opened position 70°-90° in 1.0-1.5 seconds. The drive train shall have positive, constant engagement. A force no greater than 24lbF at the lock stile of the door shall stop the door from opening. The operator shall stop the door in the open position by electrically reducing the motor voltage and stalling against an adjustable 90-degree stop. All bearings shall be ball or roller type - no bushings shall be used.

D. The operator shall close the door by spring energy. Closing speed shall be controlled by employing the motor as a dynamic brake, and closing to latch check (approximately 10 degrees) shall be in 2.5 to 4.0 seconds. Closing through the last 10 degrees shall be in 1.5 seconds minimum. The closing spring shall be a Helical compression spring, pre-loaded for positive closing action at a low material stress level for long spring life.

E. The operator shall have built-in emergency release with controlled spring return to the closed position without manual resetting. While the door is in the emergency release mode, a disconnect switch shall prevent powered operation. No housing nor jamb mounted stops or cams shall be required for emergency function. Not more than 50 lbF at the lock stile shall be required for emergency use, per ANSI A-156.10-1979.

F. The operator shall function as a manual door closer in the direction of swing with or without electrical power.

G. The forces and speeds of power opening, manual opening in both directions of swing, and spring closing in both directions of swing shall conform to the requirements of ANSI A-156.10-1979.

H. A solid state, completely enclosed electronic control with quick connect plugs shall incorporate the following features:

1. A "safety plus" -- 1-1/2 second extension of both operate and safety signals after pressure has been removed from the control mats.
2. A 2-1/2 ampere current limiting circuit which limits the opening force of the operator to a maximum of 24 lbF at the lock stile.
3. A "soft-start" motor driving circuit to smooth normal opening and recycle to minimize loosening of doors, pivots, and frames.
4. An "energy-saver" circuit that reduces power to the motor after seven seconds of maintained opening speed.

5. A cam actuated emergency breakout switch to disconnect power to the motor when the door is manually pushed in the emergency direction. The operator will then automatically reset and power will be resumed.
6. The opening speed and the opening damp speed shall be fully adjustable. Control circuitry shall include a 0-45 second adjustable time delay.
7. Provide a contact for delayed action wherever electrical latching hardware is used in conjunction with automatic operators.

I. Linkage assembly shall provide control of door through entire swing; shall permit use on butt-hung, center pivot, and offset pivot hung doors.

J. Header shall be 5-1/2" wide by 6" high, 6063-T5 extruded aluminum alloy of .156" minimum wall thickness. Access to the operator and electronic control box shall be provided by a full length removable cover, edge rabbeted to the header to ensure flush fit and fastened with 1/4-turn spring loaded fasteners. The aluminum header, including structurally integrated end caps, shall have an AA M12 C22 A41 clear finish.

2.3 LOW ENERGY AUTOMATIC OPERATORS

A. The Electric Operating Mechanism shall be Series 4100LE. The operator shall be shock mounted and concealed in an extruded aluminum case mounted to the surface of the wall. Connecting hardware shall be a double arm arrangement that can either push the door or pull the door open to suit the job condition. When the operator mounting is on the pull side and adjacent wall is within 4inches of the door frame, provide a parallel arm..

B. The operator shall be readily convertible to any hand required. Opening force shall be accomplished by a 1/8 HP D.C. permanent magnet motor working through reduction gears to the output shaft. Gear train bearings shall be sealed ball bearing types.

C. Closing force shall be supplied by a field replaceable Quadracoil™ spring (four independent coil springs separated by teflon discs and enclosed in an external spring box).

D. Close speed control shall be accomplished by dynamic braking of the motor and shall be fully adjustable.

E. Operator shall act as a manual closer when power is off or when the master control unit is removed. An On/Off toggle switch shall be supplied.

F. The master control unit shall incorporate an adjustable time delay of 2 to 30 seconds (ANSI/BHMA A156.19 requirement is 5 second minimum time delay). It shall provide infinite adjustment to opening and back check speeds including adjusting the opening force without affecting the opening speed.

G. The master control unit shall provide for immediate reversal of door motion without undue strain on the drive train by supplying stepped voltage to the motor. The door shall reverse when closing if an object stops the door. A locked door motor protection circuit shall be supplied that

shall shut off current to the motor if it is applied when the door is inadvertently locked or otherwise prevented from opening.

H. Emergency Breakout: Inswinging doors shall be equipped with an emergency breakout. When door is in emergency breakout position, power shall be removed from the operator.

I. Operation: Automatic and/or Manual:

1. Automatic: Push plate switch actuates door open; door closes after time delay expires. Operator to include the following variable adjustments so as to comply with ANSI Standard A156.19: Opening speed - 4 to 6 seconds; Closing speed - 4 to 6 seconds.
2. Opening and closing force, measured 1inch out from the lock stile of the door, not to exceed 15 pounds (67 N) of force to stop the door when operating in either direction.
3. Manual: Push-N-Go™: Manually pushing door activates automatic opening cycle; door closes after time delay expires (approximately 30% less than after pushbutton actuation).

2.4 ACTUATING AND SAFETY DEVICES

A. Provide actuating and safety devices as specified in Section 08717 – Automatic Door Sensing Systems.

END OF SECTION 08716

SECTION 08717 - AUTOMATIC DOOR SENSING SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Provide sensing systems for the following automatic door systems:

1. Automatic swinging doors.
2. Low energy automatic swinging doors

B. Systems shall include:

1. Systems to control automatic door opening.
2. Systems to allow closing cycles for safe operation.

1.2 REFERENCES

A. 28 CFR Part 36 "Nondiscrimination on the Basis of Disability Accommodations and in Commercial Facilities".

B. ANSI 156. 10 "American National Standard for Power Operated Pedestrian Doors".

C. FCC Part 15 - Subpart C.

D. International Standards Organization ISO 9002

1.3 QUALITY ASSURANCE

A. All work in this section shall be done in compliance with all applicable Federal, State and local codes including but not limited to Americans with Disabilities Act (ADA), ANSI/BHMA A156.10, ANSI/BHMA A156.19 and NFPA 101,

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Provide products specified herein produced by B.E.A., Inc. (B.E.A.), 300 s. Main Street, Pittsburgh, PA (800) 523-2462.

B. No other manufacturer will be accepted.

2.2 SIMULTANEOUS SWINGING DOORS-2 WAY TRAFFIC

A. System: Parallax.

B. Components:

1. (2) wall mounted push plates where manual activation is indicated; or
2. (2)- Eagles- used for automatic activation.
   a. 1 -Eagle mounted on the activate side of the door
   b. 1- Eagle mounted on the safety side of the door, away from the swing of the door by using the recessed ceiling mount.
3. (1)ECA- False ceiling adapter for the Eagle
4. (1) BodyGuard - Presence sensor, mounted on the safety side of the door header.
5. (1) LO-21- Lockout relay or SS-21 (depending on door control)
6. (4) SuperScansII -mounted on the top rung of each door (Safety & Swing side 1 Master, 1 Slave in a housing)

2.3 DOUBLE EGRESS SWINGING DOORS-2 WAY TRAFFIC

A. System: Parallax.

B. Components:

1. (2) wall mounted push plates where manual activation is indicated; or
2. (2)- Eagles- used for automatic activation.
   a. (2) –Eagles -1 each mounted on the header on the activate side of each door
3. (2) BodyGuards- Presence sensors, mounted on the header on the safety side of each door leaf.
4. (1) LO-21- Lockout relay or SS-21 (depending on door control)
5. (4) SuperScansII -mounted on the top rung of each door leaf (Safety & Swing side 1 Master, 1 Slave in a housing)

2.4 SINGLE SWINGING DOORS-2 WAY TRAFFIC

A. System: Parallax.

B. Components:

1. (2) wall mounted push plates where manual activation is indicated; or
2. (2)- Eagles- used for automatic activation.
   a. 1 -Eagle mounted on the swing side of the door.
   b. 1- Eagle mounted on the safety side of the door, away from the swing of the door by using the recessed ceiling mount.
3. (1)ECA- False ceiling adapter for the Eagle.
4. (1) BodyGuard - Presence sensor, mounted on the safety side of the door header.
5. (1) LO-21- Lockout relay or SS-21 (depending on door control).

6. (2) SuperScansII -mounted on the top rung of each door (Safety & Swing side 1 Master, 1 Slave in a housing).

2.5 LOW ENERGY AUTOMATIC SWINGING DOORS

A. System: Prince.

B. Components:

1. (2) wall mounted push plates where manual activation is indicated; or
2. (2)- Eagles- used for automatic activation.
   a. 1 -Eagle mounted on the swing side of the door
   b. 1- Eagle mounted on the safety side of the door, away from the swing of the door by using the recessed ceiling mount.
3. (1) SuperScan I- Mounted on the top rung of the approach (push) side
4. (1) LE-21- SuperScan lockout relay.

2.6 ACTIVATING DEVICES

A. The "Eagle" Motion detector is a unidirectional/bidirectional sensor which operates only on the FCC approved K-band frequency (24.125 GHz) It shall utilize a planar, (flat antenna) and for aesthetic purposes the unit shall be no larger than 4- 3/4" W x 3 1/8" H. x 2" D.

1. Relay hold time from 0.5 seconds to 9.0 seconds. Adjustable for unidirectional or bi-directional sensing capabilities, wide or narrow patterns. All adjustments must be made by a universal coded infrared remote control. Operating temperature range of - 30□ F to + 131 F. Mounting height, 7' to 11' above finished floor.
2. Finish: (Black, ready for non-metallic field finish painting).

B. Stainless Steel Push Plate:

1. Push plate shall have a #4 stainless steel finish. Standard normally open (NO) contact SPST switch fits all automatic door applications.The unit shall comply with full provisions/regulations of the ADA.
2. Provide plates as follows:
   a. 4 ¾ inch square
   b. Provide plates with handicap logo and inscribed "Push to Open".
   c. Provide with mounting box and weather ring for exterior/outdoor applications.

2.7 SAFETY DEVICES

A. The " Bodyguard": Active infrared presence device shall utilize a combination of focused and diffused technology. The "Bodyguard" shall recognize 2 different patterns: 1) when door is closed and 2) when door is open. When door is in open position it will provide 1 foot of threshold protection with an adjustable self-adaptation time of 30 seconds to 25 minutes. All

adjustments shall be made by a universal coded infrared remote control. Operating temperature range of -30° F to +131° F. Mounting height 7 feet to 9 feet above finished floor

B. The "SuperScan " System shall be used in conjunction with the Bodyguard/LO-21 in order to provide safety during the closing and opening cycles of the door or stand alone on the approach side of a low energy door for extra safety. The SuperScan shall detect the presence of anything entering from either side of the door. SuperScan shall be mounted on each side at top of the door and will require as many master/slave modules as required by application. Door mounted detectors shall use active infrared technology with distance measurement. Detection shall be insensitive to color or background. 12V-24V AC or DC power requirement.

1. Available in lengths from 13" to 96" W 2 1/8" H x 2 1/8"D
   a. Width to suit door size
   b. Two required for single swing doors - "Parallax I "
   c. Four required for a pair of swing doors - "Parallax II "

C. The "Lock out Relay" shall inhibit the Bodyguard output during the closing cycle. The LO-21 shall also communicate the position of the door to the Bodyguard in order for the Bodyguard to utilize 2 different programs. One program will be with the door open and the other program will be with the door closed. Coordinate with detection system package

D. SuperStop" (SS-21) Stop-And-Hold Module. This module is only needed when door operator control box does not have stall logic. Coordinate with detection system package.

E. "Safety Beams" (SBK-111) Active infrared safety beams, located at the end of the guide rails or side walls, will provide additional safety in the closing cycle. In the event someone breaks the beams, the door will not recycle open. Beams are connected to LO-21 lockout relay.

F. MC-25 - Delay on Make/Delay on Break. This module shall be used with a magnetic lock or an electric strike which is installed on an automatic door. The unit will operate on 12-24 VAC and15-24 VDC. This module will have jumpers that shall provide the installer with the flexibility of either a wet or dry output.

G. MC-50 - Multiple Door Interlock Module. This fully microprocessed module is designed to interlock multiple doors in sequential operation and it will have two outputs, the first to release a lock or strike and the second to activate the door. The module can be used in clean room applications, bank vaults, airlock, or other security applications where only one door may open at a time. This module shall operate on 12-24 VAC or 15-24 VDC and there will never be less than two MC-50's installed on a project. Each module has the capability of being a master or a slave depending on the information it is receiving at that time.

H. MC-65 - Door Sequencer. This microprocessed door sequencer shall be used in a small vestibule to coordinate inbound and outbound traffic through automatic doors. This module shall be capable of accepting four independent inputs from push plates and it can provide two relay outputs in a timed sequence depending on the direction of travel.

END OF SECTION 08717

SECTION 08730 - WEATHERSTRIPPING AND SEALS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide weatherstripping and seals where shown on the Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Zero International, Bronx, NY (800) 635-5335.
2. Reese Enterprises, Inc., Rosemount, MN (800) 824-3348.
3. Pemko Mfg Co., Memphis, TN (800) 824-3018.

2.2 WEATHERSTRIPS AND THRESHOLDS

A. Weatherstrips, door bottoms, and thresholds products as manufactured by Reese International are listed below for establishing the level of quality and performance required. Provide either the named product or a comparable product by one of the other manufacturers specified.

B. All exterior doors shall have the following:

1. Head and Jambs: Reese No. 755
2. Door Bottoms: Reese No. 967
3. Meeting Stiles at Door Pairs: Reese No. 95P x 95
4. Thresholds: Reese No. S206

C. Head, jamb and meeting stile weatherstrips for aluminum doors will be furnished by door manufacturer.

D. Finish: Clear anodized aluminum

2.3 DOOR SOUNDPROOFING GASKETS

A. Door bottom and gasketing products as manufactured by Reese International are listed below for establishing the level of quality and performance required. Provide either the named product or a comparable product by one of the other manufacturers specified.

B. Where gaskets are indicated on the Drawings, provide the following:
   1. Head and Jambs Reese No. 599
   2. Door Bottoms Reese No. 521
   3. Meeting Stiles at Door Pairs Reese No. 95P x 95

C. Finish: Clear anodized aluminum

END OF SECTION 08730

SECTION 08800 - GLAZING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide glazing and glazing accessories where shown on the Drawings, as specified herein, and as needed for a complete and proper installation of glass for the following areas:

1. Glazed curtain wall.
2. Aluminum entrance doors.
3. Interior and exterior metal doors, wood doors and view windows.
4. Frameless mirrors.
5. Glazed pass through windows.
6. Interior butt glazing all glass sidelights and partition.
7. Butt glazing.

1.2 PERFORMANCE REQUIREMENTS

A. Work of this section shall withstand normal loads due to wind, temperature and normal impact without failure, breakage of glass or seals, fogging or other defects.

1. Temperature Range: Glass and glazing shall function correctly and normally throughout an ambient temperature range of 100°F above and below installation temperature.
2. Hermetic Seals: Insulated units shall be free from internal dirt, moisture, condensation, fogging, deterioration of protected internal glass coating [if any], and visual evidence of seal failure throughout the warranty period.
3. Laminated Glass and Architectural Laminated Glass: Laminated glass shall be free from delamination, edge separation, visual discoloration, and other damage throughout the warranty period.
4. Coated Glass: Coated glass shall be free from peeling, cracking, hazing, visual non-uniformity, and other defects throughout the warranty period.

1.3 QUALITY ASSURANCE

A. Install glass and glazing to meet requirement of Local Building Code, and Requirements of Regulatory Agencies having authority.

B. Reference Standards:

1. ASTM C-1036 covering float, sheet and rolled glass.
2. ASTM C-1048 covering heat strengthened and fully tempered flat glass.
3. C.P.S.C Safety Standard for Architectural Glazing Materials; 16 CFR 1201.

4. Safety Glass Standards: Provide safety glass which complies with ANSI Z97.1 and requirements of 16 CFR Part 1201 for category II materials and is permanently marked with certification label of Safety Glass Certification Council.
5. Glass Association of North America:
   a. Glazing Manual, 1997 edition
6. Insulated Units:
   a. Manufacturer: Firm with not less than five (5) years of successful experience in production of insulating glass units of types and performances required for project.
   b. Fabricate and label units to match units which have been tested and certified by the Insulating Glass Certification Council in accordance with below listed standards and passed tests for the following classification: Insulating glass seal classification CBA, for coated and uncoated substrates.
   c. Standards
      1) ASTM E-773 and ASTM E-774, Specification for Sealed Insulating Glass Units.
      2) Insulating Glass Certification Council (IGCC): Certified Products Program or A.L.T. Certification.
      3) Sealed Insulating Glass Manufacturers Association (SIGMA): Sigma 70-7-1, Glazing Recommendations for Sealed Insulating Glass Units.

C. Heat Soaking of Tempered Glass: All heavy tempered glass (3/8 inch and thicker) shall be subject to "heat checking" prior to delivery to job site. Provide documentation of "heat checking" process.

D. Glass Thickness: Determine exact sizes and thicknesses of glass products and certify that the work of this section meets or exceeds the performance requirements specified in this section. Provide proper thicknesses, edge clearances and tolerances to comply with the recommendations of the glass manufacturer. Provide thicknesses required for application indicated.

1.4 WARRANTIES

A. Provide written warranties signed by manufacturer and Installer, agreeing to repair or replace work which exhibits defects in materials or workmanship for the following periods. "Defects" is defined to include, but is not limited to, leakage of water, abnormal aging or deterioration, failure of hermetic seal in insulating units, edge separation or delamination of laminated glass, peeling, cracking, crazing or other failure of metallic coatings in coated glass, spoiling of mirrors, and failure to meet requirements of Contract Documents. Provide warranty periods standard with manufacturer, but not less than the following:

1. Insulating Glass: 10 years from date of manufacture of insulated glass unit.
2. Laminated Glass: 4 years from date of Substantial Completion.
3. Mirror Glass: 10 years from date of Substantial Completion.
4. Coated Glass: 5 years from date of Substantial Completion.
5. Architectural Laminated Glass: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS AND GLASS PRODUCTS

A. Manufacturers:

1. Except where other manufacturers are specified, glass and all glazing units shall be manufactured only by Viracon, Inc., Owatonna, MN (800) 533-2080, Interpane Coatings, Deerfield, WI 1-800-447-0185 or Guardian Industries Corp., Carleton, MI (800) 521-9040. No other manufacturer will be accepted.
2. Clear wire glass shall be manufactured by A.F.G. or as approved equal.
3. Decorative (Architectural) glass products shall be as manufactured by Bendheim Co., Inc., Passaic, NJ (800) 835-5304.
4. Fire-rated glass shall be manufactured only by Nippon Electric Glass Co., Ltd. and distributed by Technical Glass Products [800] 426-0279. No other manufacturer will be accepted.

B. All glass shall conform to the specifications and standards listed above, and shall be factory labeled on each piece indicating the strength, type, thickness and quality. Labels shall remain on glass until final cleaning.

C. General: Provide the type and thickness shown on the Drawings or as specified.

D. Clear Float Glass: Type I - transparent, flat, Class 1 - clear, Quality q3, glazing select.

E. Tempered or Heat Strengthened glass:

1. Provide tempered or heat-strengthened glass where indicated on the Drawings, and elsewhere as required by governmental agencies having jurisdiction.
   a. Clear Heat Strengthened Glass: Provide ASTM C1048, Condition A, Type I, Class 1, Quality q3, kind HS.
   b. Clear Tempered Glass: Provide ASTM C1048, Condition A, Type I, Class 1, Quality q3, kind FT.
2. Sizes and cutting: Prior to tempering or heat treating, cut glass to required sizes as determined by accurate measurements of the openings to be glazed, making allowances for required edge clearances. Cut and process edges in accordance with the glass manufacturers' recommendations. Provide bent "curved" glass at Retail area display windows.
3. Fully tempered glass:
   a. Comply with Fed Spec DD-G-1403 and ANSI Z97.1.
   b. Install tempered glass with no visible tong marks.
   c. Permit minimum warpage practicable.

F. Laminated Glass: Provide two panes of equal thickness laminated to polyvinyl butyl inner layer and free from foreign substances and air pockets. Provide laminated glass having the following characteristics:

1. Inner Layer Color: Clear.
2. Inner Layer Material: Provide Monsanto "Saflex" or DuPont "Butacite".
3. Inner Layer Thickness: Provide 0.030" thick inner layer.

G. Architectural Glass: Provide two panes of 1/8" thickness glass, laminated to aliphatic polyurethane inner layer and free from foreign substances and air pockets. Provide laminated glass having the following characteristics:

1. Indicated on the Drawings as "Architectural" or "Decorative" glass.
2. Pattern: As selected by the Architect.
3. Inner layer material: Patented aliphatic polyurethane inner layer .030 inches thick or as required by Manufacturer.

H. Mirrors: Provide 1/4", quality q2, clear float glass with triple silver coating copper and electroplated copper backing. Provide uniformly ground and polished edges.

1. Size: Provide sizes shown. If not shown, provide continuous one piece mirrors from top of back splash to the underside of ceiling and extending in one piece the full length of the countertop. Extend mirrors wall to wall where countertop is in an alcove.

I. Transparent, Wireless, Fire Rated Glass, laminated ceramic glazing material as manufactured by Nippon Electric Glass Co., Ltd. and distributed by Technical Glass Products (800) 426-0279.

1. 5/16 inch thick FireLite® Plus, Premium (polished surfaces).
   a. For fire rated door assemblies, conform with latest edition of ASTM E152, ASTM E163, NFPA-80, NFPA 252, NFPA 257.
   b. Permanently identify each individual glazing unit with a listing mark visible after installation.
   c. In accordance with manufacturer's specifications, shall be glazed into frames with a similar rating, using silicone glazing compound which shall be supplied with the Firelite material.

2.2 GLAZING TYPES

A. The various types of glazing listed herein correspond to the types of glass and glazing units indicated on the drawings.

1. Type 1 - 1 inch insulated unit consisting of 1/4 inch heat strengthened, clear outer light with VE 1-2M Solarscreen (Low-E) coating on No. 2 surface, 1/2 inch air space and 1/4 inch clear annealed glass for interior light.
2. Type 2 - 1 inch insulated unit consisting of 1/4 inch clear tempered light with VE 1-2m Solarscreen (Low-E) coating on No. 2 surface, 1/2 inch air space and 1/4 inch clear tempered glass for interior light.
3. Type 3 - 1 inch insulated unit consisting of 1/4 inch heat strengthened, clear outer light with VE 1-2m Solarscreen (Low-E) coating on No. 2 surface, 1/2 inch air space and 1/4 inch ceramic coated heat strengthened glass for interior light. Ceramic frit shall be Viracon "Simulated Sandblast V1086" applied to the No. 3 surface.

4. Type 4 - 1 inch insulated unit consisting of 1/4 inch heat strengthened, clear outer light with VE 1-2m Solarscreen (Low-E) coating on No. 2 surface, 1/2 inch air space and 1/4 inch ceramic coated heat strengthened glass conforming to ASTM C-1048-85, Section 7-12. Ceramic color shall be one of manufacturer's colors, as selected by the Architect. Apply ceramic frit to No. 4 surface. Insulating glass unit shall match Type 1 glass units for appearance.
5. Type 5 – Triple glazed unit consisting of an exterior insulated glazing unit and a separate single glazed access panel. Exterior unit shall be 1-inch thick consisting of 1/4-inch thick tinted heat strengthened glass with VE1-2M on No. 2 surface, 1/2-inch Argon filled space, and 1/4 inch thick clear heat strengthened glass. Interior glazed access panel shall consist of 1/4-inch thick annealed clear glass.
6. Type 6 - 1 inch fire-rated insulated unit consisting of 1/4 inch heat strengthened, clear outer light with VE 1-2m Solarscreen (Low-E) coating on No. 2 surface, 1/2 inch air space and 5/16 inch clear FireLite Plus ceramic glazing material for interior light.
7. Type 7 – Clear, tempered glass; thickness as required by application but not less than 1/4-inch.
8. Type 8 – Clear, laminated glass; thickness as required by application but not less than 1/4-inch.
9. Type 9 - Clear wire glass; 1/4-inch thick.
10. Type 10 - Transparent, wireless, fire rated glass: 5/16 inch thick Firelite Plus ceramic glazing material.
11. Type 11 –Architectural, laminated glass with decorative interlayer, thickness as required.
12. Type 12 – Architectural, patterned (textured) decorative glass, thickness as required by application.

2.3 GLAZING MATERIALS

A. Glazing Materials - Shall be as recommended in the 1997 Edition of Glazing Manual, published by the Glass Association of North America, Topeka, Kansas. Unless otherwise approved, only polysulfide, polyurethane, or silicone sealants shall be used where sealants are required.

B. Mirror Adhesive: Mirro-Mastic by Palmer Products Corp. (800) 431-6151, or Mirror-Mastic by Pecora [800] 523-6688.

C. Butt Glazing Sealant:

1. General Electric Silglaze II® (800) 255-8886.
2. Dow Corning 983 Structural Silicone (800) 255-8886.
3. Tremco Proglaze® (800) 321-7906.

2.4 INSULATING GLASS UNITS

A. Insulated glass units, except as specified otherwise, shall be manufactured only by Viracon, Inc., Owatonna, MN (800) 533-2080, Interpane Coatings, Deerfield, WI 1-800-447-0185 or Guardian Industries Corp., Carleton, MI (800) 521-9040. No other manufacturer will be accepted.

1. Fire rated insulating glass units (FireLite IGU) shall be manufactured by Technical Glass Products, Kirkland, Washington, (800) 426-0279.

B. Sealed Edge Construction: Fabricate units with a permanent, hermetically sealed, dry air or gas filled space of the width indicated, between sheets of glass as indicated. Provide an edge seal consisting of twin primary sealant beads of polyisobutylene; positioned and retained by a tubular aluminum spacer-bar frame with bent, soldered or welded sealed corners, and filled with desiccant with breather ports into sealed space; with secondary edge sealant completely encapsulating outer face of spacer bar and sealed to the opposing sheets of glass. Corner key construction will not be accepted. Provide silicone or polyurethane sealant as secondary edge seal. Stamp tubular spacer bar with date of manufacture of insulated unit.

C. Fill air spaces by fabricator's standard process, using either gas or dry air with a maximum dew point of -20 degrees F. Exercise extreme care to exclude dirt and other foreign substances.

D. Label each unit to show compliance with required standards and regulations, and to list generically each component including elements of edge seal. Indicate which face of unit is for exposure to exterior of weather. Provide removable label except where regulations require a permanent label.

1. Label interior-exposed edge of spacer bar with fabricator's name, date of completing hermetic seal and classification.

END OF SECTION 08800

V175 high opacity white viraspan #4 surface - Spandrel Glass

SECTION 08911 - ALUMINUM FRAMED CURTAIN WALL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Glazed aluminum curtain wall system with silicone glazed corner units.
2. Exterior and interior aluminum entrance doors.

1.2 REFERENCES

A. *The BOCA® National Building Code/1999,* Fourteenth Edition, referred to herein as "BOCA 99":

1. The above building code is the reference standard for determining the performance requirements for design wind loads, seismic requirements and other designated or applicable loads for metal wall panel system as it pertains to exterior cladding of the building.

1.3 DESIGN CRITERIA

A. General: Provide aluminum curtain wall systems that comply with performance requirements as specified. If system tests are not available, mock-ups shall be constructed and tests performed under the direction of an independent third party laboratory acceptable to authorities having jurisdiction which show compliance to the following minimum standards.

B. Air Infiltration: Provide aluminum curtain wall system with maximum air leakage of no more than **0.06 cfm/sq. ft** of fixed wall area when tested according to ASTM E283 at a minimum static air pressure differential of **6.24 psf.**

C. Water Penetration: Provide aluminum curtain wall system that do not evidence water leakage when tested according to ASTM E331 at a minimum design positive and negative pressure differential of **15** lbs/sq. ft. with a water rate of 5 gallons/hr./sq. ft.

D. Condensation Resistance: Provide aluminum curtain wall system with condensation resistance factor (CRF) of not less than the following values when tested according to AAMA 1503.

1. Test Sample Criteria: 6'-0" x 6'-8" test unit with 1-inch insulating composed of two 1/4 inch lites with a low-e coating applied to the No. 3 surface, and 1/2-inch argon filled interspace. Data from calculation, test reports on units of different size or non-representative frame proportions will not be accepted.
2. CRF – Frame Profile: **73**

3. CRF – Glass: **68**

E. Thermal Conductance: Provide aluminum curtain wall system with average U-factor of not more than **0.48** when tested according to AAMA 1503.

F. Thermal Performance: Design metal wall panel system to provide movement of components without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, including oil canning, when subject to seasonal temperature ranges

G. Structural Performance -Implied Loads: Design and construct curtainwall sytem to withstand minimum loading requirements as specified herein.

1. Design and engineer curtainwall system in accordance with procedures for determining design wind loads for components and cladding contained in §1609.8.2 of referenced building code standards and as modified by these specifications.
2. Incorporate the following values to design wind load procedure referenced above which shall become the basis for design and engineering of architectural louver system.
   a. Basic Wind Speed: 90 mph
   b. Velocity Pressure: 20.7
   c. Wind Importance Factor: 1.23
   d. Project Exposure Category: **C**.
3. Deflection Limit: Engineer aluminum curtain wall framing with a deflection limit of 1/175 applied to positive load, per ASTM E72 Chamber Method. Ultimate structural values shall be achieved without the use of backside mechanical attachments to the structure.

H. Seismic Requirements

1. General Seismic Requirements: Architectural components and their attachments shall comply with seismic design requirements of the referenced building code for a project in Seismic Hazard Exposure Group **III**, with a Seismic Performance Category of **C**:
2. Architectural Components Design: The glazed aluminum curtain wall system and attachments shall be designed in accordance with the requirements of **Section 1610.6.3 of BOCA 99**, in its entirety, and for seismic forces (F_p) in accordance with the formula $F_p = A_v C_c P W_c$ where the following values are used:
   a. The coefficient representing effective peak velocity-related acceleration (A_v) = **0.10g**.
   b. The seismic coefficient for architectural components (C_c):
      1) Components (C_c) = 0.9.
      2) Attachments (C_c) = 3.0
   c. Performance criteria factor from **Table 1610.6.3 of BOCA 99** (P) = 1.5.
   d. W_c = weight of architectural component.

1.4 QUALITY ASSURANCE

A. Engineering and Design: Provide the services of a Professional Structural Engineer, registered in the State of Maine, to design, engineer, and certify that the work of this section meets or

exceeds the requirements specified in this section. The Engineer shall assume professional responsibility for the design of all curtain wall framing components and their connections. Design decisions which effect visual characteristics shall be subject to the approval and modifications of the Architect.

1. All shop drawings shall bear the signature and stamp of a licensed structural engineer registered in the **State of Maine,** who designed the aluminum framed curtain wall system and oversaw the production of the Shop Drawings.
2. Curtain wall submittals shall be prepared (engineered and detailed) by the curtain wall manufacturer directly, and not by glazing subcontractor or a subsidiary of the curtain wall manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Kawneer Company, Inc., Norcross, GA; "1600 Wall System".
2. Wausau Window and Wall Systems, Wausau, WI; "Superwall Series".
3. Hankins & Johann, Inc., Richmond, VA; "2500CW Series".

2.2 MATERIALS

A. Aluminum Members: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Extruded Aluminum: ASTM B221, 6063-T5 or –T6 alloy and temper.
2. Aluminum Sheet and Plate: ASTM B209, 5005H34 (anodic) or 3003H14.

B. Steel Sheet and Strip: ASTM A653; steel sheet zinc coated (galvanized) by the hot-dip process.

C. Steel Shapes, Plates and Bars: ASTM A36; shapes to suit mullion sections.

D. Primer: FS TT-P-31; red; brown; for shop application and field touch-up.

E. Fasteners: 300 Series stainless steel, type and size recommended by curtain wall manufacturer and compatible with materials being fastened.

F. Perimeter Anchors: Aluminum or steel that is properly insulated from aluminum.

G. Glazing: Provide 1-inch insulating glass of type(s) as indicated on the drawings. Where noted, provide an interior 1/4-inch glazed access panel (triple glazed units). Comply with requirements as specified in Section 08800, Glazing.

H. Glazing Gaskets: Manufacturer's standard sealed corner, pressure-glazing system of extruded silicone compatible EPDM rubber complying with ASTM C864 for glazing gaskets, setting blocks, shims and spacers.

I. Glazing Sealants: As recommended by manufacturer for joint type.

J. Bituminous Paint: Cold-applied asphalt-mastic paint, containing no asbestos fibers, formulated for 30-mil thickness per coat.

2.3 FABRICATION

A. General:

1. Fabricate components per manufacturer's installation instructions and with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
2. Provide extruded aluminum components with straight, sharp, well-defined corners and flush sightlines, free of defects or deformations. Accurately fit and secure joints and corners with shear blocks and internal reinforcement. Make joints flush, hairline and weatherproof.
3. Provide major framing members factory assembled in basic rectangular units sized for ease of erection and transportation. Provide interlocking male/female type stack joints at adjacent grid frame members to allow thermal expansion.
4. Prepare components to receive anchor devices. Fabricate anchors.
5. Arrange fasteners and attachments to ensure concealment from view.
6. Fabricate to allow for thermal movement of materials when subjected to temperature differential from –30 degrees F to +180 degrees F without damage.
7. The curtain wall system and its anchorage shall be designed to accommodate differential floor movements of 1/4-inch vertically without damage.

B. Drainage: Provide weep holes and drainage slots within glazing pockets to drain any and all condensation or accumulating water within the system to exterior.

C. Thermal Break: Frame and pressure plates shall be thermally separated. Completely insulate pressure plate retaining screws from exterior air and pressure plate contact. Do not short circuit thermal barrier with improper placement of through fasteners. Do no t impair independent frame movement by improper placement of bolts, screws, welds, or other fasteners.

D. Integral Louver Blinds: Provide remotely operated horizontal louver blinds in the space between exterior insulating glass and interior glazed access panel. Construct blinds of aluminum slats, approximately 1 inch wide, with polyester fiber cords, equipped for tilting, raising, and lowering by standard operating hardware located on inside face of sash.

2.4 DOORS

A. Doors: Manufacturer's standard aluminum glazed doors.

1. Door Design: Series 350 as manufactured by the Kawneer Company, Inc., or a comparable product by one of the other manufacturers specified.
2. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate concealed tie rods.

B. Performance Requirements:

1. Air Infiltration: Air infiltration shall be tested in accordance with ASTM E283, at a pressure differential of 1.567 psf (75 Pa). A single 3'-0" x 7'-0" entrance door and frame shall not exceed .50 CFM per linear foot of perimeter crack. A pair of 6'-0" x 7'-0" entrance doors and frame shall not exceed 1.0 CFM per linear foot of perimeter crack.

C. Hardware:

1. Install all reinforcing required and prepare all doors and frames for finished hardware furnished under Section 08710 - Finish Hardware. The finish hardware supplier will furnish physical hardware to the entrance manufacturer prior to fabrication.

D. Fabrication:

1. Corner construction shall consist of mechanical clip fastening, SIGMA deep penetration and fillet welds. Glazing stops shall be snap in type.
2. The door weathering on a single acting butt hung door and frame (single or pairs) shall be Kawneer SEAL-AIR weathering. It shall be a dense, semi-rigid polymeric material, which remains resilient and retains its weathering ability under temperature extremes.
3. Fabricate doors with 5 inch high midrail, unless sized otherwise on Contract Drawings.

2.5 FINISHES

A. High-Performance Organic-Coating 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 Two-Coat Coating System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin (Kynar 500) by weight; complying with AAMA 2605.
2. Approved Manufacturer: PPG Industries, Inc.
   a. Color and Gloss: Custom color as selected by Architect to match adjacent metal panel system.

END OF SECTION 08911

SECTION 08955 – INSULATED TRANSLUCENT ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes roof assemblies incorporating fiberglass sandwich panels and aluminum frame systems.

1.2 PERFORMANCE REQUIREMENTS

A. References: *The BOCA® National Building Code/1999,* Fourteenth Edition, referred to herein as "BOCA 99":

B. Structural Performance -Implied Loads: Design and construct insulated translucent roof roof to withstand minimum loading requirements as specified herein.

1. Design and engineer insulated translucent roof panel system in accordance with procedures for determining design wind loads for components and cladding contained in §1609.8.2 of referenced building code standards and as modified by these specifications.
2. Incorporate the following values to design wind load procedure referenced above which shall become the basis for design and engineering of insulated translucent roof panel system.
   a. Basic Wind Speed: 90 mph
   b. Velocity Pressure: 20.7
   c. Wind Importance Factor: 1.23
   d. Project Exposure Category: C.

C. Seismic Performance:

1. General Seismic Requirements: Architectural components and their attachments shall comply with seismic design requirements of the following referenced building code for a project in Seismic Hazard Exposure Group III, with a Seismic Performance Category of C:
2. Provide insulated translucent roof panel system and attachments shall be designed in accordance with the requirements of Section 1610.6.3 of BOCA '99, in its entirety, and for seismic forces (F_p) in accordance with the formula $F_p=A_vC_cPW_c$ where the following values are used:
   a. The coefficient representing effective peak velocity related acceleration (A_v) = 0.10g.
   b. The seismic cofficent for architectural components (C_c):
      1) Component (C_c) = 0.9
      2) Attachments (C_c) = 3.0
   c. Performance criteria factor from Table 1610.6.3 of BOCA '99 (P) = 1.5

d. W_c= Weight of architectural component.

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Insulated translucent roof panel system shall be manufactured by a company continuously and regularly employed in the design, engineering, fabrication, and installation of similar materials, for a period of at least ten (10) consecutive years; and which can show evidence of these materials being satisfactorily used on at least six (6) projects of similar size, scope and type within such a period. Manufacturer shall be capable of providing field service representation during construction.

B. Installer Qualifications: Erection shall be by the roof panel system manufacturer's authorized installer which has been in the business of erecting and installing specified materials for at least five (5) consecutive years, and can show evidence of satisfactory completion of projects of similar size, scope and type.

C. Engineering and Design: Provide the services of a Professional Structural Engineer, registered in the State of Maine, to design, engineer, and certify that the work of this section meets or exceeds the requirements specified in this section. The Engineer shall assume professional responsibility for the design of all insulated translucent roof panel system components and their connections. Design decisions which effect visual characteristics shall be subject to the approval and modifications of the Architect.

1. All shop drawings shall bear the signature and stamp of a licensed structural engineer registered in the State of Maine, who designed the insulated translucent roof system and oversaw the production of the Shop Drawings.

1.4 WARRANTY

A. Translucent Glazing Material Warranty: Provide written warranty signed by manufacturer, agreeing to repair or replace glazing materials which exhibit defects in materials or workmanship. Defects are defined to include fiberbloom, delamination of coating from exterior sheet or more than 8.0 Delta E units of discoloration.

1. Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Product: Aluminum-framed insulated translucent roof panel system included in the Contract Documents is based on products as manufactured by Kalwall Corporation, Manchester, NH (800) 258-9777. Subject to compliance with requirements, provide the named product or a comparable product by one of the following

1. Skywall Translucent Systems, The Vistawall Group, Terrell, TX (800) 259-7941.

2.2 ALUMINUM FRAME SYSTEMS

A. Aluminum: Alloy and temper recommended in writing by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B 209.
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
3. Extruded Structural Pipe and Tubes: ASTM B 429.

B. Components: Manufacturer's standard extruded-aluminum members of thickness required and reinforced as required to support imposed loads.

C. Anchors, Fasteners, and Accessories: Manufacturer's standard, corrosion-resistant, nonstaining, and nonbleeding; compatible with adjacent materials

2.3 FIBERGLASS SANDWICH PANELS

A. Panel Construction: Assembly of uniformly colored, translucent, thermoset, fiberglass-reinforced-polymer face sheets bonded to both sides of a grid core and complying with requirements applicable to panel materials in ICBO ES AC04, "Sandwich Panels."

1. Face-Sheet, Smoke-Developed Index: 450 or less per ASTM E 84.
2. Face-Sheet Burning Extent: 1 inch or less per ASTM D 635.

B. Panel Thickness: 2-3/4 inches.

C. Grid Core: Mechanically interlocked extruded-aluminum I-beams, with a minimum flange width of 7/16 inch.

1. Grid Pattern: Inline rectangular (Shoji), nominal 12 by 24 inches.

D. Exterior Face Sheet:

1. Thickness: 0.070 inches.
2. Color: As selected by Architect from manufacturer's full range.
3. Color Stability: Not more than 4.0 units Delta E when measured according to ASTM D 2244 after outdoor weathering in southern Florida according to procedures in ASTM D 1435.

E. Interior Face Sheet:

1. Thickness: 0.045 inch.
2. Color: As selected by Architect from manufacturer's full range.

F. Fiberglass-Sandwich-Panel Adhesive: ASTM D 2559.

1. Compatible with facing and core materials.
2. Tensile and shear bond strength of aged adhesive ensures permanent adhesion of facings to cores, as evidenced by testing according to ASTM C 297 and ASTM D 1002 after accelerated aging procedures that comply with aging requirements for adhesives with high resistance to moisture in ICBO ES AC05, "Sandwich Panel Adhesives."
   a. Tensile Strength: 750 PSI.
   b. Shear Bond: 500 PSI.

G. Panel Fabrication: Factory assemble and seal panels.

1. Laminate face sheets to grid core under a controlled process using heat and pressure to produce straight adhesive bonding lines that cover width of core members and that have sharp edges.
   a. White spots indicating lack of bond at intersections of grid-core members are limited in number to 4 for every 40 sq. ft. of panel and limited in diameter to 3/64 inch.
2. Fabricate with grid pattern that is symmetrical about centerlines of each panel.
3. Fabricate panel to allow condensation within panel to escape.
4. Reinforce panel corners.

END OF SECTION 08955

SECTION 09111 - INTERIOR METAL STUD SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Provide interior metal studs and accessories.

B. Provide deflection track assemblies at tops of metal stud partitions.

1. Provide fire-rated assemblies at fire-rated, corridor, and smoke partitions.

1.2 QUALITY ASSURANCE

A. Fire-rated Deflection Track Assemblies:

1. Provide fire-rated deflection track systems conforming to Building Code Requirements in fire resistant wall and floor assemblies.
2. Testing Requirements:
   a. All firestop/smokeseal systems shall be tested by a recognized, independent testing agency and shall conform to both Flame (F) and Temperature (T) requirements of ASTM E-814 and UBC 43-6.
   b. Conform to UL Fire Hazard Classification Requirements.
3. Fire-rated deflection track assemblies shall have fire resistance rating at least equal to the partition construction into which it is installed.

PART 2 - PRODUCTS

2.1 MANUFACTURER

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

1. Standard Steel Studs:
   a. United States Gypsum (USG), Chicago, IL 60606; (800) 874-4968
   b. Marino / Ware, South Plainfield, NJ 07080; (800) 627-4661.
   c. Superior Steel Studs, Inc., Astoria, NY 11102; (718) (718) 545-7500.
2. Deflection Track:
   a. Fire Trak Corp., Kimball MN 55353; (800) 398-7660.

2.2 METAL STUDS

A. Steel Stud System:

1. Meet or exceed minimum requirements of ASTM C 645, including requirements for minimum thickness.
2. Steel studs:
   a. Partitions, furred walls and ceiling suspension systems shall be 20 gauge standard type, except provide heavier gage studs when recommended by manufacturer for spans and loads imposed.
   b. 3-5/8" and 6" unless otherwise indicated on the drawings, shop fabricated, complete with floor and ceiling track.
   c. Studs shall be continuous one-piece from floor to underside of slab or metal deck above.

2.3 ACCESSORIES

A. General:

1. Provide all accessories including, but not necessarily limited to, tracks, clips, anchors, fastening devices, and other accessories required for a complete and proper installation; all as recommended by the manufacturer of the steel studs used.

B. Deflection Track Assemblies:

1. Non Fire-Rated Assemblies
   a. Deflection Track: Manufacturer's standard top runner with extended flanges designed to prevent cracking of gypsum board applied to interior partitions resulting from deflection of the structure above fabricated from steel sheet complying with ASTM A 653 or ASTM A 568. Thickness as indicated for studs, and width to accommodate depth of studs, and the following configuration.
      1) Top runner with extended deep flanges that either have V-shaped offsets that compress; slots 1 inch o.c. that allow fasteners attached to studs through the slots; or 16 gage sliding clip assemblies attached to top track and clipped to stud
2. Fire-Rated Assemblies:
   a. Deflection and Firestop Track: Top runner designed to allow partition heads to expand and contract with movement of structure above while maintaining continuity of the assembly. Comply with requirements of ASTM C 645 except configuration, of thickness indicated for studs and width to accommodate depth of studs indicated with flanges offset to accommodate gypsum board thickness.
      1) Offset Configuration:
         a) "Shadowline" by Fire Trak Corp., at balanced and unbalanced fire-rated assembly partitions.

b) "Cavity Shadowline" by Fire Trak Corp., at shaftwall and chase wall (double stud) partitions.

b. Coordination: Verify with partition schedule on the Drawings to ensure proper depth of flange offsets at various partitions types.

END OF SECTION 09111

SECTION 09260 - GYPSUM WALLBOARD SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Provide gypsum drywall and accessories.

B. The work to be performed includes but is not limited to:

1. Partitions:
   a. Interior metal framed drywall partitions.
   b. Furring with drywall all surfaces where furred gypsum wallboard is indicated on the drawings.
   c. Gypsum board shaft wall system.
2. Ceilings and Soffits:
   a. Interior laterally-braced metal framed drywall ceilings, soffits and fascias.
   b. Exterior gypsum wallboard soffits.
3. Sheathing:
   a. Gypsum sheathing for exterior wall system constructed of face brick with metal stud backup.
4. Provide gypsum wallboard cladding strips, fire-safing, and firestopping compound as part of fire-resistant deflection track assembly at tops of the below listed interior partition types. (Note: Deflection track and studs provided under Section 09111 – Interior Metal Stud System).
   a. Fire-rated partitions
   b. Corridor partitions
   c. Smoke partitions
5. Installation of aluminum retainers for flush mounted vinyl acrylic corner guards.
6. Other work specified herein.

1.2 QUALITY ASSURANCE

A. Fire rated partitions and construction joints at deflection tracks are based on tests listed on the Drawings. Construction of these partitions and construction joints shall conform to these tests and in addition, shall be in accordance with the details on the Drawings.

B. Comply with requirements of ASTM E580 to meet State seismic requirements for bracing the ceiling suspension system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: All materials for the various systems specified shall be manufactured one of the following.

1. United States Gypsum (USG), Chicago, IL 60606 (800) 874-4968.
2. Gold Bond (National Gypsum Company), Charlotte, NC 28211 (800) 628-4662.
3. G-P Gypsum Corp., Atlanta, GA 30303 (800) 225-6119.

B. In order to provide total systems, all materials to be used on a system, such as partition system, furred wall system or ceiling system shall be the products of one of the listed manufacturers, unless specified otherwise.

2.2 MATERIALS – GYPSUM WALLBOARD

A. Gypsum wallboard shall be fire rated Firecode Type 'X', 5/8 inch thick, as indicated, tapered edge supplied in 48 inch widths and in such lengths as will result in a minimum of joints. Wallboard shall be delivered to the job with taped ends bearing Underwriters' Laboratories labels with proper identification.

B. Fiber-Reinforced Gypsum Wallboard Panels: "Fiberock - AR", 5/8 inch thick, as indicated, tapered edges, 48 inch widths, manufactured by USG.

C. Water Resistant Gypsum Wallboard: Shall be fire rated Firecode Type 'X', 5/8 inch thick, tapered edges supplied in 48 inch widths and in such lengths as will result in a minimum of joints. Wallboard shall be delivered to the job with taped ends bearing Underwriters' Laboratories labels for proper identification.

D. Tile Backer Board Panels: For use with the installation of ceramic wall tile shall be "Durock", as manufactured by United States Gypsum Company. Thickness shall be 1/2 inches.

E. The interior gypsum wallboard panels installed on exterior walls constructed of metal studs and exterior furred walls shall be Firecode Type 'X', aluminum foil backed gypsum wallboard with taped ends bearing Underwriters' Laboratories labels. Panel thickness shall be 5/8 inch thick.

F. Exterior Gypsum Ceiling Board: Shall be fire rated 5/8 inch thick, supplied in 48 inch widths, as manufactured by U. S. Gypsum Company or as approved equal.

G. Exterior Sheathing Panels: For curtain wall construction shall be 1/2" x 48" x 96", Dens-Glass Gold Gypsum Sheathing manufactured by Georgia Pacific Corporation or 1/2" x 48" x 96" Fiberock™ Sheathing manufactured by US Gypsum Company.

H. Liner Board for Shaft Walls: ASTM C442, fire-resistant panels with non-combustible, moisture resistant core encased in a water-resistant, mold and mildew resistant face and back paper. Provide 1-inch thick by 24-inch wide panels with lengths as required, beveled edged. "Sheetrock Brand Gypsum Liner Panels – Enhanced" as manufactured by United States Gypsum."

2.3 MATERIALS

A. Gypsum Wallboard Screws:

1. Type "S" shall not be less than 1 inch long for one-ply application and not less than 1-5/8 inch for second ply attachment in two-ply application. Durock Steel Screws shall be used for the application of Tile Backer Board.
2. Screws for exterior sheathing shall be 1 inch long, Kwik-Pro S or SD as required by manufacturer for gage of stud to be used, manufactured by Hilti Corp., Tulsa, OK (1-800-879-8000), or as approved equal, and shall be provided with electroplated zinc finish.

B. Wire:

1. Hanger wire shall be 8 gauge, galvanized wire.
2. Tie wire shall be 16 gauge, galvanized wire.

C. Metal Framing Accessories:

1. Cold Rolled Channels: 3/4 inch and 1-1/2 inches as specified. Channels located in exterior soffits shall be hot dipped galvanized.
2. Metal Furring Channels: 24 gauge hot dipped galvanized steel. Sizes for Z-furring channels shall be as indicated on the drawings.
3. Shaft Wall Studs: Double "E" and "C-H" Steel Studs for Shaft Walls: 2-1/2 inches, 25 gauge hot dipped galvanized, lengths as required.
4. Shaft Wall Framing: Double "E" and "C-H" Steel Studs, and "J" Runners for Shaft Walls: 2 1/2-inch and 4-inch x 20 gauge hot dipped galvanized studs and runners, lengths as required.

D. Grid Suspension System for Interior Ceilings: Pre-engineered direct-hung grid system complying with ASTM C645 and consisting of heavy duty, double-web steel construction with galvanized finish. Provide fire rated components where ceiling is part of rated assembly.

1. "Drywall Suspension System" by USG Interiors, Chicago, IL 60606; (800) 874-4968.
2. "Drywall Furring System" by Armstrong World Industries, Lancaster, PA 17604; (800) 448-1405.
3. "640 Furring System" by Chicago Metallic Corp., Chicago, IL 60638; (800) 323-7164.

E. Trim:

1. Casing Beads: U. S. Gypsum No. 200-A; Gold Bond No. 100.

2. Corner Beads: U.S. Gypsum "Dur-A-Bead"; Gold Bond 1-1/4 inch x 1-1/4 inch.
3. Perimeter Molding for Exterior Gypsum Soffits: Fry vented reveal molding WDM-50-V-75 baked on white enamel.

F. Extruded Aluminum Trim and Shapes:

1. Manufacturer: Provide products as manufactured by Gordon, Inc., Bossier City, LA 71111; (800) 747-8954, or as approved equal.
2. Perimeter Pockets: Final Forms Type 'D", furnished complete with hanger clips and brackets. The perimeter pocket shall be factory fabricated of alloy 6063-T5 extruded aluminum in sizes and configurations as shown on drawings. Pocket shall be two piece construction with necessary splices and hangers. Pocket shall be prepainted with color to match ceiling grid.
3. Wall Reveal Channels: Final Forms series 500, manufactured by Gordon, Inc., or as approved equal. Trim shall consist of a fin, tapered, grooved and prepunched for screw attachment and to accept bonding agent. Surface coated with a protective film compatible with paint.
   a. 1/2 inch reveal - Model #512-1/2
   b. 5/8 inch reveal - Model #558-1/2
4. Trim shall consist of a fin, tapered, grooved and prepunched for screw attachment and to accept bonding agent. Surface coated with a protective film compatible with paint.

G. Control Joints:

1. Control Joints between Interior Gypsum Surfaces: U. S. Gypsum No. 093; Gold Bond "E-Z Strip".
2. Control Joints for Exterior Gypsum Soffits: USG Control Joint No. 093.

H. Grout: For metal door frames shall be "Durabond" Joint Compound, 100:2 "Red Top" Gypsum plaster-sand mix or "Structo-Lite" Gypsum plaster, as manufactured by U. S. Gypsum or approved equal.

I. Adhesives, joint tape, joint compound and concealment compound, topping compound shall be of the types recommended by the wallboard manufacturer.

J. Caulking: acoustical sealant as recommended by the wallboard manufacturer.

K. Accessories for Fire-Rated Deflection Tracks:

1. Fire-Safing: Mineral wool, 3.5 pcf density minimum.
2. Firestopping Compound: Gypsum based free of asbestos and capable of maintaining an effective barrier against flame, smoke and gas. Provide required Flame (F) and Temperature (T) ratings, as tested by an independent testing agency in accordance with ASTM E-814, and conform to applicable governing codes. Provide Sta-Smooth FS-90 Fire Shield as manufactured by National Gypsum Company, Fire Stop Compound, as manufactured by United States Gypsum Company, or approved equal.

L. Reinforcing Plates: 20 gauge cold rolled sheet steel, widths as indicated on the drawings.

END OF SECTION 09260

SECTION 09310 - CERAMIC TILE

1.1 SUMMARY

A. Provide ceramic tile where shown on the Drawings or as indicated in the Room Finish Schedule.

1.2 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: Minimum 0.6.
2. Step Treads: Minimum 0.6.

1.3 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain all tile of same type and color or finish from one source or producer.

1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

1.4 ADDITIONAL MATERIALS

A. Prior to Substantial Completion of the work, furnish and deliver the following materials to the Owner's representative for future maintenance:

1. Tile and Trim Units: Furnish quantity of full-size units equal to one (1) percent of amount installed, for each type, composition, color, pattern, and size indicated.

PART 2 - PRODUCTS

2.1 CERAMIC TILE

A. General: Provide ceramic tile, quarry tile and accessories complying with Tile Council of America Specification 137.1, in colors and patterns selected by the Architect from the specified manufacturers.

B. Floor Tile (CT-1): Unglazed, vitreous impervious porcelain tile with non-directional, multi-colored pattern.

1. Acceptable Manufacturer: "Unglazed Ceramic Mosaic" as manufactured by American Olean, Dallas, TX 75217; (214) 398-1411.
2. Size: 2-inch by 2-inch (nominal) x 1/4 inch thick.
3. Finish: Slip-resistant, with abrasive admixture.

C. Floor Tile (PORC T-1): Unglazed, vitreous impervious porcelain tile with non-directional, multi-colored pattern.

1. Acceptable Manufacturer: "Strong Series" as manufactured by Crossville Ceramics Company, Crossville, TN (931) 484-2110.
2. Size: 18-inch by 18-inch (nominal) x 3/8-inch thick.
3. Finish: Unpolished.

D. Floor Tile (PORC T-2): Unglazed, vitreous impervious porcelain tile.

1. Acceptable Manufacturer: "Ergon - Alabastro" as supplied by Stone Source, Somerville, MA 02143; (617) 666-7900.
2. Size: 12-inch by 12-inch (nominal) by 5/16-inch thick.
3. Finish: Slate texture.

E. Floor Tile (PORC T-3): Unglazed, vitreous impervious porcelain tile with non-directional, multi-colored pattern.

1. Acceptable Manufacturer: "Cross-Colors Mosaic" as manufactured by Crossville Ceramics Company, Crossville, TN (931) 484-2110.
2. Size: 3-inch by 3-inch (nominal) x 1/4-inch thick.
3. Finish: Cross-Sheen.

F. Wall Tile (CT): Glazed, vitreous impervious porcelain tile with through color.

1. Acceptable Manufacturer: "Cross-Colors" as manufactured by Crossville Ceramics Company, Crossville, TN (931) 484-2110.
2. Size: 8-inch by 8-inch (nominal) x 5/16 inch thick.
3. Finish: Cross Sheen.

G. Wall Tile (GT): Glazed, vitreous impervious porcelain tile with through color.

1. Acceptable Manufacturer: "Custom Ceramic Tiles - Velvet" as supplied by Stone Source, Somerville, MA 02143; (617) 666-7900.
2. Size: 6-inch by 6-inch (nominal) x 3/8 inch thick.
3. Finish: Glaze, satin finish.

H. Wall Tile (PT): Unglazed, vitreous impervious porcelain tile.

1. Acceptable Manufacturer: "Ergon - Alabastro" as supplied by Stone Source, Somerville, MA 02143; (617) 666-7900.
2. Size: 12-inch by 12-inch (nominal) by 5/16-inch thick.
3. Finish: Polished

I. Base Trim:

1. Base shall be 6" high consisting of (1) coved trim piece and (2) 2" x 2" pieces, except where base occurs without glazed tile walls, top of base shall be coved and sealed with sealant. Trim shall include bull nosed internal and external corners and exposed edges:

J. Pattern, Style and Color: As indicated on the Materials Distribution Index.

1. Patterns: Provide general overall pattern and border in each space.

2.2 SETTING MATERIALS

A. Manufacturers: Subject to compliance with requirements, provide products of one of the following. No other manufacturer will be accepted.

1. Mapei Corporation, Deerfield Beach, FL 33442; (954) 246-8888.
2. Laticrete International, Inc., Bethany, CT 06524; (800) 243-4788.

B. Grout: Mapei Kerapoxy or Laticrete Latapoxy SP-100.

1. Color as selected by Architect from manufacturer's standards.
2. Color; custom color approved by Architect.

C. Dry Set Mortar: shall consist of Portland cement, sand and latex additive conforming to ANSI 118.4:

1. Mapei Kerabond with Keralastic latex additive.
2. Laticrete 3030 Porcelain-Bond with Laticrete Porcelain-Bond Admix latex additive.

D. Organic Adhesive for Organic Adhesive Set Method: shall be Type 1 in accordance with ANSI Specification A136.1:

1. Mapei Ultra/Mastic 1.
2. Laticrete Latamastic 15.

E. Waterproofing Membrane:

1. Mapei: Planicrete W
   a. Accessories
      1) Reinforcing material: Flexible PVC sheeting .030 inches thick as supplied by Mapei.
      2) Fiberglass mesh: As supplied by Mapei.

F. Laticrete: Waterproof Membrane 9235 with reinforcing fabric as supplied by Laticrete.

G. Anti-fracture membrane: Reference standard; DIN ZDD 02- 1988.

1. Mapei Plani/Lastic.
2. Laticrete anti-fracture membrane.

H. Cementitious Underlayment: Mapei Mapecem with Plani/Patch at feathered edges, or Laticrete 259 Rapid Thin-set Mortar with 3701 Latex Mortar Admix.

I. Sealants: Shall be as follows:

1. Two component polyurethane complying with Federal Specifications TT-S 0027e, Type I self leveling for horizontal surfaces and Type II, non sag for vertical surfaces. Colors shall be custom to match color samples furnished by the Architect.
2. Provide flexible compressible type closed cell foam polyethylene or butyl rubber back-up rod, as required.

END OF SECTION 09310

SECTION 09510 - ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide braced acoustical ceilings as required to meet seismic requirements.

B. Remove and reinstall existing acoustical ceiling systems as required for completion of the work.

1.2 QUALITY ASSURANCE

A. Comply with requirements of ASTM E580 to meet State seismic requirements for bracing the ceiling suspension system.

1.3 EXTRA MATERIALS

A. Prior to Substantial Completion of the work, furnish and deliver the following materials to the Owner's representative for future maintenance:

1. Acoustical Panels: One (1) percent, but not less than one (1) case of each type of acoustical ceiling panel installed at the project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Armstrong World Industries, Inc., Lancaster, PA 17604; (800) 448-1405.
2. United States Gypsum (USG) Corp., Chicago, IL 60606; (800) 874-4968

2.2 ACOUSTICAL MATERIALS

A. Acoustical ceiling materials shall be non-combustible; shall conform to requirements of Federal Specification SS-S-118a, Type III, Class 25; and shall bear Underwriters Laboratories Label.

B. Basis-of-Design: The design for each acoustical panel is based on the product specified. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

Type	Product Description	Size	Grid	Color
Type-1	Armstrong Beveled Tegular Cirrus, Open Plan; No. 558	24" x 24" x 3/4"	9/16	White
Type-2	Armstrong Tegular Optima, Open Plan; No. 3256	48" x 48" x 1"	9/16	White
Type-3	Armstrong Cirrus Themes (Stars), beveled tegular edge No.'s S400/S401/412 (All for 25% patterned panels.)	24" x 24" x 3/4"	9/16	White
Type-4	Armstrong Clean Room VL/VL Humiguard Plus No. 869, perforated. No. 868, nonperforated.	24" x 24" x 5/8"	15/16	White

C. Pattern of acoustical panels shall match that of panels in existing building..

2.3 SUSPENSION SYSTEM

A. Mechanical suspension system shall be exposed Grid T System, as manufactured by one of the following, or approved equal:

1. Armstrong World Industries, Lancaster, PA 17604; (800) 448-1405.
2. Chicago Metallic Corp., Chicago, IL 60638 (800)323-7164.
3. Donn, a division of USG, Chicago, IL 60606 (800) 874-4968.

B. The acoustical grid system shall conform to requirements of the INTERMEDIATE DUTY (12# minimum) structural classification ASTM C-635, applicable seismic codes and shall be as hereinafter specified.

C. The allowable uniform load in pounds per linear foot of beam shall not exceed the amount that the section in a simply supported span is capable of supporting without mid-span deflection exceeding 0.133" in 48".

D. Cross-tees that support transverse cross tees shall be carefully chosen with respect to allowable load for the section inasmuch as their loading is similar to that of beams.

E. Radius Wall Molding:

1. Moldings to be installed at intersection of radiused vertical gypsum wallboard fascia and horizontal acoustical ceilings shall be Fry Reglet Acoustical Wall Angle or approved equal.
2. Factory bent to radius required to ensure flush installation against vertical gypsum wallboard fascia.
3. Finish shall match sample color furnished by Architect.

F. Perimeter Edge Trim System:

1. Product: Custom extruded aluminum trim system for attachment to ceiling suspension grid system shall be "Axiom" by Armstrong with factory welded and finished corners.
2. Furnish trim channel in 10 foot lengths of straight or curved profiles as indicated on the drawings, complete with factory welded and finished corners. System components shall by factory-cut , mitered and curved to match approved shop drawings.
3. Accessories: Provide all trim, clips, plates, and other fittings necessary for a complete installation. Attachment to grid system shall be by the specially designed Axiom tee-bar connection clips (AXTBC) or hanging clips (AXHGC)' Join sections of trim together using the Axiom splice plate (AXSPLICE). At drywall soffits, provide Axiom Drywall Bottom Trim with integrated taping flange.
4. Finish" All components shall receive a factory applied baked polyester paint to match acoustical panels.

G. Suspension Grid Requirements:

1. Classified Intermediate Duty in accordance with ASTM C 635.
2. Double thickness web, bulb section design.
3. Web
   a. Main Beam (unless otherwise indicated): 1-1/2 inch height with routs for cross tees 6 inches o.c.
   b. Cross Tee (unless otherwise indicated): 1-1/2 inch height for 4 foot spans; minimum of 1 inch for 2-foot spans.
4. Steel: 0.015-inch minimum thickness, conforming to ASTM A-366.
5. Provide the following suspension systems, in accordance with corresponding acoustical ceiling tile type annotated in the "Ceiling Type" column of the following schedule.

Suspension System	**Hemmed Wall Molding**	**Ceiling Type**
9/16 inch wide exposed tee grid Armstrong Suprafine Chicago Tempra 4000 Donn Centricitee DXT	 Armstrong No 7804 Chicago No. 1480 Donn No. M9	Types – 1,2, & 3
15/16 inch wide exposed tee grid, hot dip galvanized with aluminum cap: Armstrong Prelude Chicago Environmental	 Armstrong No 7820 Chicago No. 1420	Type-4

Donn ZXA	Donn No. M7	

15/16 inch wide exposed tee grid: Armstrong Prelude Plus Chicago 200 Series; 1200 Cross Tees Donn DX	 Armstrong No HD7801 Chicago No. 1478 Donn No. M7Z	Type-4

H. Finish:

1. Normal Installation: Chemically clean, electro-galvanize and bonderize all steel roll-formed parts. Provide a high-bake, low-sheen, satin finish on finished surfaces. Chemically clean, electro-galvanize and treat with chromatic conversion coating all steel stamped parts.
2. Hot Dipped Galvanized Suspension System: Chemically clean and hot dipped galvanize all steel roll-formed parts. Provide aluminum capping prefinished in baked polyester paint.
3. Color of grid shall exactly match color of acoustical panels.

2.4 OTHER MATERIALS

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

B. Accessories shall be specifically designed as an integral part of the grid system and shall be installed in strict accordance with manufacturer's recommendations.

END OF SECTION 09510

SECTION 09660 - RESILIENT TILE FLOORING AND BASE

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide resilient tile flooring and base where shown on the Drawings, in Finish Schedules, as specified herein, and as needed for a complete and proper installation.

1. Resilient tile flooring alternate designated as "VCT 1".
2. Resilient base designated in the Room Finish Schedule as "RUB".
3. Stair treads with integral risers, as indicated on the drawings and designated in the Room Finish Schedule.

B. Except as indicated otherwise, furnish and install resilient base on casework furnished under Section 06240.

1.2 QUALITY ASSURANCE

A. Flooring system including floor covering material and adhesives shall have the ability to withstand water vapor transmission levels up to 3 lbs/24 hours per 1,000/sf, and pH levels up to 9.

1.3 ADDITIONAL MATERIALS

A. Prior to Substantial Completion of the work, furnish and deliver the following materials to the Owner's representative for future maintenance:

1. Resilient Flooring (VCT): One (1) percent, but not less than one (1) case of each type, pattern and color of resilient tile floor installed.
2. Rubber Base (RUB): One (1) 100 ft roll of each color installed.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Provide colors and patterns selected by the Architect from standard patterns of the approved manufacturer and scheduled on the Room Finish Schedule and Materials Distribution Sheet.

2.2 RESILIENT MATERIALS

A. Vinyl Composition Tile (VCT –1):

1. Manufacturer: Armstrong World Industries, Lancaster, PA (800) 448-1405.
2. Product: "Excelon Imperial Texture".
   a. Pattern and Color: As selected by the Architect. Allow for three colors to be applied in pattern as indicated on the Drawings.
3. Physical Data:
   a. Size: 12 inches by 12 inches.
   b. Gage: 1/8 inches.
4. Reference Specifications:
   a. ASTM F 1066, Comp.1, Class 2 - through pattern.
5. Fire Test Data:
   a. ASTM E 648, Critical Radiant Flux - 0.45 watts/cm2 or more - Class 1.
   b. ASTM E 662, Smoke - 450 or less.
6. Static Load Limit:
   a. ASTM F 970, 75 psi.

B. Rubber Base (RUB)

1. Acceptable Manufacturer: Johnsonite, Flooring Products Division, Johnson Rubber Company [800] 637-4995
2. Base: Shall be Johnsonite Rubber Wall Base, 4" high unless otherwise indicated, top set type, coved, ribbed back, 1/8" thick, rounded top. Provide straight base similar to above in carpeted areas. Rubber base shall be furnished in continuous lengths, approximately 100' long.
3. Colors: As indicated on the Materials Distribution Index.

C. Stair Treads:

1. Acceptable Product: Freudenberg Building Systems: "Norament 825C" stair treads.
2. Stairs treads to be one piece nosing-tread-riser design. Material to be solid, homogeneous resilient rubber conforming to ASTM F 1344, Class I, Type A.
   a. Texture: Round.
   b. Color: As indicated on the Materials Distribution Index.

D. Resilient Reducer Strips: Johnsonite, Flooring Products Division, Johnson Rubber company.

1. Resilient to carpet: CTA-XX-H.
2. Resilient to unfinished: RRS-XX-C.
3. Resilient transitional profiles: CTA-XX-H
4. Colors: Shall be as selected by Architect.

2.3 OTHER MATERIALS

A. Adhesive:

1. For TILE FLR-1: Armstrong "S-515".
2. For resilient base: Armstrong "S-725".
3. For rubber stair treads: Nora –Stepfix, dry contact adhesive system.

B. Trowelable underlayment for leveling and patching of VCT: Armstrong S-180 or Masco Latex Cement manufactured by Silpro Masonry Systems, Inc.

C. Primer: Provide non-staining type as required and as recommended by the manufacturer of the material being installed.

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

END OF SECTION 09660

SECTION 09665 - SHEET VINYL FLOOR COVERING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide the following types of resilient sheet flooring:

1. Sheet vinyl flooring designated in the Room Finish Schedule as "SHT V-1"
2. Sheet rubber flooring designated in the Room Finish Schedule as "RUB-2".
3. Provide integral "Sanitary Base" designated in the Room Finish Schedule as "IB".

B. In rooms and areas where resilient sheet flooring occurs and integral flash cove base is indicated, provide integral flash cove base on casework furnished under Section 06240.

1.2 QUALITY ASSURANCE

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

B. Fire-Test-Response Characteristics: Provide flooring material to meet the following fire test performance criteria:

1. ASTM E 648 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I.
2. ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less.

C. Flooring system including floor covering material and adhesives shall have the ability to withstand water vapor transmission levels up to 5 lbs/24 hours per 1,000/sf and pH levels up to 9.

1.3 ADDITIONAL MATERIALS

A. Prior to Substantial Completion of the work, furnish and deliver the following materials to the Owner's representative for future maintenance:

1. Sheet Vinyl: One percent of each pattern and color installed.

PART 2 - PRODUCTS

2.1 SHEET VINYL FLOORING (SHT V-1)

A. Manufacturer: Mannington Mills, Inc., 75-T Mannington Mills Rd., Salem, NJ 08079 (800) 241-2262

B. Product: Mannington Commercial "Assurance" slip-retardant sheet flooring.

1. Description:
   a. Nominal Dimensions: 72-inch wide by 82-feet long.
   b. Thickness: 0.080-inch
   c. Seaming Method: Heat welded.

C. Pattern, Style and Colors: As indicated on the Materials Distribution Index.

D. Adhesive: Mannington V-85 2 part epoxy at shower rooms, bathrooms and other wet areas; and V-82 elsewhere.

2.2 SHEET RUBBER FLOORING (RUB-2)

A. Manufacturer: Freudenberg Building Systems, Inc., 94 Glenn Street, Lawrence, MA 01843; (800) 332-6672; Local Representative: Al Baker, (978) 689-0530

B. Product: Noraplan Mega, Article 106

1. Description:
   a. Nominal Dimensions: 4 feet wide by 49.2 feet long.
   b. Material: Synthetic Rubber
   c. Characteristics:
      1) Hardness : ASTM D 2240, Shore A, greater than 85
      2) Thickness; 2.0mm
      3) Seaming Method: Heat Welded.
   d. Slip Resistance:
      Static Coefficient of Friction, D-2047-85
      "James Test" equal to or greater than 0.6, ADA guidelines compliance.

C. Pattern, Style and Colors: As indicated on the Materials Distribution Index.

D. Adhesive: Nora PU310 Polyurethane Adhesive

2.3 ACCESSORY MATERIALS

A. Trowelable underlayment for leveling and patching: Armstrong S-180 or Masco Latex Cement manufactured by Silpro Masonry Systems, Inc.

B. Resilient Cove Cap: Johnsonite SCC-XX-B. Color as selected by Owner from manufacturer's full range of colors.

END OF SECTION 09665

SECTION 09680 - CARPETING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Prepare surfaces to receive carpeting.

B. Provide glue down carpeting designated as "CPT" on Finish Schedule on floor surfaces, complete with required accessories.

C. Install edge strips where carpeting terminates at other floor finishes.

1.2 QUALITY ASSURANCE

A. Qualifications of Installer: Carpet installation shall be done only by an installer having experience on similar installations and employing only experienced carpet layers skilled in this work.

B. Carpet shall conform with or pass tests of the following Standards:

1. ASTM D-2859 (Methenamine Reagent Pill Test).
2. ASTM E-648 (Flooring Radiant Panel Test): Class I (Minimum Average CRF of 0.48).
3. NBS Smoke Chamber Test: Maximum average of 450.
4. AATCC-134 (Electrostatic Propensity): Maximum electrostatic generation below level of human sensitivity.

C. Flooring system including floor covering material and adhesives shall have the ability to withstand water vapor transmission levels up to 3 lbs/24 hours per 1,000/sf and pH levels up to 9.

1.3 ADDITIONAL MATERIALS

A. Prior to Substantial Completion of the work, furnish and deliver the following materials to the Owner's representative for future maintenance:

1. Carpeting: Three percent of each pattern and color installed.
2. Adhesives: Sufficient amount of adhesive for above.

PART 2 - PRODUCTS

2.1 CARPETING

A. Carpet (CPT-1): "Bubbles" as manufactured by Atlas Carpet Mills, Inc., Los Angeles, CA 90040; (323) 724-9000.

1. Construction: Interloop construction, with Dupont Antron Legacy type 6,6 solution dyed nylon, .218-inch pile height, 36 oz/sy yarn weight, soil and stain repellent protection, polypropylene primary backing and "ActionBac" secondary backing system, 12.5 ft widths.
2. Pattern and Color: As indicated on the Materials Distribution Index.

B. Carpet (CPT-2): "Swirls" as manufactured by Atlas Carpet Mills, Inc., Los Angeles, CA 90040; (323) 724-9000.

1. Construction: Interloop construction, with Dupont Antron Legacy type 6,6 solution dyed nylon, .197-inch pile height, 36 oz/sy yarn weight, soil and stain repellent protection, polypropylene primary backing and "ActionBac" secondary backing system, 12.5 ft widths.
2. Pattern and Color: As indicated on the Materials Distribution Index.

2.2 INSTALLATION MATERIALS

A. Adhesives:

1. Provide white latex carpet adhesive such as W. W. Henry Company No. 351, Roberts Company No. 41-0504, or an equal approved by the Architect, recommended for the purpose by the manufacturer of the selected carpet.
   a. For installations directly over water vapor reduction system, provide 100% solids urethane or epoxy adhesives recommended by flooring manufacturer and acceptable to water vapor emission control system manufacturer.
2. Provide seam adhesive such as W. W. Henry Company No. 248, Roberts Company No. 41-0502, or an equal approved by the Architect and recommended for the purpose by the manufacturer of the selected carpet.
3. Provide a water-resistant, neoprene latex contact adhesive, as supplied by the manufacturer of the resilient accessories; Johnsonite #945.

B. Edge Strips: Johnsonite, Flooring Products Division, Johnson Rubber Company, (800) 637-4995

1. Profile: As selected by Architect.
2. Color: Shall be selected by Architect.

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

END OF SECTION 09680

SECTION 09720 - WALL COVERING

PART 1 - GENERAL

1.1 SUMMARY

A. Provide the types of wall covering listed below, where shown on the Drawings, or indicated in Finish Schedule.

1. Vinyl wall covering designated in the Room Finish Schedule as "VWC".
2. Fabric wall covering designated in the Room Finish Schedule as 'FWC".
3. Vinyl film wall covering for interior graphics.

1.2 QUALITY ASSURANCE

A. Provide wall coverings tested in accordance with ASTM E-84, with the following surface burning characteristics:

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

1.3 ADDITIONAL MATERIALS

A. Prior to Substantial Completion of the work, furnish and deliver the following materials to the Owner's representative for future maintenance:

1. Wall Covering: Full-size units equal to five (5) percent, but not less than one full roll of each type, pattern and color installed.

PART 2 - PRODUCTS

2.1 VINYL WALL COVERING (VWC-1)

A. Manufacturer: Maharam, Hauppauge, NY 11788, (800) 645-3943..

B. Product: Style No. 395460, "Wave".

1. Color and Pattern: As indicated on the Materials Distribution Index.
2. Width: 54 inches wide.

C. Fire Retardancy: ASTM E-84, Class A

2.2 VINYL WALL COVERING (VWC-2)

A. Manufacturer: Wolf-Gordon, Long Island City, NY 11101, (800) 347-0550.

B. Product: "Lynx".

1. Color and Pattern: As indicated on the Materials Distribution Index.
2. Width: 54 inches wide.

2.3 VINYL WALL COVERING (VWC-3)

A. Manufacturer: Maharam, Hauppauge, NY 11788, (800) 645-3943.

B. Product: Style No. 396700, "Reflection".

1. Color and Pattern: As indicated on the Materials Distribution Index.
2. Width: 54 inches wide.

2.4 FABRIC WALL COVERING (FWC-4)

A. Manufacturer: Maharam, Hauppauge, NY 11788, (800) 645-3943.

B. Product: Style No. 396320, "Gesture".

1. Color and Pattern: As indicated on the Materials Distribution Index.
2. Width: 54-inches wide.

C. Fire Retardancy: ASTM E-84, Class A

2.5 VINYL FILM

A. Wall Graphics: Provide interior removable graphic film with custom images for headwall murals.

1. Film: Opaque, non-reflective graphic film, 4-mil thick, with pressure-activated adhesive; "3M Scotchcal Graphic Film" as manufactured by 3M – Commercial Graphics Division, St. Paul, MN 55133, (800) 374-6772.
2. Imaging: Large format piezzo inkjet image; 100 ppi.
   a. Graphics: To be provided by the Architect.

2.6 OTHER MATERIALS

A. Provide a heavy-bodied water-soluble adhesive recommended by the manufacturer of the approved wall covering material.

1. Test adhesive for compatibility with existing substrate.
2. If adhesive is not compatible with existing substrate:
    a. Provide other adhesive recommended by the manufacturer of the approved wallcovering.
    b. Test alternate adhesive(s) to ensure compatibility with existing substrate.

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

END OF SECTION 09720

SECTION 09725 - PLASTIC WALL COVERING

PART 1 - GENERAL

1.1 SUMMARY

A. Provide plastic wall covering in sheet and panel form where shown on the Drawings, indicated in Finish Schedules, as specified herein, and as needed for a complete and proper installation.

1. Plastic wall covering in sheet form designated in the Room Finish Schedule as "PWC".

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Manufacturer: Provide products as manufactured by the following:

1. Construction Specialties, Inc. (C/S), Cranford, NJ 07016; (201) 272-5200.

2.2 PLASTIC WALL COVERING

A. Sheet Wall Covering (PWC): Semi-rigid vinyl/acrylic "Acrovyn Chameleon" impact-resistant plastic sheets with pebblette texture finish manufactured by Construction Specialties, Inc. Material shall be furnished by the manufacturer in 4 foot by 8 foot flat sheets. Roll material, or sheets cut from rolls, will not be accepted.

1. Sheet thickness: .060-inches

B. Wall Panels: Semi-rigid, .040-inch thick, vinyl/acrylic "Acrovyn" impact-resistant plastic sheets with texture finish factory bonded to face side of 3/8-inch thick particle board core as manufactured by Construction Specialties, Inc. Backside of panels to be laminated with a moisture resistant vapor barrier.

1. Texture: As selected by the Architect from manufacturer's full range of options.
2. Edge Detail: Bevel edge.

C. Panel Characteristics:

1. Fire Hazard Classification: Product shall be as tested by Underwriters' Laboratories Tunnel Test ASTM E-84 and shall meet all requirements for Class 1 construction.
2. Impact Strength: Minimum Izod notched impact strength of 8 pounds per inch of notch when tested as .125 inch thickness in accordance with ASTM D-256.

3. Chemical and Stain Resistance: Provide product with chemical and stain resistance in accordance with ASTM D1308.

D. Color: As indicated on the Materials Distribution Index. Color integral through the full depth of material.

2.3 ACCESSORY MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation.

B. Moldings: Supplied in matching or contrasting colors as selected by the Architect.

1. Provide trim at inside and outside corners, and top and bottom edges. Provide color match sealant at butt joints of wall panel in sheet form in lieu of vertical molding.

C. Adhesives and Sealers: Adhesive and sealer types as recommended by the wall covering manufacturers for the wall substrate over which the material is to be installed.

END OF SECTION 09725

SECTION 09841 - ACOUSTICAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide fabric clad framed acoustical wall panels where shown on the Drawings, in Finish Schedules, and as specified herein.

1. Acoustical wall panels, designed as "AWC".

B. Provide all related accessories, fasteners, and other materials necessary for secure anchorage of panels to substrate, and as needed for a complete and proper installation.

1.2 QUALITY ASSURANCE

A. Obtain framing, infill materials, and mounting system from a single manufacturer. Manufacturer shall be responsible for coordination of proper selection of materials and fabrics for end use intended.

B. Acoustical Rating: Panel system tested in accordance with ASTM C423 with a resultant Noise Reduction Coefficient (NRC) of 0.90.

C. Fire performance characteristics: Fabric panel assembly tested in accordance with ASTM E 84 (80a) with gypsum wall board substrate, UL rated Class A, with the following results.

1. Flame Spread: 25 or less.
2. Smoke Developed: 400 or less.

1.3 ADDITIONAL MATERIALS

A. Prior to Substantial Completion of the work, furnish and deliver the following materials to the Owner's representative for future maintenance:

1. Panel Fabric Material: Full-size units equal to three (3) percent of panel fabric material for each type, pattern and color installed.

1.4 WARRANTY

A. Provide manufacturer's 5 year warranty which shall contain provisions that installation shall remain dimensionally stable, without sag for the warranty period.

1. The Contractor and systems manufacturer shall certify in writing, individually and collectively, that in the event of default of the Contractor, the systems manufacturer shall assume full responsibility of all warranties referred, implied, and specified herein.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Manufacturer: Subject to compliance with requirements provide products of one of the following:

1. Decoustics, Ltd., Etobicoke, ON; (800) 387-3809.
2. Conwed Designscape, Ladysmith, WI 54848; (800) 932-2383

2.2 PRODUCTS

A. Acoustical Wall Panels: Manufacturer's standard wall panel system consisting of seamless fabric facing over fiberglass panel core with chemically hardened edges.

1. Acoustical Panel style "AP" by Decoustics, Ltd.
2. "Repond ACT" Absorptive Wall Panels by Conwed Designscape.
3. Fabric: Maharam, Hauppauge, NY11788; (800) 645-3943.

B. Mounting Method: Two-piece metal clip system with leveling bracket.

C. Panel Properties:

1. Nominal Core Density: 6 to 7 lb/cu. Ft.
2. Panel Thickness: 1-inch.
3. Panel Edge and Corner Detail: As selected by Architect from manufacturers standard options.

D. Panel Fabric (FWC):

1. Color and Pattern: As selected by the Architect.
2. Flammability: ASTM E-84 (Steiner Tunnel Test) Class A rated; ASTM E648 (Radiant Panel) Class I.
3. Fabric shall be treated for soil and stain resistance.

END OF SECTION 09841

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Paint and finish the exterior and interior exposed surfaces listed on the Painting Schedule in Part 3 of this Section, as specified herein, and as needed for a complete and proper installation.

B. Provide concrete flooring sealer in locations as indicated in the Room Finish Schedule.

C. Refinishing existing wood doors.

D. Applied painted stenciled lettering on designated partitions.

E. Work Not Included:

1. Unless otherwise indicated, painting is not required on surfaces in concealed areas and inaccessible areas such as furred spaces, foundation spaces, utility tunnels, pipe spaces, and duct shafts.
2. Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze, and similar finished materials are not required to be painted under this Section except as may be so specified.
3. Do not paint moving parts of operating units; mechanical or electrical parts such as valve operators; linkages; sensing devices; and motor shafts; unless otherwise indicated.
4. Do not paint over required labels or equipment identification, performance rating, name, or nomenclature plates.
5. The following items do not require painting, except as indicated otherwise:
   a. Catch basin and manhole covers, gratings and frames
   b. All nonferrous or plated metal surfaces
   c. Factory finished acoustical surfaces (except existing acoustical surfaces in areas as hereinafter specified to be painted.)
   d. All piping, ducts and conduit which are not exposed in the finished work
   e. All exposed piping, ducts and conduit located in Mechanical and Utility Rooms which are not scheduled to be painted.
   f. All items and equipment with factory finish, except where primed only for finish painting or where factory finish is required to be painted out to match adjacent wall or ceiling finish
   g. Gratings for exterior areaways.
   h. Exterior galvanized steel pipe rails with factory applied vinyl coating.

1.2 QUALITY ASSURANCE

A. VOC Compliance

1. In the event a specified product is not in compliance with the VOC. requirements of the regulatory agency having jurisdiction, provide, at no additional cost to the Owner, an equal product, as approved by the Architect, and meeting all such requirements.

B. Products: Only those products specified herein shall be used in the work of this section.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Duron Paint and Wallcovering, Beltsville, MD 20705; (800) 723-8766.
2. Benjamin Moore & Co., Montvale, NJ 07645; (201) 573-9600.
3. California Products, Inc., Andover, MA 01810; (978) 623-9980.
4. Pratt and Lambert Paints, Cleveland, OH 44115; (800) 289-7728.

B. Basis of Design: Products listed are those of Duron Paints and Wallcovering. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other listed manufacturers specified. Only products manufactured or furnished by the manufacturers listed herein shall be used on the project. No substitutions will be allowed.

2.2 PAINT MATERIALS

A. All materials used on the work shall be exactly as hereinafter specified in brand and quality. No claim as to the unsuitability or unavailability of any material specified or unwillingness to use same, or the inability to produce first class work with same, will be entertained by the Architect unless such claims are made in writing to the Architect prior to receipt of bids. All paint, varnish, enamels, stains, paste fillers, linseed oil, shellac, turpentine and similar materials shall be delivered in the original containers with seals unbroken and labels intact. All materials shall be used only as specified by the manufacturer's directions label on the container.

B. It shall be understood that the first quality products of one manufacturer shall be used for all coats of paint for the entire project. No deviation from this understanding will be permitted without specific authorization, in writing, by the Architect.

C. Oil: Other than finishing oil, shall be pure raw linseed oil, well seasoned.

D. Turpentine: Shall be Spirits of Turpentine meeting the requirements of Specifications ASTM D13-51.

E. Spackling Compound: Shall be ready mixed spackling compound as manufactured by Savogram, Synkaloid, Rutland or United Gilsonite Laboratories.

F. Provide paints of durable and washable quality. Do not use paint materials which will not withstand normal washing as required to remove pencil marks, ink, ordinary soil, and similar material without showing discoloration, loss of gloss, staining, or other damage.

G. Colors and glosses: The Architect will select colors to be used in the various types of paint specified and will be sole judge of acceptability of the various glosses obtained from the materials proposed to be used in the Work. Tinting colors shall be Universal fluid tinting colors manufactured by the paint manufacturer of the paint being applied.

H. Undercoats and thinners: Provide undercoat paint produced by the same manufacturer as the finish coat. Use only the thinners recommended by the paint manufacturer, and use only to the recommended limits. Insofar as practicable, use undercoat, finish coat, and thinner as parts of a unified system of paint finish.

2.3 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper installation of the work of this Section, shall be new, first quality of their respective kinds, and as selected by the Contractor, subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 EXTERIOR PAINTING SCHEDULE

A. Exterior Gypsum Soffits
   1. First Coat:
      a. Duron - Weathershield Exterior Acrylic Flat House Paint, series 34
   2. Second Coat:
      a. Duron - Weathershield Exterior Acrylic Flat House Paint, series 34

B. Exterior Concrete Masonry Units
   1. First Coat:
      a. Duron - Block Kote Latex Block Filler, 08-126
   2. Second Coat:
      a. Duron - Weathershield Exterior Acrylic Flat House Paint, series 34
   3. Third Coat:
      a. Duron - Weathershield Exterior Acrylic Flat House Paint, series 34

C. Exterior Metal - Not Factory Primed-3 Coats
   1. First Coat Primer:
      a. Duron - Dura Clad Alkyd White Metal Primer #33-010
   2. Second Coat:
      a. Duron - Dura Clad Alkyd Gloss Enamel (Urethane Modified), series 12
   3. Third Coat:
      a. Duron - Dura Clad Alkyd Gloss Enamel (Urethane Modified), series 12

D. Exterior Metal - Primed
   1. First Coat:
      a. Duron - Dura Clad Alkyd Gloss Enamel (Urethane Modified), series 12
   2. Second Coat:
      a. Duron - Dura Clad Alkyd Gloss Enamel (Urethane Modified), series 12

E. Exterior Metal - Galvanized
   1. First Coat - Primer:
      a. Duron Dura Clad Acrylic Galvanized Metal Primer, White 33-100
   2. Second Coat:
      a. Duron - Dura Clad Alkyd Gloss Enamel (Urethane Modified), series 12
   3. Third Coat:
      a. Duron - Dura Clad Alkyd Gloss Enamel (Urethane Modified), series 12

F. Exterior Ductwork, Insulated and Wrapped
   1. Apply one prime coat and two finish coats of a paint recommended by the approved paint manufacturer for application on the exposed wrapping material.

G. Exterior Aluminum (Noted on drawings to be painted)
   1. First Coat - Primer:
      a. Duron Dura Clad Acrylic Galvanized Metal Primer, White 33-100
   2. Second Coat:
      a. Duron - Dura Clad Alkyd Gloss Enamel (Urethane Modified), series 12
   3. Third Coat:
      a. Duron - Dura Clad Alkyd Gloss Enamel (Urethane Modified), series 12

H. Exterior Exposed Piping
   1. First Coat - Primer:
      a. Duron - Dura Clad Alkyd White Metal Primer #33-010
   2. Second Coat:
      a. Duron - Dura Clad Alkyd Gloss Enamel (Urethane Modified), series 12
   3. Third Coat:
      a. Duron - Dura Clad Alkyd Gloss Enamel (Urethane Modified), series 12

I. Exterior Wood (Opaque Finish)
   1. First Coat - Primer:
      a. Duron - Superior Exterior Alkyd/Oil House Paint Primer, series 08
   2. Second Coat:
      a. Duron - Weathershield Exterior 100% Acrylic Latex Satin, series 11
   3. Third Coat:
      a. Duron - Weathershield Exterior 100% Acrylic Latex Satin, series 11

J. Exterior Wood (Transparent Finish)
   1. First Coat:
      a. Duron - Dura Stain Oil Semi-Transparent Stain, 28-108
   2. Second Coat:
      a. Duron - Dura Stain Oil Semi-Transparent Stain, 28-108

3.2 INTERIOR PAINTING SCHEDULE

A. Interior Metal - Not Factory Primed
   1. First Coat - Primer:
      a. Duron - Dura - Clad Universal Acrylic Metal Primer, White 33-105
   2. Second Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Semi-Gloss Enamel, series 22
   3. Third Coat:
      a. Pratt and Lambert - Accolade Interior Semi Gloss
      b. California - Premium 100% Acrylic Latex Semi-Gloss
      c. Benjamin Moore - Regal Aqua Glo 333
      d. Pittsburgh 90-47X Int/Ext High Performance Waterborne Satin DTM Industrial Enamel
      e. Duron - Plastic Kote Interior Acrylic Latex Semi-Gloss Enamel, series 22

B. Interior Metal - Factory Primed (including interior galvanized metal doors and frames)
   1. First Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Semi-Gloss Enamel, series 22
   2. Second Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Semi-Gloss Enamel, series 22

C. Interior Galvanized Ductwork
   1. First Coat - Primer:
      a. Duron - Dura Clad Acrylic Galvanized Metal Primer, White 33-100
   2. Second Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Semi-Gloss Enamel, series 22
   3. Third Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Semi-Gloss Enamel, series 22

D. Interior Aluminum Indicated to be Painted
   1. First Coat - Primer:
      a. Duron - Dura Clad Universal Acrylic Metal Primer, White 33-105
   2. Second Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Semi-Gloss Enamel, series 22
   3. Third Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Semi-Gloss Enamel, series 22

E. Exposed Interior Ductwork - Insulated and Wrapped
   1. Apply one prime coat and two finish coats of a paint recommended by the approved paint manufacturer for application on the exposed wrapping material.

F. Interior Exposed Piping
   1. First Coat - Primer:
      a. Duron - Dura Clad "Direct-to-Metal" (DTM) Acrylic Coatings, Semi-Gloss, series 95-06X
   2. Second Coat:
      a. Duron - Dura Clad "Direct-to-Metal" (DTM) Acrylic Coatings, Semi-Gloss, series 95-06X

G. Interior Gypsum Drywall Walls and Interior Plaster Walls
   1. First Coat (At abuse resistant gypsum wallboard and standard gypsum wallboard where adjacent):
      a. United States Gypsum – Sheetrock Brand "First Coat"
   2. First Coat (At all other areas, excluding above):
      a. Duron - Interior Acrylic Latex Drywall Primer, 04-124
   3. Second Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Eggshell Enamel, series 20
   4. Third Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Eggshell Enamel, series 20

H. Interior Gypsum Drywall Walls and Interior Plaster Walls Scheduled to Receive Wall Covering
   1. One Coat:
      a. Duron - Acrylic Enamel Undercoater, 04-123

I. Gypsum Drywall Ceilings and Plaster Ceilings
   1. First Coat:
      a. Duron - Interior Acrylic Latex Drywall Primer, 04-124
   2. Second Coat:
      a. Duron - Plastic Kote Interior Flat Acrylic Latex, 17 series

J. Pipe Covering
   1. Painted same as drywall and plaster wall.

K. Exposed Interior Concrete and Masonry
   1. First Coat - Filler:
      a. Duron- Block Kote Latex Block Filler, 08-126
   2. Second Coat:
      a. Duron- Plastic Kote Interior Acrylic Latex Eggshell Enamel, series 20
   3. Third Coat:
      a. Duron- Plastic Kote Interior Acrylic Latex Eggshell Enamel, series 20

L. Interior Concrete Floors (Where indicated to be painted)
   1. First Coat:
      a. Duron - Bradley Acrylic Latex Floor & Patio Coating LFP-4XX
   2. Second Coat:
      a. Duron - Bradley Acrylic Latex Floor & Patio Coating LFP-4XX

M. Interior Hardwood Trim (transparent finish)

   NOTE: For all open grain wood precede finish coat with one (1) coat of paste filler
   1. First Coat:
      a. Duron - McCloskey Tung Seal Oil Base Wood Stain, 1969 Natural
   2. Second Coat: (Sheen: GLOSS)
      a. Duron - McCloskey Crystal Clear Polyurethane, Gloss
   3. Third Coat:(Sheen: SATIN)
      a. Duron - McCloskey Crystal Clear Polyurethane, Gloss

N. Interior Softwood or Poplar Trim (Opaque Finish)
   1. First Coat - Primer:
      a. Duron - Acrylic Enamel Undercoater, 04-123
   2. Second Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Semi-Gloss Enamel, series 22
   3. Third Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Semi-Gloss Enamel, series 22

O. Interior Wood Doors MDO Facing (Opaque Finish)
   1. First Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Eggshell Enamel, series 20
   2. Second Coat:
      a. Duron - Plastic Kote Interior Acrylic Latex Eggshell Enamel, series 20

3.3 EPOXY COATING

A. Exposed interior surfaces marked "Epoxy Coating" in the Room Finish Schedule or as so noted on the drawings shall receive coatings as hereinafter specified. The special coating shall be installed in accordance with the manufacturer's directions and shall bear certification that it meets the following criteria when tested under ASTM Designation E84-79a, "Standard Method of Test for Surface Burning Characteristics of Building Materials:"
   1. 0-25 Class A

B. Special coating shall be a water base acrylic epoxy with a semigloss sheen, as may be provided by manufacturer and approved by the Architect, applied to the various building surfaces to a Dry Film Thickness, (D.F.T.) per coat, as indicated:
   1. Masonry Surfaces:
      a. First Coat: (D.F.T. 5.5 to 8.0)
         1) Duron - Wall Kote Interior Alkyd Enamel Undercoater, 04-024
      b. Second Coat: (D.F.T. 4.0 to 6.0)
         1) Duron - Dura Clad Acrylic Semi-Gloss Epoxy White, 95-205
      c. Third Coat: (D.F.T. 4.0 to 6.0)
         1) Duron - Dura Clad Acrylic Semi-Gloss Epoxy White, 95-205
   2. Gypsum Drywall Surfaces and Gypsum Plastered Surfaces
      a. First Coat - Primer: (D.F.T. 2.0 to 3.0)
         1) Duron - Acrylic Enamel Undercoater, 04-123
      b. Second Coat: (D.F.T. 4.0 to 6.0)
         1) Duron - Dura Clad Acrylic Semi-Gloss Epoxy White, 95-205
      c. Third Coat: (D.F.T. 4.0 to 6.0)
         1) Duron - Dura Clad Acrylic Semi-Gloss Epoxy White, 95-205

END OF SECTION 09900

SECTION 09965 – REINFORCED EPOXY WALL COATING SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation and field application of high-performance coating systems to items and surfaces scheduled.

1.2 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has completed high-performance coating system applications similar in material and extent to those indicated for Project and whose work has a record of successful in-service performance.

B. Source Limitations: Obtain primers and undercoat materials for each coating system from the same manufacturer as the finish coats.

1.3 ADDITIONAL MATERIALS

A. Prior to Substantial Completion of the work, furnish and deliver the following materials to the Owner's representative for future maintenance:

1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. or 1 case, as appropriate, of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Tnemec Company, Inc. (Tnemec), Kansas City, MO 64141; (800) 863-6321.
2.
3.

B. Basis-of-Design: The design for high-performance coating system is based on the product specified. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 REINFORCED EPOXY WALL COATING SYSTEM

A. General: Provide primers, undercoats, and finish-coat materials 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.

B. Wall Coating System: Provide the following fiberglass mat reinforced epoxy system over properly prepared impact resistant gypsum wall board.

1. System Type: Tnemec "Series 273 Stranlock" mat lay up.
2. Substrate: Gypsum board with "Durabond 90" sanded and finished smooth.
   a. Prime Coat: Series 201 Epoxoprime applied at a rate of 200 sq. ft. per gallon.
   b. Bedding Coat: Series 280 Tneme-Glaze applied at a rate of 125sq. ft. per gallon (10.0 mils).
   c. Reinforcement: Series 273 Fiberglass Mat, imbedded and back rolled into Series 280 bedding coat.
   d. Second Coat: Series 280 Tneme-Glaze applied at a rate of 150 sq. ft. per gallon. (10.0 mils).
   e. Following cure, sand the surfaces to remove any raised fiber and or excess material.
   f. Intermediate Finish Coat: Series 280 Tneme-Glaze applied at a rate of 150 sq. ft. per gallon (10.0 mils).
   g. Finish Coat: Series 475 Triton roller applied to achieve 2.5 - 3.0 mils dry film thickness.
3. Color: As selected by Architect from manufacturer's standard colors.

END OF SECTION 09965

SECTION 10101 - VISUAL DISPLAY SURFACES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Markerboards.
2. Fabric faced tackboards.

1.2 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of visual display surface through one source from a single manufacturer.

B. Fire-Test-Response Characteristics: Provide fabrics with the surface-burning characteristics indicated, as determined by ASTM E 84.

1.3 WARRANTY

A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer's standard form in which manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship for the life of the building.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Alliance America, Norcross, GA 30071; (800) 631-4514.
2. Claridge Products & Equipment, Inc., Harrison, AZ 72602; (870) 743-2200.
3. Greensteel, Inc., Dixonville, PA 15734; (800) 766-4204.

2.2 MARKERBOARDS (WHITE BOARDS)

A. Markerboards: Balanced, high-pressure, factory-laminated markerboard assembly of 3-ply construction consisting of backing sheet, core material, and porcelain-enamel face sheet with low-gloss finish.

1. Face Sheet: Porcelain-enamel-clad, ASTM A 463, Type 1, stretcher-leveled aluminized steel, with 0.0236-inch uncoated thickness; with porcelain-enamel coating fused to steel at approximately 1000 deg F. Color as selected by Architect.
2. Particleboard Core: 1/2 inch thick; with 0.015-inch- thick, aluminum sheet backing.
3. Laminating Adhesive: Manufacturer's standard moisture-resistant thermoplastic type.

B. Aluminum Frames and Trim: Factory applied extruded aluminum with clear anodic finish, not less than 0.062-inch- thick, of size and shape indicated. Provide single lengths, keeping joints to a minimum. Miter corners to neat, hairline closure.

2.3 FABRIC-FACED TACKBOARDS

A. Tack Boards: 1/4-inch- thick, vinyl-faced cork sheet factory laminated to 1/4-inch thick particleboard backing, wrapped with fabric.

1. Fabric:
   a. Manufacturer: Maharam, Hauppauge, NY 11788, (800) 645-3943.
   b. Product: Style No. 396320, "Tek-Wall".
   c. Pattern and Color: As scheduled on the Materials Distribution Index Sheet.

2. Apply to cork core with light spray adhesive. Wrap all edges and staple from rear. Test adhesive with fabric and cork core prior to application to ensure compatibility of materials and avoidance of "bleed-through".

END OF SECTION 10101

SECTION 10155 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes toilet partitions and screens of the following types:

1. Types:
   a. Main Lobby: Solid surfacing material.
   b. Staff Areas/ Patient Floors: Metal, baked-enamel.
2. Toilet Enclosures: Ceiling hung.
3. Urinal Screens: Wall hung.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Metal Units:
   a. American Sanitary Partition Corporation, Ocoee, FL 34761; (407) 656-0611.
   b. Global Steel Products Corp., Deer Park, NY 11729; (631) 586-3330.
   c. Sanymetal; a Crane Plumbing Company, Somerset, KY 42501; (606) 678-2700.
2. Solid Surfacing Units:
   a. Ampco Products, Inc., Miami, FL 33054; (305) 821-5700.

2.2 SOLID-SURFACING UNITS

A. Door, Panel, and Pilaster Construction: Solid panel materials of plastic filled resin. Provide units not less than 3/4 inch thick for doors and pilasters, and 1/2-inch thick for panels and screens, with eased edges, and homogenous color and pattern throughout thickness of material.

2.3 METAL UNITS

A. Baked-Enamel Units: Facing sheets and closures fabricated from ASTM A 591/A 591M, (electrolytically zinc-coated) or ASTM A 653/A 653M (hot-dip galvanized or galvannealed), commercial steel sheet for exposed applications, that is mill phosphatized, and selected for smoothness.

1. Facing Sheet Thicknesses: Minimum base-metal (uncoated) thicknesses as follows:

a. Pilasters: Manufacturer's standard thickness, but not less than 0.0438 inch.
b. Panels and Doors: Manufacturer's standard thickness, but not less than 0.0269 inch.

2. Finish: Manufacturer's standard pigmented, organic coating, including thermosetting, electrostatically applied, and powder coatings. Provide coating system that complies with coating manufacturer's written instructions for pretreatment, application, baking, and minimum dry film thickness.
   a. Color: As selected by Architect from manufacturer's full range of colors.

B. Door, Panel, and Pilaster Construction: Seamless, metal facing sheets are pressure laminated to core material. Units have continuous, interlocking molding strip or lapped and formed edge closures. Exposed surfaces are free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections. Corners are sealed by welding or clips. Exposed welds are ground smooth.

1. Core Material: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch for doors and panels and 1-1/4 inches for pilasters.
2. Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units.
3. Tapping Reinforcement: Provide concealed reinforcement for tapping (threading) at locations where machine screws are used for attaching items to units.
4. Urinal-Screen Construction: Matching panels.

2.4 ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories of chrome-plated, nonferrous, cast zinc alloy (zamac) or stainless steel.

B. Pilaster Shoes and Sleeves (Caps): Stainless steel, ASTM A 666, Type 302 or 304, not less than 0.0312 inch specified thickness and 3 inches high, finished to match hardware.

C. Brackets (Fittings): Manufacturer's standard stirrup type, chrome-plated, nonferrous, cast zinc alloy (zamac) or stainless steel.

D. 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.

2.5 FABRICATION

A. Ceiling-Hung Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies complete with threaded rods, lock washers, and leveling adjustment nuts at pilasters for connection to structural support above finished ceiling. Provide assemblies that support

pilasters from structure without transmitting load to finished ceiling. Provide sleeves (caps) at tops of pilasters to conceal anchorage.

B. Doors: Unless otherwise indicated, provide 24-inch wide in-swinging doors for standard toilet compartments and 36-inch wide out-swinging doors with a minimum 32-inch wide clear opening for compartments indicated to be accessible to people with disabilities.

1. Hinges: Manufacturer's standard self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
2. Latch and Keeper: Manufacturer's standard recessed latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.
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 bumper at out-swinging doors.
5. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with accessibility requirements of authorities having jurisdiction. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities.

END OF SECTION 10155

SECTION 10190 - CUBICLES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Curtain tracks and curtain carriers.
2. IV tracks and hangers.

1.2 EXTRA MATERIALS

A. Prior to Substantial Completion of the work, furnish and deliver the following materials to the Owner's representative for future maintenance:

1. Cubicle Curtain Carriers and Track End Caps: Full-size units equal to **3** percent of amount installed, but not less than **10** units.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. General Cubicle Company Inc., Telford, PA 18969; (215) 723-8931.
2. Kirsch, Sturgis, MI 49091; (800) 528-1407.

2.2 CUBICLE CURTAIN TRACKS

A. Cubicle Curtain Track: Extruded aluminum having over-all dimensions of 1-3/8 - inch x 3/4-inch x 0.062-inch minimum wall thickness. . Design for surface application with side projections to overcome ceiling irregularities and affording a method for scribing a tight, neat line to the ceiling.

1. Curved Track: Provide factory fabricated corner bends with a 12-inch radius, fabricated in one continuous "L" shaped where ever practical.
2. Finish: Clear satin anodized finish.

B. Track Accessories: Provide extruded slip-on connectors, splices, coupling and joining sleeves, and nylon end stops and gates. Fabricate splices, end caps, connectors, end stops, coupling and

joining sleeves, wall flanges, brackets, ceiling clips, and other accessories from same material and with same finish as track.

C. Carriers: Provide carrier assemblies with the track, averaging 2.5 for each linear foot of track.

1. General Cubicle: Model #1062N
2. Kirsch: Model #7918

D. Exposed Fasteners: Stainless steel.

2.3 IV SUPPORT SYSTEMS

A. I.V. Track: Extruded aluminum having overall dimensions of 1-3/8 - inch x 3/4-inch x .062-inch wall thickness, slotted on the underside to receive a four wheeled nylon carrier.

1. Curved Track: Provide factory fabricated corner bends with a 12-inch radius, with a true 90° for "L" or "U" shape configurations.
2. Finish: Clear satin anodized finish.

B. I.V. Carriers:

1. General Cubicle: Model No. 17000.
2. Kirsch: Model No. 7900

C. I.V. Carriage: Body shall be solid, one piece molded Celcon equipped with 4 solid Celcon wheels. Main shaft and Safety hook shall be 0.226 inch diameter Brite Basic steel, copper coated and nickel chrome plated. Carrier mechanism shall be designed to lock against surface of reinforcing channel. I.V. track on application of approximately 1/4 turn of spiral safety hook.

1. General Cubicle: Model No. 17500.
2. Kirsch: Model No. 7960/061

D. I.V. Bottle Holder: Fabricated of polished stainless steel 3/4 inch diameter tubing for the main shaft, 3/8 inch diameter for the inner shaft and and four 1/4 inch stainless steel spiral arms. Pendants shall be capable to be raised or lowered to a height from 26 inches to 42 inches and to move up or down to increase or decrease gravitation feed.

1. General Cubicle: Model No. 17150.
2. Kirsch: Model No. 7955/061

E. Assemblies:

1. "U" and oval shape assemblies: Provide (2) carriages and (1) I.V. bottle holder.
2. Straight track assemblies: Provide (1) carriages and (1) I.V. bottle holder.

END OF SECTION 10190

SECTION 10200 - LOUVERS AND VENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Fixed, extruded-aluminum louvers.

1.2 PERFORMANCE REQUIREMENTS

A. Reference: *The BOCA® National Building Code/1999,* Fourteenth Edition, referred to herein as "BOCA 99".

B. Structural Performance -Implied Loads: Design and construct architectural louver system to withstand minimum loading requirements as specified herein.

1. Design and engineer architectural louver system in accordance with procedures for determining design wind loads for components and cladding contained in §1609.8.2 of referenced building code standards and as modified by these specifications.
2. Incorporate the following values to design wind load procedure referenced above which shall become the basis for design and engineering of architectural louver system.
   a. Basic Wind Speed: 90 mph
   b. Velocity Pressure: 20.7
   c. Wind Importance Factor: 1.23
   d. Project Exposure Category: **C**.

C. Seismic Performance:

1. General Seismic Requirements: Architectural components and their attachments shall comply with seismic design requirements of the following referenced building code for a project in Seismic Hazard Exposure Group III, with a Seismic Performance Category of C:
2. Provide louvers and attachments shall be designed in accordance with the requirements of Section 1610.6.3 of BOCA '99, in its entirety, and for seismic forces (F_p) in accordance with the formula $F_p=A_vC_cPW_c$ where the following values are used:
   a. The coefficient representing effective peak velocity related acceleration (A_v) = 0.10g.
   b. The seismic cofficent for architectural components (C_c):
      1) Component (C_c) = 0.9
      2) Attachments (C_c) = 3.0
   c. Performance criteria factor from Table 1610.6.3 of BOCA '99 (P) = 1.5
   d. W_c= Weight of architectural component.

D. Thermal Movements: Provide louvers that allow for thermal movements resulting from a temperature change (range) of 120 deg F in ambient and 180 deg F 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.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain louvers through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Construction Specialties, Inc., Cranford, NJ 07016; (888) 640-5566.
2. Airolite Company (The), Marietta, OH 45750; (740) 373-7676.
3. Airline Products, Inc., Hagerstown, MD 21740; (301) 745-8833.

2.2 MATERIALS

A. Aluminum Extrusions: ASTM B 221, alloy 6063-T5 or T-52.

B. Aluminum Sheet: ASTM B 209, alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 zinc coating, mill phosphatized.

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.

E. 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, including separation between blades and frames at head and sill, 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. Mullions: Provide vertical mullions fully recessed behind louver blades at spacings indicated, but not more than recommended by manufacturer, or 72 inches o.c., whichever is less.

2.4 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal, Drainable-Blade Louver:

1. Basis-of-Design Product: "Model 6155" by Construction Specialties or a comparable product of one of the listed manufacturers.
2. Louver Depth: **6 inches.**
3. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.080 inch for blades and 0.080 inch for frames.
4. Mullion Type: Exposed.

B. Louver Screening: Unless otherwise indicated, all louvers to be furnished with removable 1/2" aluminum mesh, .063" diameter wire intercrimp bird screen secured within a 12 B & S gauge extruded aluminum frame with mitered corners. Secure screens to louver frames with stainless steel machine screws.

C. Insulated, Blank-off Panels: Laminated metal-faced panels, 2-inch thick, consisting of foamed rigid plastic insulating core surfaced on back and front with 0.032-inch aluminum sheet. Trim perimeter edges with 0.080-inch aluminum with mitered corners. Finish panels with same type of finish applied to louvers, but black color.

2.5 FINISHES

A. High-Performance Organic-Coating 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 Two-Coat Coating System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin (Kynar 500) by weight; complying with AAMA 2605.
2. Approved Manufacturer: PPG Industries, Inc.
   a. Color and Gloss: Custom color as selected by Architect to match adjacent metal panel system.

END OF SECTION 10200

SECTION 10262 – CORNER GUARDS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes corner guards of the following type:

1. Vinyl corner guards.
2. Stainless steel corner guards.

1.2 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wall protection material through one source from a single manufacturer.

1.3 EXTRA MATERIALS

A. Prior to Substantial Completion of the work, furnish and deliver the following materials to the Owner's representative for future maintenance:

1. Corner-Guard Covers: Full-size plastic covers of maximum length equal to **2** percent of each type, color, and texture of units installed, but no fewer than **two, 8-foot** long units.
2. Include mounting and accessory components. Replacement materials shall be from same production run as installed units.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Vinyl Corner Guards:
   a. Construction Specialties, Inc. (C/S), Cranford, NJ 07016; (201) 272-5200.
   b. Balco, Inc., Wichita, KS 67217; (316) 945-9328.
   c. Pawling Corporation, Wassaic, NY 12592; (914) 373-9300.
2. Stainless Steel Corner Guards:
   a. Wilkinson Hi-Rise, LLC, Stow, OH 44224; (800) 686-6726.
   b. Pawling Corporation, Wassaic, NY 12592; (914) 373-9300.

2.2 MATERIALS

A. Extruded Rigid Plastic: ASTM D 1784, Class 1, textured, chemical- and stain-resistant, high-impact-resistant PVC or acrylic-modified vinyl plastic with integral color throughout; thickness as indicated.

1. Impact Resistance: Minimum **25.4 ft-lbf/in.** of notch when tested according to ASTM D 256, Test Method A.
2. Chemical and Stain Resistance: Tested according to ASTM D 543.
3. Self-extinguishing when tested according to ASTM D 635.
4. Flame-Spread Index: 25 or less.
5. Smoke-Developed Index: 450 or less.

B. Aluminum Extrusions: Alloy and temper recommended by manufacturer for type of use and finish indicated but with not less than strength and durability properties specified in ASTM B 221 for Alloy 6063-T5.

C. Stainless-Steel: ASTM A176, Type 430.

2.3 VINYL CORNER GUARDS

A. Acceptable Products: Design is based on use of standard products manufactured by Construction Specialties, Inc.. Provide specified product, or a comparable product by one of the listed manufacturers.

B. Fire Rated, Flush Mounted Corner Guards: Provide UL listed assemblies with fire-rating equal to fire-rating of partition where installed.

1. CG-1F, One Hour Rated Corner Guard Assemblies:
   a. C/S No.: FS-20R – 1HR
2. CG-2F, Two Hour Rated Corner Guard Assemblies:
   a. C/S No.: FS-20R – 2HR
3. CG-3F, Two-Hour Rated Partition End Assemblies:
   a. C/S No.: FSC-25R – 2HR

C. Non-Rated, Flush Mounted Corner Guards:

1. CG-1 Corner Guards (90 deg.):
   a. C/S No.: SFS-20
2. CG-3, Partition End Guards:
   a. C/S No. FSC-25

D. Provide full height units, consisting of a snap-on vinyl cover installed over a continuous aluminum retainer. Install retainer from floor to 2-inches above finish ceiling except at soffit locations, terminate retainer at soffit. Provide structural aluminum support base installed at bottom of retainer for installation of coved base. Install vinyl cover from top of base to 2-inches above finish ceiling. In soffit locations, terminate at soffit and intall end cap.

1. Install flexible fire barrier and retainer in compliance with requirements indicated as part of UL's fire-resistance rating.

E. Colors: Colors shall be selected by Architect from any of manufacturer's full range of color options.

2.4 STAINLESS STEEL CORNER GUARDS

A. Acceptable Products: Design is based on use of standard products manufactured by Wilkinson Hi-Rise, LLC.. Provide specified product, or a comparable product by one of the listed manufacturers.

B. Metal Corner Guards: Guards shall be fabricated from one piece, 16 gauge stainless steel with a brushed satin finish (#4 finish typical), with 90- or 135-degree turn to match wall condition and formed edges.

1. Surface Mounted Guards: Model WCG stainless steel corner guards with 3-1/2 -inch legs. Provide with 1/8-inch radius, unless otherwise detailed. For end wall conditions furnish WCG-U series.
   a. Mount with PL Premium Adhesive as furnished by the corner guard manufacturer.
2. Built-In Guards: Model WCGT-1 at masonry conditions; at ceramic tile on concrete masonry units or on painted concrete masonry units where use of built-in anchors is feasible.

C. All corner guards shall extend full height, from top of room base to finish ceiling.

END OF SECTION 10262

SECTION 10263 – WALL GUARDS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes wall guards of the following type:

1. Wood crash rails.
2. Vinyl wall bumpers.

1.2 EXTRA MATERIALS

A. Prior to Substantial Completion of the work, furnish and deliver the following materials to the Owner's representative for future maintenance:

1. Wall Bumper Covers: Full-size plastic covers of maximum length equal to **2** percent of each type, color, and texture of units installed, but no fewer than **two, 8-foot** long units.
2. Include mounting and accessory components. Replacement materials shall be from same production run as installed units.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Construction Specialties, Inc. (C/S), Cranford, NJ 07016; (201) 272-5200.
2. Balco, Inc., Wichita, KS 67217; (316) 945-9328.
3. Pawling Corporation, Wassaic, NY 12592; (914) 373-9300.

2.2 MATERIALS

A. Extruded Rigid Plastic: ASTM D 1784, Class 1, textured, chemical- and stain-resistant, high-impact-resistant PVC or acrylic-modified vinyl plastic with integral color throughout; thickness as indicated.

1. Impact Resistance: Minimum **25.4 ft-lbf/in.** of notch when tested according to ASTM D 256, Test Method A.
2. Chemical and Stain Resistance: Tested according to ASTM D 543.
3. Self-extinguishing when tested according to ASTM D 635.

4. Flame-Spread Index: 25 or less.
5. Smoke-Developed Index: 450 or less.

B. Aluminum Extrusions: Alloy and temper recommended by manufacturer for type of use and finish indicated but with not less than strength and durability properties specified in ASTM B 221 for Alloy 6063-T5.

C. Stainless Steel: ASTM A 176, Type 304, with No. 4 Satin Finish.

D. Solid Wood: FAS grade hardwood lumber of species indicated, kiln dried to a moisture content of 6% to 10%, free of appearance defects, and selected for compatible grain and color. Factory finish with catalyzed, high solids, clear conversion varnish using a two coat process, in accordance with specified AWI finish system

2.3 CRASH RAILS

A. Acceptable Products: Design is based on use of standard products manufactured by Construction Specialties, Inc.. Provide specified product, or a comparable product by one of the listed manufacturers.

B. Crash Rails: Surface mounted assembly, "Renaissance Model CRWS-2" by Construction Specialties, consisting of 5-1/2 –inch high, solid wood crash rail assembly with 3 rows of 1/8-inch wide stainless steel strips with stainless steel end caps.

1. Species: Maple.
2. Finish: As selected by the Architect from manufacturers full range of options.

2.4 VINYL BUMPER RAILS

A. Acceptable Products: Design is based on use of standard products manufactured by Construction Specialties, Inc. Provide specified product, or a comparable product by one of the listed manufacturers.

B. Bumper Rails: Surface mounted assembly "Model SCR-50" by Construction Specialties, consisting of continuous snap-on vinyl cover installed over continuous retainer; with continuous vinyl bumper cushion(s) centered in the retainer; designed to withstand impacts.

1. Color and Texture: As selected by Architect from manufacturer's full range.
2. End Caps and Corners: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.
3. Accessories: Concealed splices and mounting hardware.

END OF SECTION 10263

SECTION 10264 – HAND RAILS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes handrails of the following type:

1. Wood hand rails.

1.2 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of handrail through one source from a single manufacturer.

B. Structural Performance: Provide handrails capable of withstanding the following structural loads without exceeding the allowable design working stress of materials for handrails, anchors, and connections:

1. Concentrated load of 200 lbf applied at any point and in any direction.
2. Uniform load of 50 lbf/ft. applied in any direction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Construction Specialties, Inc. (C/S), Muncy, PA 07016; (800) 233-8493.
2. Balco, Inc., Wichita, KS 67217; (316) 945-9328.
3. Pawling Corporation, Wassaic, NY 12592; (914) 373-9300.

2.2 MATERIALS

A. Solid Wood: FAS grade hardwood lumber of species indicated, kiln dried to a moisture content of 6% to 10%, free of appearance defects, and selected for compatible grain and color. Factory finish with catalyzed, high solids, clear conversion varnish using a two coat process, in accordance with specified AWI finish system

B. Stainless Steel: ASTM A 176, Type 304, with No. 4 Satin Finish.

2.3 HANDRAILS

A. Acceptable Products: Design is based on use of standard products manufactured by Construction Specialties, Inc.. Provide specified product, or a comparable product by one of the listed manufacturers.

B. Handrails: Surface mounted assembly, "Renaissance Model HRWS-6C" by Construction Specialties, consisting of 1-1/2 –inch diameter, solid wood handrail assembly with stainless steel brackets and stainless steel radiused end caps.

1. Species: Maple.
2. Finish: As selected by the Architect from manufacturers full range of options.

END OF SECTION 10264

SECTION 10410 - DIRECTORIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Internally illuminated directories.

1.2 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. Message Strips: Full-size, blank strips equal to 10 percent of amount installed for each size indicated, but no fewer than 20 strips.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. ASI Sign Systems, New York, NY 10001 (800) 274-7446.
2. Andco Industries Corp. Greensboro, NC 24717 (910) 299-4511.
3. Vomar Products, Inc., Sepulveda, CA 91343 (818) 894-7174.

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:

1. Sheet: ASTM B 209.
2. Extruded Shapes: ASTM B 221, Alloy 6063.

B. Tinted Tempered Glass: ASTM C 1048, Kind FT, Condition A, Type I, Class 2 (tinted), tint as indicated, Quality q3, with exposed edges seamed before tempering, and 6 mm thick, unless otherwise indicated.

C. Fasteners: Provide screws, bolts, and other fastening devices made from same material as items being fastened, except provide hot-dip galvanized, stainless-steel, or aluminum fasteners for exterior applications. Provide types, sizes, and lengths to suit installation conditions. Use security fasteners where exposed to view.

2.3 DIRECTORIES

A. Rear-Illuminated, Message-Strip Directory: Factory-fabricated unit consisting of changeable message strips held in place by retainer frame enclosed in manufacturer's standard 4-to-6-inch-deep perimeter frame; with glazed cover, aluminum-sheet rear cover panel, and concealed illumination system.

1. Reveal Frame and Nonsectional Cover: Glazing held in cover frame mounted on full-length, concealed continuous hinge to form reveal between outer edge of cover frame and inner edge of perimeter frame. Provide nonsectional, one-piece cover for access to message strips and header panel, equipped with concealed lock.
   a. Perimeter Frame: Extruded aluminum.
   b. Perimeter Frame Profile: Square.
   c. Perimeter Frame Corners: Square.
   d. Cover Frame: Same material and finish as perimeter frame.
   e. Glazing: Gray-tinted tempered glass.
   f. Header Panel: Provide copy that complies with requirements indicated on artwork supplied on electronic media by Architect for size, style, spacing, content, height, location, material, and colors of graphics.
   g. Divider Color: Same as message strips.
2. Film-Insert Message Strips: Removable, black, negative-film message strips in interchangeable, interlocking plastic carriers.
3. Header Panel: Same material and color as changeable message strips. Provide copy that complies with requirements indicated on artwork supplied on electronic media by Architect for size, style, spacing, content, height, location, material, and colors.
4. Rear-Illumination System: Provide removable and accessible fluorescent-strip fixture system with reflective interior surfaces for uniform illumination of message strips and header panel with minimum halation and without light leaks. Include lamps and internal wiring with single concealed electrical connection to building system. Coordinate electrical characteristics with power supply provided.
5. Mounting: Semi-recessed.

2.4 FABRICATION

A. Fabricate directories to requirements indicated for dimensions, design, and thickness and finish of materials. 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.

B. Fabricate directory cabinets and door frames with reinforced corners, mitered and welded to a hairline fit, with no exposed fasteners. Provide structural reinforcement to prevent racking and misalignment.

C. Message-Strip Directories: Provide blank message strips for each carrier in entire directory.

2.5 FINISHES

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

B. Class II, Color Anodic Finish: AA-M12C22A32/A34 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, integrally colored or electrolytically deposited color coating 0.010 mm or thicker) complying with AAMA 611.

END OF SECTION 10410

SECTION 10431 - SIGNS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes interior panel signs and accessories for the following:

1. Panels signs for room identification.
2. Wayfinding signs.
3. Building code signage.

1.2 QUALITY ASSURANCE

A. Source Limitations: Obtain each sign type through one source from a single manufacturer.

B. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA) and with code provisions as adopted by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. APCO Graphics. Atlanta, GA 30321; (404) 688-9000.
2. ASI Sign System, Inc., Dallas, TX 75220; (800) 274-7732.
3. Vomar Products, Inc., Van Nuys, CA 91406; 818) 894-7174.

2.2 MATERIALS

A. Cast-Acrylic Sheet: Manufacturer's standard and as follows:

1. Color: As selected by Architect from manufacturer's full range.

2.3 PANEL SIGNS

A. General: Provide panel signs that comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.

1. Produce smooth panel sign surfaces constructed to remain flat under installed conditions within tolerance of plus or minus 1/16 inch measured diagonally.
2. Fabricate signs to allow insertion of changeable message inserts.

B. Unframed Panel Signs: Fabricate signs with edges mechanically and smoothly finished to comply with the following requirements:

1. Material: .125-inch thick acrylic.
2. Size: (Actual sizes to be determined)
   a. Room: 7-1/2 –inch by 7-1/2 –inch.
   b. Directories: 16-inch by 24-inch.
3. Edge Condition: Square cut.
4. Corner Condition: Square.

C. Graphic Content and Style: Provide sign copy to comply with requirements of artwork to be furnished on electronic media by Designer for size, style, spacing, content, mounting height and location, material, finishes, and colors of signage.

D. Tactile and Braille Copy: Manufacturer's standard process for producing copy complying with ADA Accessibility Guidelines and ICC/ANSI A117.1. Text shall be accompanied by Grade 2 braille. Produce precisely formed characters with square cut edges free from burrs and cut marks.

1. Panel Material: Opaque acrylic sheet.
2. Raised-Copy Thickness: Not less than 1/32 inch.

E. Mounting Methods: Use double-sided foam tape fabricated from materials that are not corrosive to sign material and mounting surface.

END OF SECTION 10431

SECTION 10437 - PYLON SIGNS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes internally illuminated, exterior pylon signs.

1.2 WARRANTY

A. Fiberglass Sign Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fiberglass panels that fail in materials or workmanship for a period of 5 years from date of Substantial Completion. Failures include, but are not limited to,: Coating degradation, chalking, fading, and fiberglass delamination or cracking.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. APCO Graphics. Atlanta, GA 30321; (404) 688-9000.
2. ASI Sign System, Inc., Dallas, TX 75220; (800) 274-7732.
3. Vomar Products, Inc., Van Nuys, CA 91406; 818) 894-7174.

2.2 MATERIALS

A. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of alloy 5005-H15.

B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of alloy 6063-T5.

C. Fiberglass: Molded, seamless, thermosetting, glass-fiber-reinforced polyester panels .125-inch thick, with a minimum tensile strength of 15,000 psi when tested according to ASTM D 638 and with a minimum flexural strength of 30,000 psi when tested according to ASTM D 790.

2.3 EXTERIOR SIGNS

A. Basis of Design: Multi-sided, illuminated, monolithic faced pylon of fiberglass faced construction, Series 1040R by ASI Sign Systems, or comparable product by one of the listed manufacturers.

B. Sign: Constructed of one-piece, seamless, molded-fiberglass facing panels permanently bonded to internal structural framing. Sign assembly shall be seamless with no visible screws, fasteners or retainer frames.

C. Framework: Manufacturer's standard internal framing system of aluminum extrusions reinforced with aluminum plate, designed to withstand applicable wind pressures. Provide welded construction using mitered joints

D. Mounting: Provide aluminum base mechanically fastened to anchor bolts embedded in concrete foundation.

E. Illumination: Provide internal illumination using concealed, internally wired, fluorescent-strip fixture system to illuminate message panels. Provide energy efficient, high output ballasts, UL listed; and integral photo cell.

F. Colors: As selected by the Architect from manufacturer's full range of options.

G. Graphics: Graphics shall be subsurface, protected with clear polyurethane coating. Lettering to be computer generated, of size, color and type styles to be determined.

2.4 FABRICATION

A. General: Provide manufacturer's standard pylon sign assembly consisting of message panels supported on foundation-mounted, structural framing system.

1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and contact surfaces.
2. Mill joints to a tight, hairline fit. Form joints exposed to weather to exclude water penetration.
3. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in location not exposed to view after final assembly.
4. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

END OF SECTION 10437

SECTION 10505 - METAL LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes knock-down "quiet" metal lockers.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Republic Storage Systems Co., Canton, OH 44705, (800) 477-1255
2. Lyon Metal Products, Inc., Aurora, IL 60507, (800) 323-0082.
3. Penco Products, Inc., Oaks, PA 19456, (800) 562-1000.

2.2 LOCKERS

A. Basis of Design: Provide "Quiet Lockers" by Republic Steel, or a comparable product by one of the listed manufacturers.

1. Locker Rooms: Single tier, full height, 72 inch x 12 inch by 18 inch deep.

B. Materials: Doors and door frames shall be made of cold rolled and leveled sheet steel. Other parts shall be made from mild cold rolled steel. All steel shall be free from imperfections and capable of taking a high grade enamel finish.

C. Body: All locker body components shall be made of cold rolled steel specially flanged for added strength and rigidity to ensure tight joints between bolts. All bolts and nuts shall be zinc plated.

D. Doors: Doors shall be minimum 18-gage steel, adequately flanged. Formations shall consist of two right angles at lock side of door; two right angles at hinge side; and one right angle at top and bottom.

E. Door Frames: Door frames shall be not less than 16-gage steel, capable of taking same high grade finish as remainder of locker. All parts shall be channel formation, securely welded together. Sides of frame shall form a continuous door strike.

F. Locking Device: Shall be a positive automatic pre-locking type, whereby locker may be locked while door is open, then closed without unlocking and without damaging locking mechanism

G. Latching: Shall be one-piece, pre-lubricated, spring steel latch completely contained within the lock bar, under tension, to provide a rattle-free operation. The lock bar shall be of pre-painted, double-channel steel construction. The lock bar shall be securely contained in the door channel by self-lubricating polyethylene guides that isolate the lock bar from metal-to-metal contact with the door. Provide three latching points for lockers over 42" in height and two latching points for all tiered lockers 42"and under in height. The lock bar travel is to be limited by contacting resilient elastomeric cushioning devices located inside the lock bar.

H. Recessed Handle: A non-protruding lifting feature shall be provided for actuating the lock bar when opening the door. It shall be contained in a formed 20 gauge stainless steel pocket that is securely assembled to the door. This pocket also must provide a recessed area for accommodating the various lock types and the number plate. The lifting trigger within the recess pocket shall be an integral part of the steel slide plate which is securely attached to the lock bar and functions to transfer the lifting force to the lock bar. The exposed portion of the lifting trigger shall be encased in a molded ABS thermoplastic cover. Handle shall have provision for padlocks or built-in-locks of key or combination types.

I. Locks: Provide built-in combination locks.

J. Hinges: Hinges shall be at least 2" wide of the full loop, tight pin style, securely welded to frame and riveted to door. Provide two hinges per door.

2.3 INTERIOR EQUIPMENT

A. Single-tier lockers shall have hat shelf located approximately 9" below top of locker.

B. Single-tier lockers shall have three single prong wall hooks and one coat hanger rod.

C. Hooks shall be steel, ball tip, cadmium plated, attached with two bolts per hook.

D. Each locker shall have a polished aluminum number plate with black numerals not less than 1/2" high. Plates shall be attached with split rivets.

2.4 ACCESSORIES

A. Provide continuous closed bases and filler pieces between lockers and adjacent construction, including sides and tops

B. Fillers shall be 18 gage installed with concealed fasteners and shall completely close off the abutting space to create a monolithic appearance..

2.5 FINISH

A. Before enamel is applied, the surfaces of the steel shall be phosphatized in a five-stage process to inhibit corrosion and increase the durability of the applied enamel. All parts shall then be finished with a heavy coat of baked-on enamel. Body parts shall be finished in a standard neutral color. Exposed parts shall be of color selected by the Architect from manufacturer's standards. Bolts and nuts shall be zinc plated.

END OF SECTION 10505

SECTION 10506 - WOOD LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Wood lockers with plastic-laminate-faced wood doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Hollman, Inc., Irving, TX 75038; (800) 433-3630.
2. Classic Woodworking, Inc., Tualatin, OR 97062; (800) 322-2267.
3. Treeforms, Inc., Greensboro, NC 27410; (800) 447-8733.

2.2 PLASTIC-LAMINATE FACED WOOD LOCKERS

A. Basis of Design: Provide list products by Hollman, or a comparable product by one of the listed manufacturers.

1. Staff Lockers: Model "A", single tier lockers, 12-inch by 72-inch by 20-inch deep.
2. Staff Lounges: Model "F", six tier box lockers, 12-inch by 12-inch by 20-inch deep.

B. Construction Style: Flush overlay.

C. Locker Body: Fabricated from ANSI A208.1, Grade M-2 particleboard-core panels having a minimum 45-lb/cu. ft. density covered on both sides with thermoset decorative overlay complying with LMA SAT-1. Provide manufacturer's standard 3/4 or 5/8 inch thick panel at sides, top and bottom, and 1/2 or 3/8 inch thick panel at back. Exposed panel edges to receive 3-mm thick PVC edging.

D. Plastic-Laminate-Faced Wood Doors: NEMA LD 3, high-pressure decorative laminate, Grade VGS, over both sides of manufacturer's standard 3/4-inch or 5/8-inch thick particleboard core with 3-mm thick PVC panel edges..

E. End, Corner and Filler Panels: Laminate-faced, 3/4-inch- thick panel that matches door faces.

F. Colors, Patterns, and Finishes: As selected by Architect from laminate manufacturer's full range.

2.3 FABRICATION

A. Unit Principle: Fabricate each wood locker with an individual door and frame, individual top, bottom, back, and shelves, and common intermediate uprights separating compartments

B. Fabricate components square, rigid, without warp, and with finished faces flat and free of scratches and chips. Accurately machine components for attachments in factory, with no chips. Make joints tight and true.

1. Fabricate wood lockers using manufacturer's standard construction with joints made with dowels, dados, or rabbets. Dado side panels to receive shelving, except where indicated to be adjustable.

C. 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.

2.4 WOOD LOCKER HARDWARE

A. General: Provide manufacturer's standard wood locker hardware and accessories complying with the following:

B. Frameless Hinges (European Type): Fully concealed, self-closing, nickel-plated steel, with not less than 125 degrees of opening.

C. Door Locks: Key-controlled, three-number dialing combination locks; capable of at least five combination changes made automatically with a control key.

D. Number Plates: 1-1/2-inch- diameter, etched, embossed, or stamped, brass plates with black numbers and letters at least 1/2 inch high. Finish plates to match other wood locker hardware.

E. Hooks: Manufacturer's standard ball-pointed, aluminum or steel; finished to match other wood locker hardware. Attach hooks with at least two fasteners.

F. Coat Rods: 3/4-inch- diameter steel; finished to match other wood locker hardware.

G. Exposed Hardware Finishes: Satin chrome, unless otherwise indicated.

H. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage.

END OF SECTION 10506

SECTION 10522 - FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following fire protection specialties where shown on the Drawings, as specified herein, as needed for a complete and proper:

1. Fire-protection cabinets.
2. Mounting brackets for fire extinguishers.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Larsen's Manufacturing Company, Minneapolis, MN 55342, (800) 527-7367
2. JL Industries, Inc., Bloomington, MN 55435, (800) 554-6077
3. Modern Metal Products; Div. of Technico, Owatonna, MN 55060, (800) 435-5544

2.2 FIRE EXTINGUISHER CABINETS

A. Basis of Design: Where shown on the Drawings, provide "Larsen Model 2712R" modified to size indicated on the Drawings, or a comparable product by one of the listed manufacturers.

B. Fire-Protection Cabinets: Provide manufacturer's heavy gage enameled steel box (tub) modified to 12-inch depth, with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated for fully recessed installation.

1. Weld joints and grind smooth.
2. Finish: Manufacturer's standard white baked enamel.

C. Trim: Exposed one piece combination flat trim and perimeter door frame, with corners mitered, welded, and ground smooth.

D. Cabinet Door: Horizontal duo with clear tempered safety glass panel style with continuous hinge permitting door to open 180 degrees. Provide recessed door pull and friction latch.

E. Trim and Door Finish: Manufacturer's standard baked enamel, ready for field finish painting.

2.3 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

END OF SECTION 10522

SECTION 10651 - OPERABLE PANEL PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes electrically operated, continuously hinged partitions.

1.2 QUALITY ASSURANCE

A. Acoustical Performance: Operable panel partition assembly tested for laboratory sound transmission loss performance according to ASTM E 90, determined by ASTM E 413, and rated for not less than the STC indicated.

B. Fire-Test-Response Characteristics: Provide operable panel partitions with flame spread rating of 25 or less, and smoke developed of 450 or less, per ASTM E84.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Modernfold, Inc., New Castle, IN 47362, (800) 869-9685.
2. Hufcor Inc., Janesville, WI 53547, (800) 542-2371.
3. Kwik-Wall Co., Springfield, IL 62703, (217) 522-5553.

2.2 OPERABLE PANEL PARTITIONS

A. Basis of Design: Operable partition shall be a series of continuously hinged flat panels, electrically operated, top supported with operable floor seals; "Acoustic-Seal 933E" by Modernfold, Inc.

B. Panel Construction: 3.25-inch thick by 48-inch maximum width, steel framed panel construction, faced with 21 gauge roll-formed steel sheet and gypsum board. Fabricate panels with tight hairline joints, free of bow, warp, twist, and deformation, Reinforce panels for hardware and suspension system attachment.

1. Finish Facing: Custom fabric wall covering. Color and pattern as selected by Architect from manufacturer's full range.
2. STC: Not less than 50.

3. Hardware: Manufacturer's standard as required to operate operable panel partition and accessories; with decorative, protective finish.
4. Seals: Tight fitting continuous acoustical PVC seals in profiles that minimize sound leakage producing operable panel partitions complying with acoustical performance requirements.
    a. Vertical interlocking sound seals between panels (astragals) of a reversible tongue and groove configuration shall be required in each panel edge.
    b. Horizontal top seals shall be continuous contact type.
    c. Horizontal bottom floor seals to be automatically operated providing nominal 1.5-inch operating clearance

C. Suspension System:

1. Tracks: Continuous 7 gauge roll-formed steel track system with adjustable steel hanger rods for overhead support. Provide head closure trim as required for acoustical performance.
2. Soffit: Exposed removable track soffit shall be all steel, attached to track bracket without exposed fasteners.
3. Carriers: Manufacturer's heavy-duty trolley system as required for configuration type, size, and weight of partition with all steel ball-bearing wheels.
4. Aluminum Finish: Mill finish or manufacturer's standard, factory-applied, decorative finish, unless otherwise indicated.

D. Accessories:

1. Pass Doors: Swinging door built into and matching panel construction, size as indicated. Fabricated to comply with recommendations of "Accessibility Guidelines for Buildings and Facilities (ADAAG)." Provide complete with frames and operating hardware. No threshold will be permitted.

END OF SECTION 10651

SECTION 10800 - TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Provide toilet and bath accessories where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

1.2 WARRANTY

A. Manufacturer's Mirror Warranty: Written warranty, executed by mirror manufacturer agreeing to replace mirrors that develop visible silver spoilage defects within 15 years from date of Substantial Completion..

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. American Specialties, Inc. (ASI), Yonkers, NY 10701, (914) 476-9000.
2. Bobrick Washroom Equipment, Inc., Clifton Park, NY 12065, (518) 877-7444.
3. General Accessory Manufacturing Co. (Gamco), Durant, OK, 74701, (800) 451-5766.

2.2 TOILET TISSUE HOLDER

A. Provide theft resistant spindles at all toilet tissue holders.

B. Where recessed toilet tissue holders are located in masonry partitions, provide units and mounting accessories suitable for installation in masonry partitions.

C. Recessed toilet tissue holders:

1. A.S.I. No. 74022
2. Bobrick No. B-697
3. Gamco No. 212-Dbl

D. Surface mounted toilet tissue holders

1. A.S.I. No. 7305-2

2. Bobrick No. B-7686
3. Gamco No. 5163

E. Partition mounted toilet tissue holders

1. A.S.I. No. 0264-1
2. Bobrick No. B-2740
3. Gamco No. 814

2.3 PAPER TOWEL DISPENSERS

A. Recessed Paper Towel Dispenser - Type A: 4" deep rough wall opening

1. A.S.I. 0457
2. Bobrick B-359
3. Gamco No. TD-4

B. Recessed Paper Towel Dispenser - Type B: 4" deep rough wall opening

1. A.S.I. 0452
2. Bobrick B-362
3. Gamco No. TD-3.

C. Recessed Paper Towel Dispenser and Disposal - Type C: 4" deep rough wall opening

1. A.S.I. 0469
2. Bobrick B-3944
3. Gamco No. TW-1

D. Surface Mounted Paper Towel Dispenser – Type D

1. A.S.I. 0210
2. Bobrick B-262
3. Gamco No. TD-2.

E. Surface Mounted Paper Towel Dispenser - Type E

1. A.S.I. 0215
2. Bobrick B-2621
3. Gamco No. TD-2-8.

2.4 SEMI-RECESSED WASTE RECEPTACLE

A. Minimum of 12 gallon capacity, 4" deep rough wall opening

1. A.S.I. 0458

2. Bobrick B-3644
3. Gamco No. WR-6

2.1 MIRROR

A. Angle framed; size - 18" x 30"

4. A.S.I. 0600
5. Bobrick B-290
6. Gamco No. A series

B. Angle framed; size - 18" x 54"

1. A.S.I. 0600
2. Bobrick B-290
3. Gamco No. A series

2.5 GRAB BARS

A. Grab bars:

1. Stainless steel tubing, 1-1/4" o.d., minimum 18 gauge, Type 304L.
2. Each flange shall be of sufficient strength and design to sustain a concentrated load of 250 pounds.
3. Standard wall clearance shall be 1-1/2", unless indicated otherwise.
4. Provide Snap Flange construction except where indicated otherwise. Heliarc weld mounting flanges to tubing to form single structural unit. Secure flanges to concealed mounting plate drilled and tapped to accommodate appropriate type stainless steel screws.
5. Provide snap-on cover unless other type mounting is indicated. Snap flange cover escutcheon shall be minimum 22 gage type 304 stainless steel.

B. Straight Grab Bars: length as indicated

1. A.S.I. 3700 P Series
2. Bobrick B-5806.99 Series
3. Gamco No. 125 S Series

C. Finish/Texture:

1. Grab bars shall be peened.
2. Satin finish flange and bar end.

2.6 TOWEL BARS

A. Towel bars shall be similar to grab bars, except provide satin finish in lieu of peened finish. Bars shall be 1-1/4 inch diameter and 24" long. Wall anchorage shall be identical to grab bars.

1. A.S.I. 3700 Series
2. Bobrick 5806 Series
3. Gamco No. 125 S Series

B. Grip Surface Texture: satin

2.7 SURFACE MOUNTED NAPKIN DISPOSAL

A. A.S.I. 0852

B. Bobrick B-270

C. Gamco No. ND-1.

2.8 RECESSED SANITARY NAPKIN DISPOSAL

A. A.S.I. 0473

B. Bobrick B-353

C. Gamco No. ND-4.

2.9 THROUGH-PARTITION NAPKIN DISPOSAL

A. A.S.I. 0472

1. End stall unit: 0473-A

B. Bobrick B-354

1. End stall unit: B-254

C. Gamco ND-6

1. End stall unit: ND-5

2.10 RECESSED DUAL SANITARY NAPKIN/TAMPON VENDOR

A. Coin mechanism or free, adjustable by Owner.

1. A.S.I. 04684
2. Bobrick B-3500X2
3. Gamco No. NV-2-4.

2.11 ROBE HOOKS

A. Robe hooks:

1. A.S.I. - 7340
2. Bobrick - B-7671
3. Gamco No. 5153.

2.12 DOUBLE ROBE HOOKS

A. Robe hooks:

1. A.S.I. - 7345
2. Bobrick - B-7672
3. Gamco No. 5154.

2.13 STAINLESS STEEL SHELF

A. Size - 8" x 24"

1. A.S.I. 0692
2. Bobrick B-298
3. Gamco No. S-8 series.

2.14 MOP RACK WITH SHELF AND RAG HOOKS

A. Unit; 30" long with 3 holders:

1. A.S.I. 1315
2. Bobrick B-224
3. Gamco No. US-1.

2.15 BABY CHANGING TABLE

A. Provide manufacturer's industrial grade hardware kit required which shall include all fasteners and instructions for manufacturer's recommended installation.

1. A.S.I. 9011
2. Bobrick B-2210
3. Gamco Diaper Deck

2.16 LOCKS

A. All locks shall be keyed alike. Provide twelve keys.

2.17 FINISHES

A. Finish: All toilet accessories shall be stainless steel, satin finish except as indicated otherwise.

END OF SECTION 10800

SECTION 11014 – WINDOW WASHING EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes window washing anchor system, as shown on the Drawings, specified herein, and as needed for a complete and proper installation.

1.2 QUALITY ASSURANCE

A. References:

1. ANSI/IWCA 1-14.1 – 2001 Window Cleaning Safety Standard (International Window Cleaning Association.)
2. OSHA Regulations:
   a. 1910, Subpart D (Walking and Working Surfaces).
   b. Appendix C to 1910 Subpart F (Personal Fall Arrest Systems).
   c. "OSHA Ruling on Window Cleaning by Bosun's Chair" memorandum to Regional Administrators from P.K. Clark, Director Directorate of Compliance Programs.

B. Design Requirements:

1. Design window cleaning/suspended maintenance system to suit building and in accordance with plans, specifications, and referenced standards and codes.
2. Locate safety and tie-back anchors to suit suspension equipment which will be used on the building with respect to items such as rigging, spacing, roof edge conditions and similar items.
3. Design all anchor components to provide adequate attachment to the building and suited to current window cleaning /suspended maintenance practices. Ensure compatibility with industry standard equipment.
4. Ensure all anchor components conform to proper engineering principles and have been designed by a Professional Engineer registered in the State of Maine, qualified in the design of window cleaning/suspended maintenance equipment, its application and safety requirements.
5. Design system fall arrest safety anchors to comply with the following structural requirements:
   a. Fall arrest safety anchors are designed to atypical maximum fall arresting force of 1800 lbs when wearing a body harness with a factor of safety of 2 without any permanent deformation and to 5000 lbs against fracture or detachment.

C. Manufacturer shall have specific liability insurance (products and completed operations) insurance in the amount of $2,000,000.00 to protect against product/system failure.

PART 2 - PRODUCTS

2.1 MANUFACTURER

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

1. Pro-Bel Enterprises, Ltd., Ajax, ON, (800) 461-0575.
2. Acme Maintenance Equipment, Inc., South Houston, TX 77587, (800) 862-0239.
3. Spider Engineered Systems Group, Tukwila, WA 98188, (877) 774-3370.

2.2 EQUIPMENT

A. Basis of Design: Provide Pro-Bel Roof Anchor Model EPB-78S Epoxy Adhesive Bolt, modified in accordance with the details indicated on the Contract Drawings and as specified herein.

2.3 MATERIALS

A. Safety U-Bars: Type 304 stainless steel with yield strength of 35 ksi. U-bar to be not less than 3/4-inch diameter material with 1-1/2 –inch eye opening.

B. Securement Bolts: Mild steel, Type 300W with yield strength of 44 ksi, hot-dip galvanized to ASTM A123/A 123M-2000.

C. Hollow Steel Section Piers: Galvanized steel as above with yield strength of 50 ksi. Wall thickness to suit application.

D. Base Plate and all other Sections: Galvanized mild steel as able with yield strength of 44 ksi. Thickness and securement to suit application.

E. Miscellaneous Bolts, Nuts, and Washers: Mild steel, Type 300W with yield strength of 44 ksi, hot-dip galvanized to ASTM A123A 123M-2000.

F. Drilled Concrete Anchors shall only be adhesive epoxy anchors manufactured by U-pat or Hilti. Mechanical fasteners shall not be used.

1. All anchors relying upon chemical adhesive fasteners to be 100% tested on site for 5,000 lbs.

END OF SECTION 11014

SECTION 11132 - PROJECTION SCREENS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes electrically operated front projection screens.:

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Da-Lite Screen Co., Inc., Warsaw, IN 46580, (800) 662-3737.
2. Draper, Inc., Spiceland, IN 47385, (800) 238-7999.

2.2 PROJECTION SCREENS

A. General: Manufacturer's standard units consisting of case, screen, motor, controls, mounting accessories, and other components necessary for a complete installation. Provide units that are listed and labeled as an assembly by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Control: Remote, key-operated, 3-position control switch installed in recessed metal device box with flush cover plate matching other electrical device cover plates in room where switch is installed.
2. Motor in Roller: Instant-reversing motor of size and capacity recommended by screen manufacturer; with permanently lubricated ball bearings, automatic thermal-overload protection, preset limit switches to automatically stop screen in up and down positions, and positive-stop action to prevent coasting. Mount motor inside roller with vibration isolators to reduce noise transmission.

B. Recessed, Electrically Operated Screens with Automatic Ceiling Closure: Provide units designed and fabricated for recessed installation in ceiling; with bottom of case composed of two panels fully enclosing screen, motor, and wiring, one panel hinged and designed to open and close automatically when screen is lowered and fully raised, the other removable or openable for access to interior of case.

1. Products:

a. "Boardroom Electrol" by Da-Lite Screen Co., Inc.

b. "Envoy" by Draper, Inc.

2. Provide metal or metal-lined wiring compartment on units with motor in roller.
3. Screen Case: Aluminum framing with side, end, and top panels of fire-retardant hardboard. Provide screen case constructed to be installed with ceiling finish applied to underside.

C. Screen Material: Provide seamless screens of mildew and flame resistant vinyl-coated glass-fiber fabric with black masking borders and the following type of viewing surface:

1. Matte-White Viewing Surface: Peak gain of 0.9 to 1.0, and gain of not less than 0.8 at an angle of 50 degrees from the axis of the screen surface.

2. Size of Viewing Surface: 7'-0" high by 9'-0" wide.

END OF SECTION 11132

SECTION 12485 - FOOT GRILLES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes recessed foot grilles and frames.

1. Foot grilles are designated in the Room Finish Schedule as "WOM".

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide foot grilles and frames capable of withstanding and supporting a 300 lb rolling load and uniform load of 300 lbf/sq. ft. without exceeding the allowable design working stress of the materials involved, including anchors and connections.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Balco, Inc., Wichita, KS 67217, (800) 767-0082.
2. Construction Specialties, Inc., Muncy, PA 17756, (800) 23-8493.
3. Pawling Corporation, Wasaic, NY 12592, (800) 431-3456.

2.2 FOOT GRILLES

A. General: Provide manufacturer's standard foot grille assemblies consisting of treads of type and profile indicated, joined together by cross members or interlocked, and with support legs (if any) and other components needed to produce a complete installation.

1. Basis of Design: "Pedi-Grid" by Construction Specialties, Inc.

B. Grid Frame: Provide manufacturer's level base frame fabricated of 6063-T5 aluminum alloy with 1/2-inch exposed surface and 1-13/16 –inch depth. Furnish with anchorages and accessories.

1. Drain Pan: Provide manufacturer's 16 gage aluminum waterproof drain pane complete with 2-inch IPS PVC drain, and stainless steel strainer. Coat bottom of pan with protective coating recommended by manufacturer

C. Foot Grilles: Provide manufacturer's standard extruded aluminum tread rails, spaced 1-1/2 – inches o.c. with 1/8-inch wide openings between treads, resting on continuous vinyl cushions on 3-inch deep extruded aluminum support members.

1. Aluminum Finish: Mill.

D. Tread Insert: Heavy duty, solution dyed 100% nylon carpet.

1. Color: As selected from manufacturer's full range of options.

2.3 FABRICATION

A. Shop fabricate foot grilles to greatest extent possible in sizes as indicated. If not otherwise indicated, provide each grille as a single unit; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in grilles are necessary, space symmetrically and away from normal traffic lanes.

B. Fabricate frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced and pieces spliced together by straight connecting pins.

SECTION 12494 - ROLLER SHADES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes roller shades and motorized shade operators.

1.2 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide roller shade materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below:

1. Flame-Resistance Ratings: Passes NFPA 701.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. MechoShade Systems, Inc., Long Island City, NY 11101, (800) 437-6360.
2. VIMCO, Richmond, VA 23228, (800) 777-1503.

2.2 ROLLER SHADES

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

1. "Blackout Shades" by MechoShade System.
2. "StopLite Shades" by VIMCO.

B. Shade Material: Totally opaque, 14 mil PVC coated, fiberglass fabric. Material shall be first class quality materials with no pinholes, breaks or cracks. Fabric shall be bacterial and mildew resistant.

1. Color: As selected by Architect from manufacturer's full range of fabric options..

C. Roller Tube: 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.

D. Mounting Brackets: Galvanized or zinc-plated steel.

E. Pocket-Style Headbox: U-shaped, formed-steel sheet or extruded aluminum; long edges returned or rolled; with a bottom cover consisting of slot opening of minimum dimension to allow lowering and raising of shade and a removable or openable, continuous metal access panel concealing shade roller, brackets, and operating hardware and operators within.

F. Bottom Bar: Extruded aluminum, bottom bar with spline groove to receive and secure fabric at top and "T" slot at bottom for wool pile light seal.

G. Audiovisual Light-Blocking Shades: Designed for eliminating all visible light gaps when shades are fully closed; fabricated from blackout shade band material with headbox and bottom bar extended and formed for light-tight joints among shade components and between shade components and adjacent construction.

1. Side Channels, and Perimeter Seals: Manufacturer's standard design, including sill light seal attached to bottom bar, for eliminating light gaps when shades are closed.

H. Electric Motors: UL-approved, 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.

1. Motor Mounting: Within manufacturer's standard roller enclosure.

I. Individual/Group Control Stations: Momentary-contact, three-position, key operated, wall switch control station with open, close, and center off functions for individual and group control.

END OF SECTION 12494

SECTION 12496 - WINDOW TREATMENT HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes mounting and installation hardware for draperies and curtains.

1.2 EXTRA MATERIALS

A. Prior to Substantial Completion of the work, furnish and deliver the following materials to the Owner's representative for future maintenance.

1. Carriers: Full-size units equal to 5 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Kirsch, Sturgis, MI 49091; (800) 528-1407
2. Silent Gliss USA, Inc., Loganville, GA 30249; (800) 938-7225.

2.2 WINDOW TREATMENT HARDWARE

A. Track: Extruded aluminum, slotted not more than 16 inches o.c. for mounting. Size track for span and weight of window treatment indicated.

1. Finish: White baked enamel.

B. Track Mounting: Manufacturer's standard mounting brackets designed to support weight of track assembly and window treatment plus force applied to operate window treatment.

1. Track Mount: Recessed in ceiling.

C. Manual Operation: Provide for two-way draw with baton.

D. Carriers: Manufacturer's standard, sized for span and weight of window treatment indicated. Provide overlap type master carriers.

E. Installation Fasteners: For support of track and window treatment units under conditions of normal use, provide at least 2 fasteners per bracket, fabricated from metal noncorrosive to track hardware and adjoining construction.

END OF SECTION 12496

SECTION 13090 - RADIATION PROTECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide radiation protection where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. New England Lead Burning Co., Inc. (NELCO), Woburn, MA 01801, (800) 635-2613.
2. Radiation Protection Products, Inc., Wayzata, MN 55319, (952) 476-4400.
3. Radiation Shielding Systems, Inc., Warwick, NY 10990, (888) 631-2278.

2.2 SHEET LEAD

A. Sheet lead shall be 99.9 percent pure lead, free from dross oxide inclusions, laminations, scales blisters or cracks. Sheet lead shall conform with Federal Specification QQ-L-201.

2.3 LEAD GLASS

A. Lead glass shall be clear X-ray lead glass approximately 1/4" thick and shall be installed in single or multiple thicknesses to provide a lead equivalent not less than that of the partition of which it is a part.

2.4 LEAD INSULATED WALLBOARD

A. Lead insulated wallboard shall consist of unpierced lead sheet, factory laminated to gypsum wallboard. Wallboard shall be 5/8" thick, 48" wide.

B. Lead shall be 1/8 inch thick and provided to a height of 8' - 0" above finish floor.

C. A two-inch wide lead strip shall be installed behind all joints of lead insulated wallboard; 3-1/2 inch wide lead strips at all corners. Edges of board shall then be butt jointed and fastened to

metal studs using the drive-screw method. Cover the head of drive screw with a one-inch diameter lead disc cemented to wallboard.

D. Lead shall extend into all opening frames, full depth, with lead extending into rabbets of view window and door frames, to effectively lap with lead lining of frames.

E. At mechanical lines, conduits and outlet boxes, trim wallboard as required to meet field conditions. Where lead seal in wallboard is interrupted due to mechanical lines, patch those areas with sheet lead.

F. Wallboard joints will be taped as part of the work of Section 09260 - Gypsum Wallboard System.

2.5 LEAD-LINED FRAMES

A. Door frames will be furnished under Section 08113 - Steel Frames.

B. Line frames occurring in lead-lined partitions with sheet lead of same thickness as scheduled for partitions in which they occur.

C. Install lead in frames in accordance with details shown on the Drawings.

2.6 OPERATOR'S CONTROL WINDOW

A. Operator's control window shall be of a type that will permit observation, permit the passage of sound and afford complete protection for the operator.

B. Frames shall be of hollow metal construction with lead lining.

C. Frames shall be glazed with lead glass held in place with removable stops.

D. Frames shall be of size and at location indicated on the plans.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install the work of this Section in strict accordance with the original design, the approved Shop Drawings, pertinent requirements of governmental agencies having jurisdiction, and the manufacturers' recommended installation procedures as approved by the Architect, anchoring all components firmly into position for long life under hard use.

END OF SECTION 13090

SECTION 13100 - LIGHTNING PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes lightning protection for buildings.

1.3 SUBMITTALS

A. Product Data: For air terminals and mounting accessories.

B. Shop Drawings: Detail lightning protection system, including air-terminal locations, conductor routing and connections, and bonding and grounding provisions. Include indications for use of raceway and data on how concealment requirements will be met.

C. Qualification data for firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include data on listing or certification by nationally recognized testing laboratory (NRTL) or trade association.

D. Certification, signed by Contractor, that roof adhesive for air terminals is approved by manufacturers of both the terminal assembly and the single-ply membrane roofing material.

E. Field inspection reports indicating compliance with specified requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who is NRTL listed or who is certified by LPI as a Master Installer/Designer.

B. Listing and Labeling: As defined in NFPA 780, Article 2-2, "Definitions."

C. Provide UL Master Label.

D. Provide LPI certification of system.

E. Provide ETL Master Label indicating system complies with specified requirements.

1.5 COORDINATION

A. Coordinate installation of lightning protection with installation of other building systems and components, including electrical wiring, supporting structures and building materials, metal bodies requiring bonding to lightning protection components, and building finishes.

B. Coordinate installation of air terminals attached to single-membrane roof systems with roofing manufacturer and installer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. A-C Lightning Security, Inc.
2. Automatic Lightning Protection.
3. Harger Lightning Protection, Inc.
4. Heary Bros. Lightning Protection Co. Inc.
5. Independent Protection Company, Inc.
6. Robbins Lightning, Incorporated.
7. Thompson Lightning Protection, Inc.

2.2 LIGHTNING PROTECTION SYSTEM COMPONENTS

A. Comply with UL 96.

B. Roof-Mounting Air Terminals: NFPA Class [I] **copper, solid,** unless otherwise indicated.

1. Single-Membrane, Roof-Mounting Air Terminals: Designed for single-membrane roof materials.

C. Stack-Mounting Air Terminals: **Solid copper.**

D. Ground Rods, Ground Loop Conductors, and Concrete-Encased Electrodes: Comply with Division 16 Section "Grounding and Bonding" and standards referenced in this Section.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install lightning protection components and systems according to **UL 96A,** and **NFPA 780.**

B. Install conductors with direct paths from air terminals to ground connections. Avoid sharp bends and narrow loops.

C. Conceal the following conductors:

1. System conductors.
2. Down conductors.
3. Interior conductors.
4. Conductors within normal view from exterior locations at grade within 200 feet (60 m) of building.
5. Notify Architect at least 48 hours in advance of inspection before concealing lightning protection components.

D. Cable Connections: Use approved exothermic-welded connections for all conductor splices and connections between conductors and other components, except those above single-ply membrane roofing.

E. Air Terminals on Single-Ply Membrane Roofing: Comply with adhesive manufacturer's written instructions.

F. Bond extremities of vertical metal bodies exceeding 60 feet (18 m) in length to lightning protection components.

G. A counterpoise installation based on requirements in Division 16 Section "Grounding and Bonding" may be used as a ground loop required by NFPA 780, provided counterpoise conductor meets or exceeds minimum requirements in NFPA 780.

1. Bond ground terminals to counterpoise conductor.
2. Bond grounded metal bodies on building within 12 feet (3.6 m) of ground to counterpoise conductor.
3. Bond grounded metal bodies on building within 12 feet (3.6 m) of roof to **interconnecting loop at eave level or above.**

H. Bond lightning protection components with intermediate-level interconnection loop conductors to grounded metal bodies of building at 60-foot (18-m) intervals.

3.2 CORROSION PROTECTION

A. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture unless moisture is permanently excluded from junction of such materials.

B. Use conductors with protective coatings where conditions would cause deterioration or corrosion of conductors.

3.3 FIELD QUALITY CONTROL

A. Periodic Inspections: Engage an LPI inspector to perform periodic inspections during construction and at its completion, according to LPI-177.

B. UL Inspection: Apply for inspection by UL as required to obtain a UL Master Label for system.

C. ETL Inspection: Engage an ETL inspector to inspect completed system for compliance with specified requirements.

END OF SECTION 13100

SECTION 13810 - CLOCK CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes a master clock- and program-control unit, analog clocks, digital clocks and digital clock controllers.

B. Related Sections include the following:

1. Division 16 Section "Conductors and Cables" for wires and cables.
2. Division 16 Section "Control/Signal Transmission Media" for low-voltage control cables.

1.3 SYSTEM DESCRIPTION

A. An integrated, microprocessor-based system for originating and distributing time and time-correction signals. Components display time at various locations. The system transmits time and program signals from a master control unit to indicating clocks. System design is based on the 2351 Series Simplex Time Control System.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each product specified. Describe features and operating sequences, both automatic and manual.

B. Shop Drawings: Wiring diagrams to detail power, signal, and control systems and to differentiate between manufacturer-installed and field-installed wiring. Identify terminals and wiring color-codes to facilitate installation, operation, and maintenance. Indicate recommended types and sizes for field-installed system wiring and show how wiring is protected from overcurrent.

C. Samples for Initial Selection: Manufacturer's color photographs or color chips showing the full range of colors available for clocks and control panels.

D. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

E. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

F. Maintenance Data: For each clock- and program-control component to include in maintenance manuals specified in Division 1.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is an authorized representative of the master control unit manufacturer for both installation and maintenance of units required for this Project.

B. Manufacturer Qualifications: A firm that maintains a service center capable of providing maintenance and repairs at Project site within 24 hours.

C. Source Limitations: Obtain clock-control components through one source from a single manufacturer.

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.

E. Comply with NFPA 70 for components and installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Simplex Time Recorder Co.

2.2 MASTER CONTROL UNIT

A. Description: Unit supplies power for clocks and sends time-correction signals to them. Unit controls programmable output circuits, both automatically and manually.

B. Time Reference Unit: Uses a temperature-compensated crystal oscillator to regulate system timing functions to within plus or minus three seconds per month. Operates on internal, automatically recharging battery power for a minimum of seven days when normal power is disconnected. Automatically resets system and corrects clocks when power resumes.

C. Microprocessor: An integral self-diagnostic program automatically checks functioning of LEDs, switches, input keys, central processor, read-only memory, and random access memory output circuits. A control panel display indicates failure by identifying the faulty device or circuit.

D. Lockout Codes: A minimum of two levels of access shall restrict use of system operating and programming controls to authorized personnel.

1. Level 1: Access to all user-programming and control functions.
2. Level 2: Access to review existing programs only.

E. Clock-Control Function: Unit supervises and corrects individual system clocks automatically.

1. Daylight Savings Time Correction: Programmable for automatic correction.
2. Analog Minute Synchronuous Clocks: Correct for minute- and second-hand synchronization with master time control at least once each hour and for hour-hand synchronization at least once daily.
3. Digital Clocks: Test clocks automatically for synchronization with master time control at least once every hour and automatically correct those not synchronized with the time reference unit.

F. Housing: Steel cabinet with locking front panel. When cabinet is locked, time indication is visible on front panel face. Arrange cabinet for surface, semirecessed, or flush mounting as indicated.

2.3 CLOCKS

A. Description: Types, sizes, mounting, and descriptions indicated; match master control unit for power supply and time-correction signals.

1. Connection Provisions: Plug connection or wire pigtail, in accordance with manufacturer's system requirements.

B. Analog Synchronous Clocks: Driven by self-starting, permanently lubricated, sealed synchronous motors, and equipped with sweep second hands and correcting solenoid actuators.

C. Digital Clocks: Solid-state units with LED digital display that is a minimum of 2 inches (50 mm) high with numerals visible at 100 feet (30 m) in normal ambient light. Clocks shall be capable of displaying time in 12- or 24-hour formats with "PM" LED display for 12-hour format.

D. Interval Timer Function: Flush-mounted local control station, near clocks indicated to have this feature, controls clock so unit can display either current real time or manually controlled elapsed time with start-stop capability, with or without reset. Hour and min-

ute display shall be at least 2 inches (50 mm) high, with reduced height for display of seconds.

2.4 BACK BOXES FOR CLOCK AND PROGRAM DEVICES

A. Suitable for indicated mounting method.

B. Equip with knockouts and hanger straps or mounting adapters. Back-box cover plate suits mounting of designated device.

2.5 WIRE

A. Description: Provide solid (3)#12 AWG, red, black, and white for each clock. Materials and installation requirements are specified in Division 16 Section "Conductors and Cables."

B. Plenum Cable: All cables shall be plenum rated for master clock system.

C. Color-Coding: Uniformly identified and coordinated with wiring diagrams throughout the system.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Wiring Method: Install 120-V wiring in raceway. Install low-voltage wiring in raceway except in accessible ceiling spaces and in hollow gypsum board partitions. Use listed plenum cable for low-voltage wiring in air-handling spaces, plenums, and plenum ceilings.

B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess; use lacing bars and distribution spools.

C. Control-Circuit Wiring: Install control circuits according to NFPA 70 and as indicated. Install number of conductors recommended by system manufacturer for control functions indicated.

3.2 CONNECTIONS

A. Contractor shall perform all terminations. Make splices, taps, and terminations on numbered terminal strips in junction, pull and outlet boxes, terminal cabinets, and equipment enclosures. All cables shall be labeled with a unique ID for each cable.

B. Each outlet shall have a Simplex type female receptacle installed.

C. Ground clocks, programming equipment, and conductor and cable shields to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 IDENTIFICATION

A. Comply with Division 16 Section "Electrical Identification."

B. Apply wire and cable marking tape to designate wires and cables so they are uniformly identified and coordinated with wiring diagrams throughout the system.

3.4 FIELD QUALITY CONTROL

A. Testing: Engage a qualified testing agency to perform the following field quality-control testing:

B. Testing: Perform the following field quality-control testing:

1. Adjust system and perform operational system tests to verify compliance with Specifications. Include operation of all modes of clock correction and all programming and manually programmed signal and relay operating functions.
2. Verify that units and controls are properly labeled and interconnecting wires and terminals are identified.

C. Repair or replace malfunctioning units. Retest as specified above after repairs or replacements are made.

D. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including clock-control equipment. Report results in writing.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain clock control as specified below:

1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment and schedules.

2. Review data in maintenance manuals. Refer to Division 1 Section "Operation and Maintenance Data."
3. Schedule training with Owner, through Architect, with at least seven days' advance notice.

END OF SECTION 13810

SECTION 13851 - FIRE ALARM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes fire alarm systems for the following:

1. Extension of existing fire alarm system into new building via networked interface to new fire alarm control panel in new building.
2. Complete fire alarm system in new building.
3. Coordination of interface between new and existing fire alarm system.

B. Related Sections include the following:

1. Division 8 Section "Door Hardware" for door closers and holders with associated smoke detectors, electric door locks, and release devices that interface with the fire alarm system.

1.3 DEFINITIONS

A. FACP: Fire alarm control panel.

B. LED: Light-emitting diode.

C. NICET: National Institute for Certification in Engineering Technologies.

D. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

1.4 SYSTEM DESCRIPTION

A. Noncoded, analog-addressable system; automatic sensitivity control of certain smoke detectors; and multiplexed signal transmission dedicated to fire alarm service only.

1. Interface with existing fire alarm system.

1.5 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 72.

B. Premises protection includes 1B **building construction** and **occupancy type I2.**

C. Fire alarm signal initiation shall be by one or more of the following devices:

1. Manual stations.
2. Heat detectors.
3. Flame detectors.
4. Smoke detectors.
5. Verified automatic alarm operation of smoke detectors.
6. Automatic sprinkler system water flow.
7. Fire extinguishing system operation.
8. Fire standpipe system.

D. Fire alarm signal shall initiate the following actions:

1. Alarm notification appliances shall operate continuously.
2. Identify alarm at the FACP[**and remote annunciators**].
3. De-energize electromagnetic door holders.
4. Transmit an alarm signal to the remote alarm receiving station.
5. Unlock electric door locks in designated egress paths.
6. Release fire and smoke doors held open by magnetic door holders.
7. Activate voice/alarm communication system.
8. Switch heating, ventilating, and air-conditioning equipment controls to fire alarm mode.
9. Close smoke dampers in air ducts of system serving zone where alarm was initiated.
10. Record events in the system memory.
11. Record events by the system printer.

E. Supervisory signal initiation shall be by one or more of the following devices or actions:

1. Operation of a fire-protection system valve tamper.

F. System trouble signal initiation shall be by one or more of the following devices or actions:

1. Open circuits, shorts and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.
2. Opening, tampering, or removal of alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at the FACP.
4. Ground or a single break in FACP internal circuits.
5. Abnormal ac voltage at the FACP.

6. A break in standby battery circuitry.
7. Failure of battery charging.
8. Abnormal position of any switch at the FACP or annunciator.
9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
10. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system.

G. System Trouble and Supervisory Signal Actions: Ring trouble bell and annunciate at the FACP[**and remote annunciators**]. Record the event on system printer.

1.6 SUBMITTALS

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

B. Shop Drawings:

1. Shop Drawings shall be prepared by persons with the following qualifications:

   a. Trained and certified by manufacturer in fire alarm system design.
   b. Fire alarm certified by NICET, minimum Level III.

2. System Operation Description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not acceptable.
3. Device Address List: Coordinate with final system programming.
4. System riser diagram with device addresses, conduit sizes, and cable and wire types and sizes.
5. Wiring Diagrams: Power, signal, and control wiring. Include diagrams for equipment and for system with all terminals and interconnections identified. Show wiring color code.
6. Batteries: Size calculations.
7. Duct Smoke Detectors: Performance parameters and installation details for each detector, verifying that each detector is listed for the complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
8. Ductwork Coordination Drawings: Plans, sections, and elevations of ducts, drawn to scale and coordinating the installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, the detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
9. Voice/Alarm Signaling Service: Equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
10. Floor Plans: Indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.

C. Qualification Data: For Installer.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For fire alarm system to include in emergency, operation, and maintenance manuals. Comply with NFPA 72, Appendix A, recommendations for Owner's manual. Include abbreviated operating instructions for mounting at the FACP.

F. Submittals to Authorities Having Jurisdiction: In addition to distribution requirements for submittals specified in Division 1 Section "Submittals," make an identical submittal to authorities having jurisdiction. To facilitate review, include copies of annotated Contract Drawings as needed to depict component locations. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of comments from authorities having jurisdiction, submit them to Architect for review.

G. Documentation:

1. Approval and Acceptance: Provide the "Record of Completion" form according to NFPA 72 to Owner[, **Architect, and authorities having jurisdiction**].
2. Record of Completion Documents: Provide the "Permanent Records" according to NFPA 72 to Owner[, **Architect, and authorities having jurisdiction**]. Format of the written sequence of operation shall be the optional input/output matrix.

    a. Hard copies on paper to Owner[, **Architect, and authorities having jurisdiction**].

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

B. Installer Qualifications: Work of this Section be performed by a UL-listed company.

C. Installer Qualifications: Personnel certified by NICET as Fire Alarm Level **III**.

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.

1.8 PROJECT CONDITIONS

A. Interruption of Existing Fire Alarm Service: Do not interrupt fire alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:

1. Notify **Construction Manager and Owner** no fewer than **two** days in advance of proposed interruption of fire alarm service.
2. Do not proceed with interruption of fire alarm service without **Owner's** written permission.

1.9 SEQUENCING AND SCHEDULING

A. Existing Fire Alarm Equipment: Maintain fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service and label existing fire alarm equipment "NOT IN SERVICE" until removed from the building.

B. Equipment Removal: After acceptance of the new fire alarm system, remove existing disconnected fire alarm equipment.

1.10 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. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but not less than 1 unit.
2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but not less than 1 unit.
3. Smoke, Fire, and Flame Detectors: Quantity equal to 10 percent of amount of each type installed, but not less than 1 unit of each type.
4. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but not less than 1 unit of each type.
5. Keys and Tools: One extra set for access to locked and tamperproofed components.
6. Audible and Visual Notification Appliances: One of each type installed.
7. Fuses: Two of each type installed in the system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. FACP and Equipment:

a. Honeywell.

2. Wire and Cable:

   a. Comtran Corporation.
   b. Helix/HiTemp Cables, Inc.; a Draka USA Company.
   c. Rockbestos-Suprenant Cable Corporation; a Marmon Group Company.
   d. West Penn Wire/CDT; a division of Cable Design Technologies.
   e. Pyrotenax CIC Cable

3. Audible and Visual Signals:
   a. System Sensor; a GE-Honeywell Company.

2.2 EXISTING FIRE ALARM SYSTEM

A. Compatibility with Existing Equipment: Fire alarm system and components shall operate as an extension of an existing system.

2.3 FACP

A. General Description:

1. Modular, power-limited design with electronic modules, UL 864 listed.
2. Addressable initiation devices that communicate device identity and status.

   a. Smoke sensors shall additionally communicate sensitivity setting **and allow for adjustment of sensitivity at the FACP.**
   b. Temperature sensors shall additionally test for and communicate the sensitivity range of the device.

3. Addressable control circuits for operation of mechanical equipment.

B. Alphanumeric Display and System Controls: Arranged for interface between human operator at the FACP and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.

1. Annunciator and Display: Liquid-crystal type Three line(s) of 80 characters, minimum.
2. Keypad: Arranged to permit entry and execution of programming, display, and control commands; **and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters.**

C. Circuits:

1. Signaling Line Circuits: NFPA 72, Class A, Style 6.

a. System Layout: Install no more than 50 addressable devices on each signaling line circuit.

2. Notification-Appliance Circuits: NFPA 72, Class A, Style Z.
3. Actuation of alarm notification appliances, **emergency voice communications,** annunciation, **smoke control, elevator recall, and actuation of suppression systems** shall occur within 10 seconds after the activation of an initiating device.
4. Electrical monitoring for the integrity of wiring external to the FACP for mechanical equipment shutdown and magnetic door-holding circuits is not required, provided a break in the circuit will cause doors to close and mechanical equipment to shut down.

D. Smoke-Alarm Verification:

1. Initiate audible and visible indication of an "alarm verification" signal at the FACP.
2. Activate a listed and approved "alarm verification" sequence at the FACP and the detector.
3. Record events by the system printer.
4. Sound general alarm if the alarm is verified.
5. Cancel FACP indication and system reset if the alarm is not verified.

E. Notification-Appliance Circuit: Operation shall sound in a **[temporal pattern, complying with ANSI S3.41] [60 beats per minute, march-time pattern] [120 beats per minute, march-time pattern].**

F. Elevator Controls: Heat detector operation shuts down elevator power by operating a shunt trip in a circuit breaker feeding the elevator.

G. Elevator Controls: Water-flow alarm connected to sprinkler in an elevator shaft and elevator machine room shuts down elevators associated with the location without time delay.

1. A field-mounted relay actuated by the fire detector or the FACP closes the shunt trip circuit and operates building notification appliances and annunciator.

H. Power Supply for Supervision Equipment: Supply for audible and visual equipment for supervision of the ac power shall be from a dedicated dc power supply, and power for the dc component shall be from the ac supply.

I. Alarm Silencing, Trouble, and Supervisory Alarm Reset: Manual reset at the FACP[**and remote annunciators,**] after initiating devices are restored to normal.

1. Silencing-switch operation halts alarm operation of notification appliances and activates an "alarm silence" light. Display of identity of the alarm zone or device is retained.

2. Subsequent alarm signals from other devices or zones reactivate notification appliances until silencing switch is operated again.
3. When alarm-initiating devices return to normal and system reset switch is operated, notification appliances operate again until alarm silence switch is reset.

J. Walk Test: A test mode to allow one person to test alarm and supervisory features of initiating devices. Enabling of this mode shall require the entry of a password. The FACP and annunciators shall display a test indication while the test is underway. If testing ceases while in walk-test mode, after a preset delay, the system shall automatically return to normal.

K. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and control of changes in those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and make a print-out of the final adjusted values on the system printer.

L. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, trouble, and supervisory signals to a remote alarm station through existing interface.

M. Voice/Alarm Signaling Service: A central emergency communication system with redundant microphones, preamplifiers, amplifiers, and tone generators provided [**in a separate cabinet located in the Fire Command Center.**

1. Indicated number of alarm channels for automatic, simultaneous transmission of different announcements to different zones, or for manual transmission of announcements by use of the central-control microphone. Amplifiers shall be UL 1711 listed.

    a. Allow the application of and evacuation signal to indicated number of zones and, at the same time, allow voice paging to the other zones selectively or in any combination.
    b. Programmable tone and message sequence selection.
    c. Standard digitally recorded messages for "Evacuation" and "All Clear."
    d. Generate tones to be sequenced with audio messages of the type recommended by NFPA 72 and that are compatible with tone patterns of the notification-appliance circuits of the FACP.

2. Notification-Appliance Circuits: NFPA 72, Class **A.**
3. Status Annunciator: Indicate the status of various voice/alarm speaker zones and the status of firefighters' two-way telephone communication zones.
4. Preamplifiers, amplifiers, and tone generators shall automatically transfer to backup units, on primary equipment failure.

N. Service Modem: Ports shall be RS-232 for system printer and for connection to a dial-in terminal unit.

1. The dial-in port shall allow remote access to the FACP for programming changes and system diagnostic routines. Access by a remote terminal shall be by encrypted password algorithm.

O. Printout of Events: On receipt of signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble), and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also print system reset event, including the same information for device, location, date, and time. Commands initiate the printing of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.

P. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signal, [**supervisory signal**] [**supervisory and digital alarm communicator transmitter**] [**and**] [**digital alarm radio transmitter**] shall be powered by the 24-V dc source.

1. The alarm current draw of the entire fire alarm system shall not exceed 80 percent of the power-supply module rating.
2. Power supply shall have a dedicated fused safety switch for this connection at the service entrance equipment. Paint the switch box red and identify it with "FIRE ALARM SYSTEM POWER."

Q. Secondary Power: 24-V dc supply system with batteries and automatic battery charger and an automatic transfer switch.

1. Batteries: **Sealed lead calcium.**
2. Battery and Charger Capacity: Comply with NFPA 72.

R. Surge Protection:

1. Install surge protection on normal ac power for the FACP and its accessories. Comply with Division 16 Section "Transient Voltage Suppression" for auxiliary panel suppressors.
2. Install surge protectors recommended by FACP manufacturer. Install on all system wiring external to the building housing the FACP.

S. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

2.4 MANUAL FIRE ALARM BOXES

A. Description: UL 38 listed; finished in red with molded, raised-letter operating instructions in contrasting color. Station shall show visible indication of operation. Mounted

on recessed outlet box; if indicated as surface mounted, provide manufacturer's surface back box.

1. Single-action mechanism, **pull-lever** type. With integral addressable module, arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.
2. Double-action mechanism requiring two actions to initiate an alarm, [**breaking-glass or plastic-rod**] [**pull-lever**] type. With integral addressable module, arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.
3. Station Reset: Key- or wrench-operated switch.

2.5 SYSTEM SMOKE DETECTORS

A. General Description:

1. UL 268 listed, operating at 24-V dc, nominal.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
3. Multipurpose type, containing the following:

    a. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
    b. Piezoelectric sounder rated at 88 dBA at 10 feet (3 m) according to UL 464.
    c. Heat sensor, combination rate-of-rise and fixed temperature.

4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. Provide terminals in the fixed base for connection of building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type. Indicating [**detector has operated**] [**and power-on**] status.
7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.

    a. Rate-of-rise temperature characteristic shall be selectable at the FACP for 15 or 20 deg F (8 or 11 deg C) per minute.
    b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at the FACP to operate at 135 or 155 deg F (57 or 68 deg C).
    c. Provide multiple levels of detection sensitivity for each sensor.

B. Photoelectric Smoke Detectors:

1. Sensor: LED or infrared light source with matching silicon-cell receiver.

2. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.

C. Ionization Smoke Detector:

1. Sensor: Responsive to both visible and invisible products of combustion. Self-compensating for changes in environmental conditions.
2. Detector Sensitivity: Between 0.5 and 1.7 percent/foot (0.0016 and 0.0056 percent/mm) smoke obscuration when tested according to UL 268A.

D. Beam-Type Smoke Detector: Each detector shall consist of a separate transmitter and receiver, and shall have the following features:

1. UL 268 listed, operating at 24-V dc, nominal.
2. Adjustable Sensitivity: At least six sensitivity levels, settable at the receiver, measured as percent of obscuration.
3. Two selectable alarm delay settings, allowing each to be associated with a corresponding sensitivity.
4. Trouble signal delay[, **fixed at 20 seconds**].
5. Separate Color-Coded LEDs: Indicate normal, alarm, and trouble status[**with remote indicator panels**].

E. Remote Air-Sampling Detector System: Includes air-sampling pipe network, a laser-based photoelectric detector, a sample transport fan, and a control unit.

1. UL 268 listed, operating at 24-V dc, nominal.
2. Pipe Network: Electrical metallic tubing connects control unit with designated sampling holes.
3. Smoke Detector: Particle-counting type with continuous laser beam. Sensitivity adjustable to a minimum of three preset values.
4. Sample Transport Fan: Centrifugal type, creating a minimum static pressure of 0.05-inch wg (12.5 Pa) at all sampling ports.
5. Control Unit: Single or multizone unit as indicated. Provides same system power supply, supervision, and alarm features as specified for the central FACP plus separate trouble indication for airflow and detector problems.
6. Signals to the Central FACP: Any type of local system trouble is reported to the central FACP as a composite "trouble" signal. Alarms on each system zone are individually reported to the central FACP as separately identified zones.

F. Duct Smoke Detectors:

1. Photoelectric Smoke Detectors:

a. Sensor: LED or infrared light source with matching silicon-cell receiver.
b. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.

2. Ionization Smoke Detectors:

   a. Sensor: Responsive to both visible and invisible products of combustion. Self-compensating for changes in environmental conditions.
   b. Detector Sensitivity: Between 0.5 and 1.7 percent/foot (0.0016 and 0.0056 percent/mm) smoke obscuration when tested according to UL 268A.

3. UL 268A listed, operating at 24-V dc, nominal.
4. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
5. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. The fixed base shall be designed for mounting directly to the air duct. Provide terminals in the fixed base for connection to building wiring.

   a. Weatherproof Duct Housing Enclosure: UL listed for use with the supplied detector. The enclosure shall comply with NEMA 250 requirements for Type 4X.

6. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
7. Integral Visual-Indicating Light: LED type. Indicating [**detector has operated**] [**and power-on**] status.[**Provide remote status and alarm indicator and test station where indicated.**]
8. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.
9. Each sensor shall have multiple levels of detection sensitivity.
10. Sampling Tubes: Design and dimensions as recommended by manufacturer for the specific duct size, air velocity, and installation conditions where applied.
11. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.6 NONSYSTEM SMOKE DETECTORS

A. Single-Station Smoke Detectors:

1. UL 217 listed, suitable for NFPA 101, Section 9.6.2.9 occupancies, operating at 120-V ac[, **with 9-V dc battery as the secondary power source. Provide with "low" or "missing" battery chirping-sound device**].
2. Auxiliary Relays: One Form [**C rated at 0.5 A**] [**A and 1 form C, both rated at 0.5 A**].
3. Audible Notification Appliance: Piezoelectric sounder rated at 90 dBA at 10 feet (3 m) according to UL 464.
4. Visible Notification Appliance: 177 candela strobe.
5. Heat sensor, 135 deg F (57 deg C) [**combination rate-of-rise and**]fixed temperature.

6. Test Switch: Push-to-test, simulates smoke at rated obscuration.
7. Tandem Connection: Allow tandem connection of number of indicated detectors; alarm on one detector shall actuate notification on all connected detectors.
8. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
9. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
10. Integral Visual-Indicating Light: LED type. Indicating [**detector has operated**] [**and power-on**] status.

B. Single-Station Duct Detectors:

1. UL 268A listed, operating at 120-V ac.
2. Sensor: LED or infrared light source with matching silicon-cell receiver.

    a. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.

3. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. The fixed base shall be designed for mounting directly to the air duct. Provide terminals in the fixed base for connection to building wiring.

    a. Weatherproof Duct Housing Enclosure: UL listed for use with the supplied detector. The enclosure shall comply with NEMA 250 requirements for Type 4X.

4. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
5. Integral Visual-Indicating Light: LED type. Indicating [**detector has operated**] [**and power-on**] status.[**Provide remote status and alarm indicator and test station where indicated.**]
6. Sampling Tubes: Design and dimensions as recommended by manufacturer for the specific duct size, air velocity, and installation conditions where applied.
7. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.7 HEAT DETECTORS

A. General: UL 521 listed.

B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) or rate-of-rise of temperature that exceeds 15 deg F (8 deg C) per minute, unless otherwise indicated.

1. Mounting: **[Adapter plate for outlet box mounting] [Plug-in base, interchangeable with smoke-detector bases]**.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F (88 deg C).

1. Mounting: **[Adapter plate for outlet box mounting] [Plug-in base, interchangeable with smoke-detector bases]**.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

D. Continuous Linear Heat-Detector System: Consists of detector cable and control unit.

1. Detector Cable: Rated detection temperature **[155 deg F (68 deg C)] <Insert temperature>**. Listed for "regular" service and a standard environment. Cable includes two steel actuator wires twisted together with spring pressure, wrapped with protective tape, and finished with PVC outer sheath. Each actuator wire is insulated with heat-sensitive material that reacts with heat to allow the cable twist pressure to short circuit wires at the location of elevated temperature.
2. Control Unit: Two-zone or multizone unit as indicated. Provides same system power supply, supervision, and alarm features as specified for the central FACP.
3. Signals to the Central FACP: Any type of local system trouble is reported to the central FACP as a composite "trouble" signal. Alarms on each detection zone are individually reported to the central FACP as separately identified zones.
4. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

2.8 FLAME DETECTORS

A. Ultraviolet type with solid-state amplifier-switching circuit set for 10-second delay, unless otherwise indicated.

1. Mounting: **[Adapter plate for outlet box mounting] [Plug-in base, interchangeable with smoke-detector bases]**.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

2.9 NOTIFICATION APPLIANCES

A. Description: Equipped for mounting as indicated and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly.

B. Visible Alarm Devices: Xenon strobe lights listed under UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.

1. Rated Light Output: [75] [110] **<Insert number>** candela.
2. Strobe Leads: Factory connected to screw terminals.

C. Voice/Tone Speakers:

1. UL 1480 listed.
2. High-Range Units: Rated 2 to 15 W.
3. Low-Range Units: Rated 1 to 2 W.
4. Mounting: Flush, semirecessed, or surface mounted; bidirectional as indicated.
5. Matching Transformers: Tap range matched to the acoustical environment of the speaker location.

2.10 FIREFIGHTERS' TWO-WAY TELEPHONE COMMUNICATION SERVICE

A. Dedicated, two-way, supervised, telephone voice communication links between the FACP[, **the Fire Command Center,**] and remote firefighters' telephone stations. Supervised telephone lines shall be connected to talk circuits by controls in a control module. Provide the following:

1. Common-talk type for firefighter use only.
2. Selective-talk type for use by firefighters and fire wardens.
3. Controls to disconnect phones from talk circuits if too many phones are in use simultaneously.
4. Audible Pulse and Tone Generator, and High-Intensity Lamp: When a remote telephone is activated, it causes audible signal to sound and high-intensity lamp to flash.
5. Selector panel controls simultaneous operation of telephones in selected zones and permits up to six phones to be operated simultaneously. Indicate ground faults and open or shorted telephone lines on the panel front by individual LEDs.
6. Provide [**graphic**] [**liquid-crystal digital**] display to indicate location of caller.
7. Remote Telephone Cabinet: Flush or surface-mounted cabinet, as indicated, factory-standard red finish, with handset.

    a. Install one-piece handset to cabinet with vandal-resistant armored cord. Silk-screened or engraved label on cabinet door, designating[**"Fire Warden Phone" or**] "Fire Emergency Phone."
    b. With "break-glass" type door access lock.

8. Remote Telephone Jack Stations: Single-gang, stainless-steel-plate mounted plug, engraved[**"Fire Warden Phone" or**] "Fire Emergency Phone."
9. Handsets: Provide[**push-to-talk**] type sets[**with noise-canceling microphone**]. Provide **<Insert number>** handsets stored in a cabinet [**adjacent to the FACP**] [**in the Fire Command Center**].

2.11 SPRINKLER SYSTEM REMOTE INDICATORS

A. Remote status and alarm indicator and test stations, with LED indicating lights. Light is connected to flash when the associated device is in an alarm or trouble mode. Lamp is flush mounted in a single-gang wall plate. A red, laminated, phenolic-resin identification plate at the indicating light identifies, in engraved white letters, device initiating the signal and room where the smoke detector or valve is located. For water-flow switches, the identification plate also designates protected spaces downstream from the water-flow switch.

2.12 MAGNETIC DOOR HOLDERS

A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching door plate.

1. Electromagnet: Requires no more than 3 W to develop 25-lbf (111-N) holding force.
2. Wall-Mounted Units: Flush mounted, unless otherwise indicated.
3. Rating: 24-V ac or dc.
4. Rating: 120-V ac.

B. Material and Finish: Match door hardware.

2.13 REMOTE ANNUNCIATOR

A. Description: Duplicate annunciator functions of the FACP for alarm, supervisory, and trouble indications. Also duplicate manual switching functions of the FACP, including acknowledging, silencing, resetting, and testing.

1. Mounting: [**Flush**] cabinet, NEMA 250, Class 1.

B. Display Type and Functional Performance: Alphanumeric display same as the FACP. Controls with associated LEDs permit acknowledging, silencing, resetting, and testing functions for alarm, supervisory, and trouble signals identical to those in the FACP.

2.14 ADDRESSABLE INTERFACE DEVICE

A. Description: Microelectronic monitor module listed for use in providing a system address for listed alarm-initiating devices for wired applications with normally open contacts.

B. Integral Relay: Capable of providing a direct signal **[to the elevator controller to initiate elevator recall] [to a circuit-breaker shunt trip for power shutdown] <Insert other functions>.**

2.15 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Listed and labeled according to UL 632.

B. Functional Performance: Unit receives an alarm, supervisory, or trouble signal from the FACP, and automatically captures one or two telephone lines and dials a preset number for a remote central station. When contact is made with the central station(s), the signal is transmitted. The unit supervises up to two telephone lines. Where supervising 2 lines, if service on either line is interrupted for longer than 45 seconds, the unit initiates a local trouble signal and transmits a signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. When telephone service is restored, unit automatically reports that event to the central station. If service is lost on both telephone lines, the local trouble signal is initiated.

C. Secondary Power: Integral rechargeable battery and automatic charger. Battery capacity is adequate to comply with NFPA 72 requirements.

D. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

2.16 RADIO ALARM TRANSMITTER

A. Listed and labeled according to NFPA 1221. Comply with 47 CFR 90.

B. Description: Manufacturer's standard commercial product; factory assembled, wired, and tested; and ready for installation and operation.

1. Packaging: A single, modular, NEMA 250, Type 1 metal enclosure with a tamper-resistant flush tumbler lock.
2. Signal Transmission Mode and Frequency: VHF or UHF 2-W power output, coordinated with operating characteristics of the established remote alarm receiving station designated by Owner.
3. Normal Power Input: 120-V ac.
4. Secondary Power: Integral-sealed, rechargeable, 12-V battery and charger. Comply with NFPA 72 requirements for battery capacity; submit calculations.
5. Antenna: Omnidirectional, coaxial half-wave, dipole type with driving point impedance matched to transmitter and antenna cable output impedance. Wind-load

strength of antenna and mounting hardware and supports shall withstand 100 mph (160 km/h) with a gust factor of 1.3 without failure.

6. Antenna Cable: Coaxial cable with impedance matched to the transmitter output impedance.
7. Antenna-Cable Connectors: Weatherproof.
8. Alarm Interface Devices: Circuit boards, modules, and other auxiliary devices, integral to the transmitter, matching fire alarm and other system outputs to message-generating inputs of the transmitter that produce required message transmissions.

C. Functional Performance: Unit receives an alarm, supervisory, or trouble signal from the FACP or from its own internal sensors or controls, and automatically transmits signal along with a unique code that identifies the transmitting station to the remote alarm receiving station. Transmitted messages correspond to standard designations for the fire-reporting system to which the signal is being transmitted and include separately designated messages in response to the following events or conditions:

1. Transmitter Low-Battery Condition: Sent when battery voltage is below 85 percent of rated value.
2. System Test Message: Initiated manually by a test switch within the transmitter cabinet, or automatically at an optionally preselected time, once every 24 hours, with transmission time controlled by a programmed timing device integral to transmitter controls.
3. Transmitter Trouble Message: Actuated by failure, in excess of one-minute duration, of the transmitter normal power source, derangement of the wiring of the transmitter, or any alarm input interface circuit or device connected to it.
4. Local Fire Alarm System Trouble Message: Initiated by events or conditions that cause a trouble signal to be indicated on the building system.
5. Local Fire Alarm System Alarm Message: Actuated when the building system goes into an alarm state. Identifies device that initiated the alarm.
6. Local Alarm System Supervisory Alarm Message: Actuated when the building alarm system indicates a supervisory alarm.

2.17 SYSTEM PRINTER

A. Listed and labeled as an integral part of the fire alarm system.

2.18 GUARDS FOR PHYSICAL PROTECTION

A. Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection.

1. Factory fabricated and furnished by manufacturer of the device.
2. Finish: Paint of color to match the protected device.

2.19 WIRE AND CABLE

A. Wire and cable for fire alarm systems shall be UL listed and labeled as complying with NFPA 70, Article 760.

B. Signaling Line Circuits: Twisted, shielded pair, **not less than size recommended by system manufacturer.**

1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70 Article 760, Classification CI, for power-limited fire alarm signal service. UL listed as Type FPL, and complying with requirements in UL 1424 and in UL 2196 for a 2-hour rating.

C. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.

1. Low-Voltage Circuits: No. 16 AWG, minimum.
2. Line-Voltage Circuits: No. 12 AWG, minimum.
3. Multiconductor Armored Cable: NFPA 70 Type MC, copper conductors, TFN/THHN conductor insulation, copper drain wire, copper armor[**with outer jacket**] with red identifier stripe, UL listed for fire alarm and cable tray installation, plenum rated, and complying with requirements in UL 2196 for a 2-hour rating.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Connecting to Existing Equipment: Verify that existing fire alarm system is operational before making changes or connections.

1. Connect new equipment to the existing control panel in the existing part of the building.
2. Connect new equipment to the existing monitoring equipment at the Supervising Station.
3. Expand, modify, and supplement the existing [**control**] [**monitoring**] equipment as necessary to extend the existing [**control**] [**monitoring**] functions to the new points. New components shall be capable of merging with the existing configuration without degrading the performance of either system.

B. Smoke or Heat Detector Spacing:

1. Smooth ceiling spacing shall not exceed [**30 feet (9 m)**] [**the rating of the detector**].
2. Spacing of heat detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas, shall be determined according to Appendix A in NFPA 72.
3. Spacing of heat detectors shall be determined based on guidelines and recommendations in NFPA 72.

C. HVAC: Locate detectors not closer than 3 feet (1 m) from air-supply diffuser or return-air opening.

D. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of the duct.

E. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.

F. Single-Station Smoke Detectors: Where more than one smoke alarm is installed within a dwelling or suite, they shall be connected so that the operation of any smoke alarm causes the alarm in all smoke alarms to sound.

G. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.

H. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.

I. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling.

J. Device Location-Indicating Lights: Locate in public space near the device they monitor.

K. FACP: Surface mount with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.

L. Annunciator: Install with top of panel not more than 72 inches (1830 mm) above the finished floor.

M. Antenna for Radio Alarm Transmitter: Mount to building structure where indicated. Use mounting arrangement and substrate connection that will resist 100-mph (160-km/h) wind load with a 1.3 gust factor without damage.

3.2 WIRING INSTALLATION

A. Install wiring according to the following:

1. NECA 1.
2. TIA/EIA 568-A.

B. Wiring Method: Install wiring in metal raceway according to Division 16 Section "Raceways and Boxes."

1. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.

C. Wiring Method:

1. Cables and raceways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
2. Fire-Rated Cables: Use of 2-hour fire-rated fire alarm cables, NFPA 70 Types MI and CI, is[**not**] permitted.
3. Signaling Line Circuits: Power-limited fire alarm cables **[may]** [**shall not**] be installed in the same cable or raceway as signaling line circuits.

D. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

E. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

F. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

G. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum 1-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signals from other floors or zones.

H. Wiring to Remote Alarm Transmitting Device: 1-inch (25-mm) conduit between the FACP and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals according to Division 16 Section "**[Basic Electrical Materials and Methods] [Electrical Identification]**."

B. Install instructions frame in a location visible from the FACP.

C. Paint power-supply disconnect switch red and label "FIRE ALARM."

3.4 GROUNDING

A. Ground the FACP and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to the FACP.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect[, **test, and adjust**] field-assembled components and equipment installation, including connections[, **and to assist in field testing**]. Report results in writing.

B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

C. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:

D. Perform the following field tests and inspections and prepare test reports:

1. Before requesting final approval of the installation, submit a written statement using the form for Record of Completion shown in NFPA 72.
2. Perform each electrical test and visual and mechanical inspection listed in NFPA 72. Certify compliance with test parameters. All tests shall be conducted under the direct supervision of a NICET technician certified under the Fire Alarm Systems program at Level III.

    a. Include the existing system in tests and inspections.

3. Visual Inspection: Conduct a visual inspection before any testing. Use as-built drawings and system documentation for the inspection. Identify improperly located, damaged, or nonfunctional equipment, and correct before beginning tests.
4. Testing: Follow procedure and record results complying with requirements in NFPA 72.

    a. Detectors that are outside their marked sensitivity range shall be replaced.

5. Test and Inspection Records: Prepare according to NFPA 72, including demonstration of sequences of operation by using the matrix-style form in Appendix A in NFPA 70.

3.6 ADJUSTING

A. Occupancy Adjustments: 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.

B. Follow-Up Tests and Inspections: After date of Substantial Completion, test the fire alarm system complying with testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for three monthly, and one quarterly, periods.

C. Semiannual Test and Inspection: Six months after date of Substantial Completion, test the fire alarm system complying with the testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

D. Annual Test and Inspection: One year after date of Substantial Completion, test the fire alarm system complying with the testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for monthly, quarterly, semiannual, and annual periods. Use forms developed for initial tests and inspections.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the fire alarm system, appliances, and devices. Refer to Division 1 Section "**[Closeout Procedures] [Demonstration and Training]**."

END OF SECTION 13851

SECTION 13915 - FIRE-SUPPRESSION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following fire-suppression piping inside the building:

1. Automatic wet-type, Class I standpipe systems.
2. Wet-pipe sprinkler systems.
3. Dry-pipe sprinkler systems.

B. Related Sections include the following:

1. Division 13 Section "Fire Alarm" for alarm devices not specified in this Section.

1.3 DEFINITIONS

A. CR: Chlorosulfonated polyethylene synthetic rubber.

1.4 SYSTEM DESCRIPTIONS

A. Existing water service to Richards Building shall be rerouted through Charles Street Project. Reconnect to existing fire service located at Richards basement level. Provide expansion fitting at building separation.

B. Combined Standpipe and Sprinkler System: System shall connect to L.L. Bean fire main located in sub-basement. Service shall extend through connecting tunnel to be distributed throughout Charles Street Project.

C. Automatic Wet-Type, Class I Standpipe System: Includes NPS 2-1/2 hose connections at each intermediate landing between floor levels in every required exit stairway. Fire department connections (siamese) and alarm bells shall be located at the north and south entrances to Charles Street. Standpipe systems shall maintain a minimum of 65psig at the most remote hose outlet. Provide Class hose cabinet in tunnel connecting Charles Street Project with L.L. Bean building.

D. Wet-Pipe Sprinkler System: Automatic sprinklers shall provide 100% coverage of all areas throughout the Charles Street Project including the tunnel connection. Existing sprinkler systems shall be modified in the L.L. Bean sub-basement and Richards basement, second, third and fourth floor levels. Linen chute shall be protected in accordance with manufacturers recommendations and as required by NFPA 13. Sprinklers shall be installed in elevator pits (165°F), top of shaft (212°F), and machine room (212°F) locations. Sprinkler heads shall quick-response, frangible bulb, concealed style installed flush with ceiling.

E. Dry-Pipe Sprinkler System: Automatic sprinklers shall protect the unheated area of the building overhang located on the basement and ground floor levels. Two dry valve assemblies with dedicated air compressor unit located on the basement level will serve each area as required.

1.5 PERFORMANCE REQUIREMENTS

A. Standard Piping System Component Working Pressure: Listed for at least 175 psig.

B. Fire-suppression standpipe system design shall be approved by authorities having jurisdiction.

1. Minimum residual pressure at each hose-connection outlet is the following:

a. NPS 2-1/2 Hose Connections: 65 psig.

2. Unless otherwise indicated, the following is maximum residual pressure at required flow at each hose-connection outlet:

a. NPS 2-1/2 Hose Connections: 175 psig.

C. Fire-suppression sprinkler system design shall be approved by authorities having jurisdiction.

1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
2. Sprinkler Occupancy Hazard Classifications:

a. Building Service Areas: Ordinary Hazard, Group 1.
b. Electrical Equipment Rooms: Ordinary Hazard, Group 1.
c. General Storage Areas: Ordinary Hazard, Group 1.
d. Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
e. Office and Public Areas: Light Hazard.
f. Patient areas: Light Hazard.

3. Minimum Density for Automatic-Sprinkler Piping Design:

a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft. area.
b. Dry Light-Hazard Occupancy: 0.10 gpm over 1950-sq. ft. area.
c. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. area.
d. Ordinary-Hazard, Group 2 Occupancy: 0.20 gpm over 1500-sq. ft. area.

4. Maximum Protection Area per Sprinkler:

a. Patient Areas: 225 sq. ft.
b. Storage Areas: 130 sq. ft.
c. Mechanical Equipment Rooms: 130 sq. ft.
d. Electrical Equipment Rooms: 130 sq. ft.
e. Other Areas: According to NFPA 13 recommendations, unless otherwise indicated.

5. Total Combined Hose-Stream Demand Requirement: According to NFPA 13, unless otherwise indicated:

a. Light-Hazard Occupancies: 100 gpm for 30 minutes.
b. Ordinary-Hazard Occupancies: 250 gpm for 60 to 90 minutes.

D. Seismic Performance: Fire-suppression piping shall be capable of withstanding the effects of earthquake motions determined according to NFPA 13 and ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."

1.6 SUBMITTALS

A. Product Data: For the following:

1. Piping materials.
2. Pipe hangers and supports, including seismic restraints.
3. Valves, including listed fire-protection valves, and specialty valves and trim.
4. Dry pipe valve and accessories.
5. Air compressors, including electrical data.
6. Sprinklers, escutcheons, and guards. Include sprinkler flow characteristics, mounting, finish, and other pertinent data.
7. Hose connections, including size, type, and finish.
8. Fire department connections, including type; number, size, and arrangement of inlets; caps and chains; size and direction of outlet; escutcheon and marking; and finish.
9. Alarm devices, including electrical data.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Fire pump flow test report.

D. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations, if applicable.

E. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13 and NFPA 14. Include "Contractor's Material and Test Certificate for Aboveground Piping" and "Contractor's Material and Test Certificate for Underground Piping."

F. Welding certificates.

G. Field quality-control test reports.

H. Operation and Maintenance Data: For standpipe and sprinkler specialties to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer's responsibilities include designing, fabricating, and installing fire-suppression systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.

    a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.

B. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.

C. NFPA Standards: Fire-suppression-system equipment, specialties, accessories, installation, and testing shall comply with the following:

1. NFPA 13, "Installation of Sprinkler Systems."
2. NFPA 14, "Installation of Standpipe, Private Hydrant, and Hose Systems."

1.8 COORDINATION

A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

1.9 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. Sprinkler Cabinets: Finished, wall-mounting, steel cabinet with hinged cover, with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler on Project.

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. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 STEEL PIPE AND FITTINGS (Schedule 40)

A. Threaded-End, Standard-Weight Schedule 40 Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795, hot-dip galvanized where indicated and with factory- or field-formed threaded ends.

1. Cast-Iron Threaded Flanges: ASME B16.1.
2. Malleable-Iron Threaded Fittings: ASME B16.3.
3. Gray-Iron Threaded Fittings: ASME B16.4.
4. Steel Threaded Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, seamless steel pipe hot-dip galvanized where indicated. Include ends matching joining method.
5. Steel Threaded Couplings: ASTM A 865 hot-dip galvanized-steel pipe where indicated.

B. Plain-End, Standard-Weight Schedule 40 Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795 hot-dip galvanized-steel pipe where indicated.

1. Locking-Lug Fittings: UL 213, ductile-iron body with retainer lugs that require one-quarter turn to secure pipe in fitting.

a. Available Manufacturers:

1) Anvil International, Inc.
2) Victaulic Co. of America.
3) Ward Manufacturing.

C. Plain-End, Standard-Weight Schedule 40 Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795 hot-dip galvanized-steel pipe where indicated.

1. Steel Welding Fittings: ASTM A 234/A 234M, and ASME B16.9 or ASME B16.11.
2. Steel Flanges and Flanged Fittings: ASME B16.5.

D. Grooved-End, Standard-Weight Schedule 40 Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795, hot-dip galvanized where indicated and with factory- or field-formed, square-cut- or roll-grooved ends.

1. Grooved-Joint Piping Systems:

a. Available Manufacturers:

1) Anvil International, Inc.
2) Central Sprinkler Corp.
3) Victaulic Co. of America.
4) Ward Manufacturing.

b. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
c. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, prelubricated rubber gasket listed for use with housing, and steel bolts and nuts.

2.3 SPRINKLER SPECIALTY FITTINGS

A. Sprinkler specialty fittings shall be UL listed or FMG approved, with 175-psig minimum working-pressure rating, and made of materials compatible with piping.

B. Sprinkler Drain and Alarm Test Fittings: Cast- or ductile-iron body; with threaded or locking-lug inlet and outlet, test valve, and orifice and sight glass.

1. Available Manufacturers:

a. Central Sprinkler Corp.
b. Fire-End and Croker Corp.
c. Viking Corp.
d. Victaulic Co. of America.

C. Sprinkler Branch-Line Test Fittings: Brass body with threaded inlet, capped drain outlet, and threaded outlet for sprinkler.

1. Available Manufacturers:

    a. Elkhart Brass Mfg. Co., Inc.
    b. Fire-End and Croker Corp.
    c. Potter-Roemer; Fire-Protection Div.

D. Sprinkler Inspector's Test Fitting: Cast- or ductile-iron housing with threaded inlet and drain outlet and sight glass.

1. Available Manufacturers:

    a. AGF Manufacturing Co.
    b. Central Sprinkler Corp.
    c. G/J Innovations, Inc.
    d. Triple R Specialty of Ajax, Inc.

E. Drop-Nipple Fittings: UL 1474, adjustable with threaded inlet and outlet, and seals.

1. Available Manufacturers:

    a. CECA, LLC.
    b. Merit.

F. Dry-Pipe-System Fittings: UL listed for dry-pipe service.

2.4 LISTED FIRE-PROTECTION VALVES

A. Valves shall be UL listed or FMG approved, with 175-psig minimum pressure rating.

B. Gate Valves with Wall Indicator Posts:

1. Gate Valves: UL 262, cast-iron body, bronze mounted, with solid disc, nonrising stem, operating nut, and flanged ends.
2. Indicator Posts: UL 789, horizontal-wall type, cast-iron body, with hand wheel, extension rod, locking device, and cast-iron barrel.
3. Available Manufacturers:

    a. Grinnell Fire Protection.
    b. McWane, Inc.; Kennedy Valve Div.
    c. NIBCO.
    d. Stockham.

C. Ball Valves: Comply with UL 1091, except with ball instead of disc.

1. NPS 1-1/2 and Smaller: Bronze body with threaded ends.
2. NPS 2 and NPS 2-1/2: Bronze body with threaded ends or ductile-iron body with grooved ends.

3. NPS 3: Ductile-iron body with grooved ends.

4. Available Manufacturers:

   a. NIBCO.
   b. Victaulic Co. of America.

D. Butterfly Valves: UL 1091, Bronze, cast-iron, or ductile-iron body; wafer type or with flanged or grooved ends.

1. Coordinate subparagraph and list below with Part 2 "Manufacturers" Article. Retain "Available" for nonproprietary and delete for semiproprietary specifications.

   a. Available Manufacturers:

      1) Central Sprinkler Corp.
      2) McWane, Inc.; Kennedy Valve Div.
      3) Mueller Company.
      4) NIBCO.
      5) Victaulic Co. of America.

E. Check Valves: UL 312, swing type, cast-iron body with flanged or grooved ends.

1. Available Manufacturers:

   a. AFAC Inc.
   b. Central Sprinkler Corp.
   c. Hammond Valve.
   d. McWane, Inc.; Kennedy Valve Div.
   e. Mueller Company.
   f. NIBCO.
   g. Potter-Roemer; Fire Protection Div.
   h. Stockham.
   i. Victaulic Co. of America.
   j. Watts Industries, Inc.; Water Products Div.

F. Gate Valves: UL 262, OS&Y type: Cast-iron body with flanged ends.

1. Coordinate subparagraph and list below with Part 2 "Manufacturers" Article. Retain "Available" for nonproprietary and delete for semiproprietary specifications.

   a. Available Manufacturers:

      1) Hammond Valve.
      2) Milwaukee Valve Company.
      3) Mueller Company.
      4) NIBCO.

5) Red-White Valve Corp.

G. Indicating Valves: UL 1091, with integral indicating device and ends matching connecting piping.

1. Ball valve or butterfly valve with cast- or ductile-iron body; wafer type or with flanged or grooved ends.

a. Available Manufacturers:

1) Central Sprinkler Corp.
2) Grinnell Fire Protection.
3) McWane, Inc.; Kennedy Valve Div.
4) Milwaukee Valve Company.
5) NIBCO.
6) Victaulic Co. of America.

2.5 SPECIALTY VALVES

A. Sprinkler System Control Valves: UL listed or FMG approved, cast- or ductile-iron body with flanged or grooved ends, and 175-psig minimum pressure rating.

1. Available Manufacturers:

a. AFAC Inc.
b. Central Sprinkler Corp.
c. Venus Fire Protection, Ltd.
d. Victaulic Co. of America.
e. Viking Corp.

2. Dry-Pipe Valves: UL 260, differential type; with bronze seat with O-ring seals, single-hinge pin, and latch design. Include UL 1486, quick-opening devices, trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.

a. Air-Pressure Maintenance Device: UL 260, automatic device to maintain correct air pressure in piping. Include shutoff valves to permit servicing without shutting down sprinkler piping, bypass valve for quick filling, pressure regulator or switch to maintain pressure, strainer, pressure ratings with 14- to 60-psig adjustable range, and 175-psig maximum inlet pressure.

1) Available Manufacturers:

a) AFAC Inc.
b) Central Sprinkler Corp.
c) Viking Corp.

b. Air Compressor: UL 753, fractional horsepower, 120-V ac, 60 Hz, single phase.

1) Available Manufacturers:

a) AFAC Inc.
b) Gast Manufacturing, Inc.
c) Viking Corp.

2.6 SPRINKLERS

A. Sprinklers shall be UL listed or FMG approved, with 175-psig minimum pressure rating.

B. Available Manufacturers:

1. Central Sprinkler Corp.
2. Reliable Automatic Sprinkler Co., Inc.
3. Viking Corp.

C. Automatic Sprinklers: With heat-responsive element complying with the following:

1. UL 199, for nonresidential applications.
2. UL 1767, for early-suppression, fast-response applications.

D. Sprinkler Types and Categories: Nominal 1/2-inch orifice for "Ordinary" temperature classification rating, unless otherwise indicated or required by application.

1. Open Sprinklers: UL 199, without heat-responsive element.

a. Orifice: 1/2 inch, with discharge coefficient K between 5.3 and 5.8.

E. Sprinkler types, features, and options as follows:

1. Concealed ceiling sprinklers, including cover plate (Office, Patient, Corridor & Staff areas) #G4QR or equal.
2. Concealed ceiling sprinklers, including cover plate and dust tight concealer (C-Section). #G4FR or equal.
3. Sidewall sprinklers (Existing Toilet Rooms). #F1FR/CCP or equal.
4. Upright sprinklers (Areas with no ceiling). #F1FR or equal.

F. Sprinkler Finishes: Chrome plated, bronze, and painted white.

G. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

1. Ceiling Mounting: Plastic, white finish, one piece, flat. Provide dust covers on concealed heads located in C-Section rooms.
2. Sidewall Mounting: Plastic, white finish, one piece, flat.

H. Sprinkler Guards (Connector Tunnel): Wire-cage type, including fastening device for attaching to sprinkler.

2.7 HOSE CONNECTIONS

A. Available Manufacturers:

1. AFAC Inc.
2. Central Sprinkler Corp.
3. Elkhart Brass Mfg. Co., Inc.
4. Fire-End and Croker Corp.
5. Fire Protection Products, Inc.
6. McWane, Inc.; Kennedy Valve Div.
7. Mueller Company.
8. Potter-Roemer; Fire-Protection Div.

B. Description: UL 668, brass or bronze, 300-psig minimum pressure rating, hose valve for connecting fire hose. Include angle pattern design; female NPS inlet and male hose outlet; and lugged cap, gasket, and chain. Include NPS 2-1/2 as indicated, and hose valve threads according to NFPA 2000 and matching local fire department threads.

1. Valve Operation: Nonadjustable type.
2. Finish: Rough metal or chrome-plated.

2.8 FIRE DEPARTMENT CONNECTIONS

A. Manufacturers:

1. Central Sprinkler Corp.
2. Elkhart Brass Mfg. Co., Inc.
3. Fire-End and Croker Corp.
4. Potter-Roemer; Fire-Protection Div.
5. Reliable Automatic Sprinkler Co., Inc.

B. Wall-Type, Fire Department Connection: UL 405, 175-psig (1200-kPa) minimum pressure rating; with corrosion-resistant-metal body with brass inlets, brass wall escutcheon plate, brass lugged caps with gaskets and brass chains, and brass lugged swivel connections. Include inlets with Storz connection matching local fire department sizes, extension pipe nipples, check devices for inlets, and escutcheon plate with marking similar to "AUTO SPKR & STANDPIPE."

1. Type: Flush, with two inlets and rectangular escutcheon plate.
2. Finish: Polished chrome-plated.

2.9 WALL-TYPE FIRE HYDRANTS

A. Manufacturers:

1. Elkhart Brass Mfg. Co., Inc.
2. Guardian Fire Equipment Incorporated.
3. Potter-Roemer; Fire-Protection Div.

B. Description: Cast-brass-body fire hydrant with brass wall escutcheon plates, brass lugged caps with gaskets and brass chains, and brass lugged swivel connections. Include outlets with threads according to NFPA 2000 and matching local fire department sizes and threads, inlet with pipe threads, extension pipe nipple, and valve control.

1. Type: Flush with two hose-connection outlets and square or rectangular escutcheon plate.
2. Finish: Polished chrome-plated.
3. Hydrant Escutcheon-Plate Marking: "HYDRANT."
4. Hydrant Valve Control: Wall-mounting assembly with extension rod for manual control of valve inside building.
5. Hydrant Valve-Control Escutcheon-Plate Marking: "HYDRANT VALVE CONTROL."

2.10 HOSE STATIONS

A. Manufacturers:

1. Elkhart Brass Mfg. Co., Inc.
2. Fire-End and Croker Corp.
3. Potter-Roemer; Fire-Protection Div.

B. Description: UL 47, semiautomatic hose stations. Include the following:

1. Valve: UL 668, brass, 300-psig (2070-kPa) minimum pressure rating, 90-degree-angle-pattern hose valve with female NPS inlet and outlet, unless otherwise indicated.

   a. Valve Operation: Pressure-regulating type.

2. Threads and Gaskets: NFPA 2000 and matching local fire department threads.

2.11 ALARM DEVICES

A. Alarm-device types shall match piping and equipment connections.

B. Water-Flow Indicator: UL 346, electrical-supervision, paddle-operated-type, water-flow detector with 250-psi pressure rating and designed for horizontal or vertical installation. Include two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.

1. Available Manufacturers:

a. Potter Electric Signal Company.
b. Viking Corp.
c. Watts Industries, Inc.; Water Products Div.

C. Pressure Switch: UL 753, electrical-supervision-type, water-flow switch with retard feature. Include single-pole, double-throw, normally closed contacts and design that operates on rising pressure and signals water flow.

1. Available Manufacturers:

a. Grinnell Fire Protection.
b. Potter Electric Signal Company.
c. Viking Corp.

D. Valve Supervisory Switch: UL 753, electrical, single-pole, double-throw switch with normally closed contacts. Include design that signals controlled valve is in other than fully open position.

1. Available Manufacturers:

a. McWane, Inc.; Kennedy Valve Div.
b. Potter Electric Signal Company.

2.12 PRESSURE GAGES

A. Available Manufacturers:

1. AGF Manufacturing Co.
2. AMETEK, Inc.; U.S. Gauge.
3. Brecco Corporation.
4. Dresser Equipment Group; Instrument Div.
5. Marsh Bellofram.
6. WIKA Instrument Corporation.

B. Description: UL 393, 3-1/2- to 4-1/2-inch-diameter, dial pressure gage with range of 0 to 300 psig.

1. Water System Piping: Include caption "WATER" or "AIR/WATER" on dial face.
2. Air System Piping: Include retard feature and caption "AIR" or "AIR/WATER" on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

A. Perform fire-hydrant flow test according to NFPA 13, NFPA 14, and NFPA 291. Use results for system design calculations required in Part 1 "Quality Assurance" Article.

B. Report test results promptly and in writing.

3.2 EXAMINATION

A. Examine roughing-in for hose connections and stations to verify actual locations of piping connections before installation.

B. Examine walls and partitions for suitable thicknesses, fire- and smoke-rated construction, framing for hose-station cabinets, and other conditions where hose connections and stations are to be installed.

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

3.3 PIPING APPLICATIONS, GENERAL

A. Shop weld pipe joints where welded piping is indicated.

B. Do not use welded joints for galvanized-steel pipe.

C. Flanges, flanged fittings, unions, nipples, and transition and special fittings with finish and pressure ratings same as or higher than system's pressure rating may be used in aboveground applications, unless otherwise indicated.

D. Piping between Fire Department Connections and Check Valves: Galvanized, standard-weight steel pipe with threaded ends; cast- or malleable-iron threaded fittings; and threaded or grooved ends; grooved-end fittings; grooved-end-pipe couplings; and grooved joints.

3.4 STANDPIPE SYSTEM PIPING APPLICATIONS

A. Standard-Pressure, Wet-Type Standpipe System, 175-psig Maximum Working Pressure:

1. Threaded-end, black or galvanized, standard-weight schedule 40 steel pipe; cast- or malleable-iron threaded fittings; and threaded joints.
2. Plain-end, black, standard-weight steel pipe; steel welding fittings; and welded joints.
3. Grooved-end, black or galvanized, standard-weight schedule 40 steel pipe with square-cut- or roll-grooved ends; grooved-end fittings; grooved-end-pipe couplings; and grooved joints.

3.5 SPRINKLER SYSTEM PIPING APPLICATIONS

A. Standard-Pressure, Wet-Pipe Sprinkler System, 175-psig Maximum Working Pressure:

1. Threaded-end, black or galvanized, standard-weight schedule 40 steel pipe; cast- or malleable-iron threaded fittings; and threaded joints.
2. Plain-end, black or galvanized, standard-weight steel pipe; locking-lug fittings; and twist-locked joints.
3. Plain-end, black, standard-weight schedule 40 steel pipe; steel welding fittings; and welded joints.

B. Standard-Pressure, Dry-Pipe Sprinkler System, 175-psig Maximum Working Pressure:
1. Threaded-end, galvanized, standard-weight schedule 40 steel pipe; cast- or malleable-iron threaded fittings; and threaded joints.
2. Grooved-end, galvanized, standard-weight schedule 40 steel pipe; grooved-end fittings; grooved-end-pipe couplings; and grooved joints.

3.6 VALVE APPLICATIONS

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Listed Fire-Protection Valves: UL listed and FMG approved for applications where required by NFPA 13 and NFPA 14.

a. Shutoff Duty: Use ball, butterfly, or gate valves.

3.7 JOINT CONSTRUCTION

A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for basic piping joint construction.

B. Threaded Joints: Comply with NFPA 13 for pipe thickness and threads. Do not thread pipe smaller than NPS 8 with wall thickness less than Schedule 40 unless approved by

authorities having jurisdiction and threads are checked by a ring gage and comply with ASME B1.20.1.

C. Grooved Joints: Assemble joints with listed coupling and gasket, lubricant, and bolts.

1. Steel Pipe: Square-cut or roll-groove piping as indicated. Use grooved-end fittings and rigid, grooved-end-pipe couplings, unless otherwise indicated.
2. Dry-Pipe Systems: Use fittings and gaskets listed for dry-pipe service.

3.8 PIPING INSTALLATION

A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for basic piping installation.

B. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.

1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.

C. Use approved fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

D. Install unions adjacent to each valve in pipes NPS 2 and smaller. Unions are not required on flanged devices or in piping installations using grooved joints.

E. Install flanges or flange adapters on valves, apparatus, and equipment having NPS 2-1/2 and larger connections.

F. Install sprinkler piping with drains for complete system drainage.

G. Install sprinkler zone control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.

H. Install drain valves on standpipes.

I. Install ball drip valves to drain piping between fire department connections and check valves. Drain to floor drain or outside building.

J. Install alarm devices in piping systems.

K. Hangers and Supports: Comply with NFPA 13 for hanger materials.

1. Install standpipe system piping according to NFPA 14.
2. Install sprinkler system piping according to NFPA 13.

L. Earthquake Protection: Install piping according to NFPA 13 to protect from earthquake damage.

M. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.

N. Drain dry-pipe sprinkler piping.

O. Pressurize and check dry-pipe sprinkler system piping and air-pressure maintenance devices.

P. Fill wet-standpipe system piping with water.

Q. Fill wet-pipe sprinkler system piping with water.

3.9 VALVE INSTALLATION

A. Install listed fire-protection valves, unlisted general-duty valves, specialty valves and trim, controls, and specialties according to NFPA 13 and NFPA 14 and authorities having jurisdiction.

B. Install listed fire-protection shutoff valves supervised-open, located to control sources of water supply except from fire department connections. Install permanent identification signs indicating portion of system controlled by each valve.

C. Install check valve in each water-supply connection. Install backflow preventer instead of check valve in fire-service supply source.

D. Specialty Valves:

1. Dry-Pipe Valves: Install trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.

    a. Air-Pressure Maintenance Devices for Dry-Pipe Systems: Install shutoff valves to permit servicing without shutting down sprinkler system; bypass valve for quick system filling; pressure regulator or switch to maintain system pressure; strainer; pressure ratings with 14- to 60-psig adjustable range; and 175-psig maximum inlet pressure.

3.10 SPRINKLER APPLICATIONS

A. Drawings indicate sprinkler types to be used. Where specific types are not indicated, use the following sprinkler types:

1. Rooms without Ceilings: Upright sprinklers.
2. Rooms with Suspended Ceilings: Concealed sprinklers.
3. Wall Mounting: Sidewall sprinklers.
4. Spaces Subject to Freezing: Dry sprinklers or sidewall, dry sprinklers as indicated.
5. Sprinkler Finishes:

    a. Upright, Pendent, and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view.
    b. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.

3.11 SPRINKLER INSTALLATION

A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels and tiles.

B. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing. Use dry-type sprinklers with water supply from heated space.

3.12 HOSE-CONNECTION INSTALLATION

A. Install hose connections adjacent to standpipes, unless otherwise indicated.

B. Install wall-mounting-type hose connections in cabinets. Include pipe escutcheons, with finish matching valves, inside cabinet where water-supply piping penetrates cabinet. Install valves at angle required for connection of fire hose. Refer to Division 10 Section "Fire-Protection Specialties" for cabinets.

3.13 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Install ball drip valves at each check valve for fire department connection. Drain to floor drain or outside building.

D. Connect piping to specialty valves, hose valves, specialties, fire department connections, and accessories.

E. Connect compressed-air supply to dry-pipe sprinkler piping.

F. Electrical Connections: Power wiring is specified in Division 16.

G. Connect alarm devices to fire alarm.

H. Ground equipment according to Division 16 Section "Grounding and Bonding."

I. Connect wiring according to Division 16 Section "Conductors and Cables."

J. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.14 LABELING AND IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13 and NFPA 14 and in Division 15 Section "Mechanical Identification."

3.15 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Energize circuits to electrical equipment and devices.
4. Start and run air compressors.
5. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
6. Flush, test, and inspect standpipe systems according to NFPA 14, "System Acceptance" Chapter.
7. Coordinate with fire alarm tests. Operate as required.
8. Verify that equipment hose threads are same as local fire department equipment.

B. Report test results promptly and in writing to Architect and authorities having jurisdiction.

3.16 CLEANING AND PROTECTION

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers with paint other than factory finish.

C. Protect sprinklers from damage until Substantial Completion.

3.17 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specialty valves.

END OF SECTION 13915

SECTION 14211 - ELECTRIC ELEVATORS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide electric traction passenger and hospital elevators as indicated on the Drawings, specified herein, and as needed for a complete and proper installation in a first-class workmanlike manner.

B. In all cases where a device or part of the equipment is referred to in the singular, it is intended that such reference shall apply to as many such devices as are required to complete the installation.

C. Elevators will be designed for future 2 floors of vertical expansion in which the elevators will be removed and the equipment relocated to a new overhead machine room. All signal boxes with covers in cars and at landings shall be currently sized to suit the future additional 2 floors with signal and markings only visible and centered for the levels now being built.

1.2 QUALITY ASSURANCE

A. All work in this section shall be done in compliance with all applicable Federal, State and local codes including but not limited to the National Electrical Code, Americans with Disabilities Act (ADA) and ASME/ANSI A17.1, Safety Code for Elevators, Dumbwaiters and Escalators.

B. "Special Notice":

1. NO PROPRIETARY EQUIPMENT shall be used in the installation. All equipment included in the elevator installation shall have repair or replacement parts readily accessible to the general elevator trade. Without limitation, this shall include diagnostic tools, solid state boards and controller components required for the complete maintenance of the installed equipment.
2. All such parts as described above in subparagraph 1., which are not directly available to the general elevator trade, but which may be proposed to be available to the Owner for use by the general elevator trade for servicing elevator systems, will be considered to be proprietary and will not be approved.
3. The elevator installation shall be a design that can be maintainable by any licensed elevator maintenance company employing journeymen mechanics, without the need to purchase or lease additional diagnostic devices, special tools, or instructions from the original equipment manufacturer.

1.3 MAINTENANCE

A. Furnish maintenance on the entire elevator equipment described herein for a period of twelve (12) months after final acceptance of the equipment, including systematic examination, adjustment and lubrication of all equipment. Repair or replace electrical and mechanical parts of the elevator equipment whenever this is required during the maintenance period. Use only genuine standard parts produced by the manufacturer of the equipment concerned.

1. Maintenance service shall be performed solely by the installer and shall not be assigned or transferred to any agent or sub-contractor.
2. Include 24-hour-per-day, 7-day-per-week emergency callback service

1.4 DESCRIPTION OF EQUIPMENT

A. Passenger Elevators (Public):

1. Quantity: 2 with 1 future.
2. Capacity: 3,500 lbs.
3. Speed: 350 fpm
4. Travel distance: 91'-6" (129'-7 1/2" future)
5. Floors served: 7 (9 future)
6. Size of platform: 6' - 8" wide; 5' - 5" deep
7. Hoistway Doors: 3'-6" x 7'-0" , 2 speed
8. Number of Openings: 5, In line.

B. Hospital Elevators (Patient / Service):

1. Quantity: 3.
2. Capacity: 6,500 lbs.
3. Speed: 350 fpm
4. Travel distance: 91'-6" (129'-7 1/2" future)
5. Floors served: 7 (9 future)
6. Size of platform: 6' - 4" wide; 10' - 9" deep
7. Hoistway Doors: 4'-6" x 7'-0" , 2 speed
8. Number of Openings: 5, In line.

1.5 OPERATION AND CONTROL

A. Operation - Group Automatic

1. The elevators shall be arranged for Group Automatic Operation as defined by the current edition of the American National Standard Safety Code for Elevators with Group Supervisory Control and Automatic Dispatching Systems.

2. Momentary pressing of a car or a corridor button by a passenger shall register a car or corridor call for the corresponding landing and illuminate the car or corridor call registration light.
3. Car calls shall be answered successively as the landings are reached regardless of the sequence in which the buttons are pressed.
4. When traveling in the up direction, the car shall stop at landing for which a car or an up hall call has been registered, but shall not stop at landings where down hall calls only have been registered.
5. Similarly when traveling down, the car shall stop at landings for which a car or a down hall call has been registered, but shall not stop at landings where up hall calls only have been registered.
6. Where both up and down hall calls are registered, only the call corresponding to the direction of travel shall be cancelled upon the stopping of the car at that landing.
7. A car without registered car calls arriving at a floor where both up and down hall calls are registered shall initially respond to the call in the direction that the car was traveling. If not car call or hall call is registered for further travel in that direction, the car shall close its doors and immediately re-open them in response to the hall call in the opposite direction. The direction lanterns shall indicate the changed direction when the doors re-open.

B. Solid State Motor Drives:

1. Provide new variable voltage, variable frequency, AC motor drives for all elevators.
2. The motor shall electronically generate an adjustable speed curve or pattern. This pattern shall be compared with the output of the hoist motor's integral tachometer to produce SCR trigger signals which gate the SCR's to control the power applied to the new AC motor. When the elevator speed is above the desired patterns, the SCR's shall add power to the slow speed winding.
3. In addition, the Motor Control shall:
    a. Monitor the incoming power supply for phase reversal and phase loss.
    b. Provide thermal protection for the SCR's.
    c. Provide tachometer overspeed protection and tachometer loss protection (with two separate adjustments).
    d. Provide nine field adjustments for: starting torque, gain, acceleration, three car speeds, deceleration, leveling speed and brake drop-out time.
    e. Provide visual (LED) indication of driving and braking operation and correct incoming power.
    f. Provide in sequence: a zero speed electrical stop signal; brake set signal; and motor contractor turn off signal.
    g. Provide a solid state control system for each car controller. The system shall utilize isolated solid state input/output interface for the majority of signals. It is understood, where required by code, relays and contacts shall be utilized for safety or power control considerations. The use of relays as input or output devices are not acceptable.
        1) Design controller components to provide the required operation as herein specified.
        2) Securely mount all assemblies, power supplies, switches, relays and other items on a substantial, self-supporting steel frame of angles or channels,

totally enclosed with covers in a floor mounted cabinet. Do not mount equipment on any of the covers.

3) Operate all controller switches and relays with contacts of design and material to ensure maximum conductivity, long life and reliable operation without overheating or excessive wear. Provide a wiping action to prevent sticking due to fusion.
4) Where time delay relays are used in circuits, they shall be of an acceptable design that is reliable and consistent, such as condenser timing or electronic timing circuits. No dashpot time relays shall be used
5) Each device on all panels shall be properly identified by name, letter, or standard symbol which shall be neatly stencil painted (or otherwise marked), in an indelible and legible manner, on device or panel. Where identification markings are used on wiring diagrams, the ampere rating shall be marked adjacent to all fuse holders. All spare conductors shall be neatly formed, laced and identified.
6) Safety switch shall cut off current, automatically apply brake and stop car upon current failure or upon operation of any electrical safety device.
7) The system operations shall change continuously by demand and not rely on a forced method of program change.

C. Automatic Self-Leveling: The elevator shall be provided with a self-leveling feature that will automatically bring the car to the floor landing. The self-leveling shall, within its zone, be entirely automatic, silent and independent of rope stretch and shall correct over-travel as well as under-travel.

D. Independent Service Operation: Switch shall be provided for each elevator to allow operation from only its car push buttons and prevent it from answering landing calls. The doors shall remain open subject to the door close button, which when pushed will cause the doors to close and allow the car to run. The other car or cars shall operate in a normal manner responding to all landing calls and their own car calls.

E. Emergency Priority Service:

1. A key switch and signal light shall be provided at each of the landings to permit an available elevator to be called to that landing, canceling all car calls and by-passing all hall calls on the way. When the car arrives, it shall remain with doors open for a pre-determined time to permit the car to be placed on Emergency Hospital Service. If not placed on this service, the doors shall close, and the car shall automatically return to normal operation.
2. The signal lights shall be illuminated while a car is responding to a priority call and will be extinguished when the car has been placed on Emergency Hospital Service or has been returned to normal service.
3. If there is no other car available for emergency priority service, the signal lights shall remain illuminated until a car becomes available to receive a priority service call.
4. A priority call cannot be initiated until the signal lights are extinguished.

F. Emergency Hospital Service: When the elevator is desired for emergency service, a key-operated switch in the car operating device shall be provided. With the key-operated switch "on", the following operation shall result:

1. Constant pressure of any selected car button shall cause the car and hoistway doors to close and the car to proceed to the corresponding landing without responding enroute to any car or landing calls. When the selected landing is reached the car shall stop automatically, and the car and hoistway doors shall open. As the car stops, pressure of the car button may be released and the car and hoistway doors shall remain open unless another car button is pressed or the key switch is turned to its "off" position.
2. Landing or car calls registered before or during the emergency operation shall remain registered and shall be answered when the car is restored to normal operation, except that car and landing calls for landings at which stops were made during emergency operation shall be cancelled and require re-registration.
3. When emergency operation is not longer desired, the key switch is turned to its "off" position and the key removed.

G. Fireman's Service: Fireman's Service feature shall be supplied as per the current edition of the American National Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks, and all codes having legal jurisdiction.

H. Emergency Power Operation

1. Provide an arrangement as hereafter detailed for the operation of the emergency power source of all elevators. The electrical trades will provide a transfer switch to transfer the elevator feeder to the emergency generator plant in the event of a failure of the normal power source. A pilot circuit which will be energized with the transfer of the feeder to the emergency source will be provided by the electrical trades and this pilot circuit shall be used by the elevator supplier to provide the operation of the elevators as hereinafter detailed.
2. When the elevator feeder has been transferred to the emergency power source, elevators shall be automatically activated one at a time, shall discharge passengers at the designated terminal floor and shall be shut down. The last elevator to be activated shall remain in service until normal power is restored, at which time elevators shall automatically be returned to normal service. During the emergency a different elevator may be chosen to remain in service by means of a manual selector switch.
3. Furnish and install in the First Floor elevator lobby, in an area approved by the Architect, a flush emergency control cabinet containing a panel with a 120 volt pilot light and a manual rotary switch which has five positions, automatic and one position for each elevator and future elevatorBy means of the rotary switch, the automatic operation described above may be by-passed and any elevator in the bank may be selected to service the hospital during emergency.
4. The pilot circuit will be brought to the emergency control cabinet by the electrical trades. Furnish, install and connect in this cabinet a step down transformer with proper 120 volt fuse protection. Make connection to the pilot light and extend the 120 volt pilot circuit up to suitable control relays in the elevator machine room. When the pilot circuit is energized, these relays shall switch the control of the elevators down to the rotary switch in the emergency control panel. All control wiring between the controllers in the machine

room and the rotary switch shall be furnished and installed under the work of this Section 14211. Submit with shop drawings electrical drawings showing the circuitry proposed for transferring the elevators to and from the Center's emergency power supply.

5. The flush emergency control panel shall have stainless steel trim with a hinged flush stainless steel door equipped with a key operated lock. Hinges shall be concealed type. Door shall have a red jewel insert over the pilot light to indicate when emergency power is activated. The jewel shall have engraved inscription EM. GEN. Each position of the rotary control switch shall be clearly identified as to the elevator which it controls.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

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

1. Thyssen-Krupp Elevator.
2. Otis Elevator Co.

2.2 ELEVATOR EQUIPMENT

A. Machine: Single worm geared traction type with motor, brake, gearing and driving sheave mounted in proper alignment on a steel bedplate. Worm shall be of hardened and ground steel., integral with worm shaft, and have a ball or roller thrust bearing designed to take the end thrust of worm in both directions The ring gear shall be hobbed from a bronze rim, accurately fitted and bolted to the gear spider. Support sheave and gear spider by heavy duty ball or roller bearings. Provide roller and anti-friction metal bearings with adequate means of protection.

1. Drive: Variable Voltage Variable Frequency (VVVF) type.
   a. Motor :Totally enclosed, non-ventilated AC motor with Class F insulation. Motor armature shall be dynamically balanced and supported by ball bearings of ample capacity.
   b. Control: Vector controlled pulse-width modulated AC drive. The variable voltage variable frequency drive shall convert the AC power supply using a two step process to a variable voltage variable frequency power supply for use by the hoist motor. Speed control shall be by means of vector control providing independent excitation and torque current. Provide a digital velocity encoder on the motor, giving feedback to the controller on motor speed and position.
   c. Brake: Spring applied electric break, held open by an electro-magnet actuated by the controller and designed to make smooth, positive stops. Break shall be designed to automatically apply in the event of interruption of power supply from any cause. Control of the operation of the break shall be all digital. The setting and lifting of the break shall be software based and all electronic. All adjustments and setup of the break shall be made using a PC interface. No contactors or resistors shall be use in the actuation of the break.

d. Machine location: Machines shall be placed over the hoistway and supported on the floor of the structure, except, manufacturers may, at their option, mount machines on structural steel beams or channels and bearing plates furnished by the elevator installer. Beams shall be securely fastened to the building's structural framing.

B. Ropes: Traction steel hoist ropes of size and number to ensure proper wearing qualities, consisting of at least six strands wound around a hemp core center. Governor ropes shall be iron or steel. Furnish adequate compensation for weight of hoist ropes when required to maintain proper counterbalance ratio.

C. Counterweight: Counterbalance each elevator for smooth and economical operation by cast iron or steel plate weights contained in a structural steel frame. Counterweight shall equal a complete elevator car and approximately 40 percent of the specified weight.

D. Safety and Governor: Car safety shall be mounted on the bottom members of the car frame and be operated by a centrifugal speed governor. The governor shall be designed to cut off power to the motor and apply the break whenever the governor indicates the car has excess speed.

E. Sound Reducing Materials: Provide necessary sound reducing materials, preferably rubber pads of proper density; to effectively isolate the motor generator set and the machine from the floors or supporting beams

F. Automatic Terminal Limits: Place electric limit switches in the hoistway near the terminal landings. Limit switches shall be designed to cut off the electric current and stop the car if it runs beyond either terminal landing.

G. Car Platform: Construction shall be of suitable substantial structural steel framing and stringers all rigidly assembled and provided with laminated wood flooring (or equal type) prepared to receive the finishing floor covering and car enclosure. An auxiliary frame of steel members shall form the mounting support for each platform, which shall be attached securely to the car frame and be braced to the side stiles with tie rods. The platform shall be isolated from its supports and braces by rubber (or equal) pads and shields of proper density and shapes so as to effectively cushion the platform from its supports, so as to avoid sound and other vibrations being transmitted to the car platform and enclosure. The underside of wood portions shall be fireproofed with approved sheet metal.

1. Floor Finish: As indicated on the Room Finish Schedule.

H. Sills: Shall be made of nickel silver approximately five inches wide by one inch in vertical height. The extruded or cast member shall be not less than 5/32 inch thick in any area of cross section and shall be designed for anchoring so that no fastenings or holes will be exposed on any top area of the sill.

I. Door Hanger and Tracks

1. Furnish and install for each hoistway door sheave type two point suspension hangers and tracks complete, and hang hoistway door panels.

2. Sheaves shall be hardened steel with rubber tires or composition (not less than 2-3/4 inches in diameter), with ball bearings sealed to retain grease lubrication and mounted on steel housings arranged for attaching to the doors on two cap screws. Equip hangers with ball bearing adjustable rollers to take the upthrust of the doors. Tracks shall be cold drawn steel of heavy section with the surface shaped to conform to the tread of the hanger sheaves and rollers. Use suitable means to transmit motion from one door panel to the other.

J. Electric Interlocks and Door Contacts
1. Provide the doors at each hoistway landing with approved type hoistway door interlocks, as required by applicable code.
2. Equip the doors of elevator cars with approved electric contacts conforming to the requirements of applicable codes.
3. Equip car top emergency exits of elevators with fastenings as required by applicable codes.

K. Car and Hoistway Door Operation

1. Provide electric operator on the car and at the hoistway landing to operate car and hoistway doors quietly and smoothly, open and close the doors and hoistway door simultaneously.
2. The doors shall open in not more than 1.5 seconds and shall close in not more than 2.9 seconds.
3. Provide an electric contact for the car door to prevent elevator movement away from the landing, unless the door is in the closed position as defined in the safety code for elevators, dumbwaiters, and escalators.
4. Electric Door Control
   a. The door protection shall be provided by an infra red light curtain comprised of at least 40 beams. The curtain shall screen the elevator entrance way, to a height of 6 feet. Interruption of a single beam shall cause the doors to halt and reverse.
5. Equip each hoistway door with a positive electromechanical interlock and auxiliary door closing device complying with the safety code for elevators, dumbwaiters, and escalators, so that the elevator can be operated only after the interlock circuit is established.
6. Car Operating Panel:
   a. The car operating panels shall include "call register" lights in the car buttons. Each car button shall illuminate to show that a call is registered for that floor. Alarm button shall be connected to an alarm bell located in or adjacent to the elevator shaft and other alarms as required by code.
   b. The car operating panel fixture shall be provided with a faceplate constructed of stainless steel #4 finish.
   c. Make provisions in the car operating panel for future addition of 6 levels. Provisions shall be such that work required for the additional levels shall be at a minimum.

L. Landing Push Button Fixtures

1. A single riser of landing button fixtures shall be provided at each landing with UP and DOWN buttons at each intermediate landing and single buttons at each terminal landing.

2. A Call Acknowledging Light shall be associated with each landing push button. Its illumination shall acknowledge the registration of a call from the corresponding landing button. As the call is answered the acknowledging light shall be extinguished.

M. Car Position Indicator

1. Furnish in the car station a digital position indicator with direction arrows. Install an audible floor passing signal to meet handicap code.
2. Make provisions for future levels. Fabricate cover plates to show present conditions.

N. Waiting Passenger Lanterns and Gongs

1. Waiting Passenger Lanterns of standard design with arrival gongs shall be provided over each entrance to show the direction in which the car is set to run when it leaves the landing. The gong shall sound once for the up direction and twice for the down direction.
2. A car stopping at a landing shall sound the gong and shall illuminate the lantern in advance of its arrival to indicate the direction in which the car will leave the landing. The lantern shall remain illuminated until the doors have started to close. If the doors are re-opened the lantern shall re-illuminate and the gong shall re-sound.

O. Combination Position Indicator and Waiting Passenger Lantern: A combination digital position indicator and waiting passenger lantern of standard design shall be provided over the corridor entrances at the main floor only. It shall have a finished faceplate. The position indicator shall indicate the location of the car to passengers. Directional arrows to indicate the direction of the car shall be incorporated in the fixture. The waiting passenger lantern with an arrival gong shall be provided. The gong shall sound and a directional indication light shall show the direction in which the car is set to travel when it leaves the floor. These signals are given as the car comes into the landing, when the direction of departure has previously been established. The gong shall sound once for the UP direction and twice for the DOWN direction.

P. Car Enclosure Emergency Lighting: A complete emergency lighting system shall be provided and installed in each car enclosure in addition to the standard lighting system

Q. Telephone: Provide as an integral part of the car station a 2-way self dialing telephone. Telephone unit shall be ADA approved

R. Electronic Door Control

1. Electronic control of the car and landing doors shall minimize door-open time at each stop commensurate with passenger transfer. Two light beams shall be arranged to cross the opening directly above the car threshold to detect a passenger transfer.
2. Photo-electronic equipment shall initiate a primary door-open interval of approximately seven seconds for waiting passengers when a car stops at a landing. Interruption of a light beam during this interval or during door closure shall terminate the primary interval, and the doors shall reclose immediately after the last passenger transfers.
3. Either time interval may be cancelled by momentary pressure of a door close button in the car operating panel. Constant pressure of the companion door open button shall provide reasonable extension of the intervals.

4. If the doors have been held open an extended period of time, they shall automatically start to close and a warning buzzer will sound. If the door open button is pressed, the doors shall stop but not re-open and the warning buzzer shall continue to sound until the entrance has been cleared of the obstruction.

S. Car Enclosure

1. Elevator car shall be of the following construction and design to suit the elevator platform. Submit complete details for approval by the Architect before construction.
   a. Each car side, rear, front, return and transom panels shall be constructed of 3/4" minimum thick, 45 pound medium density, fire retardant panels from floor to canopy, faced on the car side with .048 inch thick high pressure plastic laminate. The panels shall be butted to make joints practically invisible. The panels shall be covered on the outside with No. 26 U.S. gauge sheet steel. Plastic laminate shall be furnished by a manufacturer selected by the Architect. Colors shall be selected by the Architect from the manufacturer's full range of colors.
   b. The entrance columns shall be square and shall be formed integral with the return panels. A transom shall be furnished between entrance columns. Return panels, transom and entrance columns shall be best-grade stainless steel not less than #14 standard gauge.
   c. The coved base shall be 6" high stainless steel.
   d. The canopy shall consist of No. 12 gauge sheet steel car top. The canopy members shall be mitered and welded at the corners and represent practically one-piece construction. The car top shall be reinforced to support a load as required by the A.S.E. Code. The interior sheet steel surfaces shall be finished in white baked enamel.
2. The ceiling shall be suspended on all four sides in an aluminum frame. Ceiling shall consist of aluminum egg-crate shaped core with 1/2" x 1/2" x 1/2" cells, formed true and symmetrical and of generally uniform pattern appearance. Finish of core shall be baked enamel. The supports shall line with grooves between side panels.
3. Key operated lighting shall be of direct fluorescent type. There shall be two rows of fluorescent lamps on all four sides in a light trough above the suspended ceiling. The lighting circuit shall contain a continuously variable dimmer switch.
4. Ventilation shall consist of a single-speed key operated exhaust blower mounted on sound isolation pads to keep vibration and noise to a minimum.
5. Each door panel shall be of hollow metal flush type construction, not less than 1" thick and shall be made of No. 16 U.S. gauge steel, covered with laminated plastic and vertical stainless steel binding angles on the car side and not less than No. 16 U.S. gauge cold rolled furniture steel finished in a solid color baked enamel as selected on the hoistway side. The car door leaves shall be hung on two point suspension sheave type hangers similar to those specified for hoistway doors. Doors shall be especially designed and reinforced for power operation. Provide 16 gauge stainless steel kick plates on cab side of doors.
6. The car shall be provided with an emergency exit in conformance with requirements of the A.S.E. Code.
7. Necessary cutouts shall be provided in the car for operating fixtures, signal fixtures, etc., as specified elsewhere. Faceplates shall be 16 gauge stainless steel.

8. Install stainless steel handrail on back and side walls of the cab. The handrail shall be manufacturer's standard design without visible fastenings.
9. The car shall be securely fastened to the platform.
10. Provide one set of elevator protection pads with stainless steel pad hooks secured to walls of each cab. The pads shall be quilted, soil resistant and fire resistant.

T. Hollow Metal Elevator Entrances

1. Furnish and install at the required openings metal entrances, consisting of frames, doors, sills, fascia plates, hanger supports, struts and closer angles, hanger cover plates, tracks and hangers and hardware in accordance with the following:
2. Unit Frames: The Unit Frames shall be made from #14 U.S. gauge best grade steel and shall comprise head and jamb sections with integral casing or time with bolted or welded corners to form one piece unit frames. Frames shall contain suitable material for effective sound deadening. All frames shall be securely fastened to sills and hanger supports and shall be returned on the hoistway side to present a neat appearance.
3. Doors: Doors shall be two-speed sliding type for clear openings, flush door construction, and shall contain suitable material for sound deadening. The door panels shall be formed from not lighter than #16 U.S. gauge steel and all joints shall be welded their full length. Removable laminated phenolic guides shall be provided to run in the sill slots with minimum clearances. All doors to be reinforced for door opening mechanisms. All hoistway landing doors shall be equipped with approved metal sight guards finished to match the door panels. Doors shall be 1-1/2 hour, Class B, fire retardant construction, certified by an inspecting laboratory providing re-examination service.
4. Sills: The sills shall be nickel silver with fluted surface. Grooves for the door guides shall provide minimum clearance for the door guides. The sills shall be supported on steel anchors securely fastened to the floor construction.
5. Fascia Plates: Fascia Plates shall be of #14 U.S. gauge steel reinforced to insure a flat even surface throughout and shall be securely fastened to the hanger housing and sill above.
6. Toe Guards: Toe Guards, made of #14 U.S. gauge steel, shall be supplied for the lowest landing, and they shall be gradually beveled to the wall.
7. Hangers: Each hoistway door shall be provided with sheave type two point suspension hangers and tracks complete. Sheave shall not be less than 3-1/4" diameter with ball bearings properly sealed to retain grease lubrication. Hangers shall be equipped with adjustable ball bearing rollers. Either the tracks or the wheels shall be non-metallic.
8. Hanger Supports or Headers: Hanger supports shall be 3/16" thick formed sections securely bolted to the struts angles or closer support angles.
9. Struts and Closer Angles: Structural steel angles shall be furnished of sufficient size to accommodate the door closers. Angles to be continuous and securely bolted to the sills and building beams above.
10. Hanger Cover Plates: Hanger cover plates shall be made of #14 U.S. gauge steel and shall extend the full travel of the doors. Covers shall be made in sections for convenient access when servicing the hangers. The sections above the door openings shall be removable from within the elevator car.
11. Erection: Sills, struts, hanger supports, hanger covers, fascias, guards and unit frames shall be erected prior to the erection of rough walls and set in proper relation to the

elevator car guides. Doors shall be installed after the walls are finished. Frames shall have a protective covering for finished surfaces.

2.3 FINISHES

A. Finish of baked enamel shall be as follows: Furniture steel surfaces shall be thoroughly cleaned of oil, grease and other foreign substances in preparation for finishing. Materials shall then receive a rust preventing treatment such as "Bonderizing" or the equal followed by a baked-on primer coat. All exposed furniture steel surfaces shall receive applications of mineral filler with each application baked and sanded to insure a smooth surface. This shall be followed by a heavy coat of baked enamel primer or surfacer which is sanded and rubbed smooth. Three additional coats of enamel in color to be selected by Architect shall be applied, each of which shall be baked on separately and made smooth and clean. All structural members shall receive a shop coat of black paint.

B. All stainless steel shall be #302 18-8 Non-magnetic, and shall be finished after fabrication by belt sanding with a 50 grit belt, followed by sanding with 100 grit belt and finally polished using a 120 grit belt. The die marks and skin fractures at corners of bends are to be removed and those areas also finished in the same manner.

END OF SECTION 14211

SECTION 14560 – LAUNDRY AND LINEN CHUTES

PART 1 - GENERAL

1.1 SUMMARY

A. Provide soiled linen chutes where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

1.2 QUALITY ASSURANCE

A. NFPA Compliance: Provide chutes complying with NFPA 82.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Cutler Manufacturing Corp., Lakeland, FL 33813, (800) 237-2312.
2. U.S. Chutes Corp., Brookfield, CT 06804, (800) 872-4883.
3. Wilkinson Hi-Rise, LLC, Stow, OH 44224, (800) 686-6726.

2.2 MATERIALS

A. Chute Metal: Aluminum-coated, cold-rolled, commercial steel sheet; ASTM A 463/A 463M, Type 1 with not less than T1-40 coating.

1. Specified (Nominal) Thickness: 0.060.

2.3 DOORS

A. Intake Door Assemblies: ASTM A 240/A 240M, Type 302/304 stainless-steel, self-closing units with positive latch and latch handle; Class B labeled; 1-1/2-hour fire rated with 30-minute temperature rise of 250 deg F; and with frame suitable for enclosing chase construction.

1. Door Type: Hopper-type doors, with foot operators that unlatch and open door when foot pedal is depressed.
2. Size: Not less than 21-inch by 21-inch, as standard with manufacturer..
3. Finish: Manufacturer's standard satin or No. 3 directional polish finish.

4. Locks: Cylinder locks with keys that are removable only when cylinder is locked. For each chute, key locks alike. For each door, furnish four keys.

B. Discharge Door Assemblies: Aluminum-coated-steel doors of 1-hour fire-rated construction that is suitable for Class B openings; equipped with fusible links that cause doors to close in the event of fire. All exposed to view surfaces shall have two coats of aluminum spray paint applied with pressure.

1. Horizontal Discharge: Provide top-hinged, self-closing, hopper door not less than 24-inch by 30-inch, with self-latching hardware; floor leg-brace designed to absorb impact of material dropping against chute; and minimum NPS 2 drain pipe connection. Piping and fittings for connection to a floor drain shall be furnished and installed under this Section.

C. Access Door Assemblies: Manufacturer's standard ASTM A 240/A 240M, Type 302/304 stainless-steel doors; Class B labeled; 1-1/2-hour fire rated with 30-minute temperature rise of 250 deg F; with frame suitable for enclosing chase construction; and in satin or No. 3 directional polish finish.

2.4 ACCESSORIES

A. Fire Sprinklers: NPS 1/2 fire sprinklers ready for piping connections.

B. Flushing Spray Unit: NPS 3/4 spray head unit located in chute above highest intake door, ready for hot-water piping connection, and with access for head and piping maintenance.

C. Heat-Detector System: Interlock system with temperature-rise elements that lock chute doors when temperature in chute reaches a predetermined, adjustable temperature.

2.5 FABRICATION

A. General: Factory-assemble chutes to greatest extent practical with continuously welded or lock-seamed joints without bolts, rivets, or clips projecting on chute interior. Include intake-door assemblies and chute-support frames at each floor, and chute expansion joints between each support point. All intake doors shall be removable from the intake tube or throat with tools readily available to any maintenance employee.

1. The chute shall be constructed of aluminum coated steel, 24-inch in diameter with smooth offsets where indicated. The chute shall have vertical seams lock joined and horizontal seams slip jointed with 2" overlaps.
2. The intake throat shall be of the same construction as the main vertical chute and shall be welded to the vertical chute. The transition of the chute tube and intake throat shall be smooth, sloped to the tube and grooved for drainage into the tube.
3. The outlet tube of the chute shall be constructed of the same material as the chute and shall be reinforced by a 14 gauge galvanized steel plate. Outlet tube shall be welded to

the main chute tube forming a smooth transition radius between the tube and the outlet door.

B. Roof Vent: Fabricate vent unit to extend 48 inches above roof with full-diameter, with glass explosion-release cap with protective expanded metal grille. Fabricate with roof-deck flange, and with counterflashing and clamping ring of nonferrous metal compatible with chute metal. The proper and absolute flashing of the soiled linen chute shall be the responsibility of this section.

C. Fire Sprinklers: Comply with NFPA 13. Locate fire sprinklers at or above the top service opening of chutes, within the chute at alternate intake doors, and at the discharge door.

D. Equipment Access: Fabricate chutes with access for maintaining equipment located within the chute, such as flushing and sanitizing units, fire sprinklers, and plumbing and electrical connections.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install the work of this Section in strict accordance with the manufacturer's recommendations and instructions.

END OF SECTION 14560

SECTION 14580 - PNEUMATIC TUBE SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes furnishing all engineering, materials, supplies, labor and startup for a complete pneumatic tube system as shown on the Drawings, specified herein, and as needed for a complete and proper installation.

1. The base installed system shall consist of 11 stations on one zone and one interzone connection to the hospital's existing system.
2. Provide all drawings and equipment data necessary for the coordination of the installation.
3. Furnish and install all low-voltage control wire and equipment terminals required for the proper operation of the system. Include power wiring between the equipment and the source.

1.2 QUALITY ASSURANCE

A. The equipment furnished shall be the product of the system manufacturer and shall be installed by skilled mechanics under direct employment and supervision of the manufacturer.

B. The manufacturer shall have a service branch within one hundred-twenty five (125) miles of the installation and shall provide service within 24 hours of call.

PART 2 - PRODUCTS:

2.1 SYSTEM DESCRIPTION - GENERAL

A. The System shall be a complete Translogic Corporation "PTS" Computer Controlled Tube Distribution System consisting of new 4 inch tube, recessed stations, transfer units, blower packages, and carriers.

1. Manufacturer: Swisslog-Translogic Corporation, Denver, CO 80239 (800) 525-1841. No other manufacturer will be accepted.

2.2 EQUIPMENT

A. Transmission Tubing:

1. 4 inch O.D., 16 gauge, cold-rolled, electric welded steel with flash removed and hot dip galvanized.
2. Form bends of same material on a center line radius of not less than 50 inches. Maintain a uniform cross-section free from wrinkles and distortions. No expanded bends shall be allowed in the system.
3. Cut all ends square, file and mandrel when cutting tube.
4. Use solid steel or split steel sleeves for rigid joints. Use split sleeves at all equipment connections.
5. Seal joints with suitable airtight compound.
6. Support tubing with suitable hangers and supports as follows:
   a. Every ten (10) feet.
   b. At every floor of vertical runs.
   c. At each of bends.
   d. At equipment connections.
   e. At center of bend radius - sway brace
7. Hangers shall be pre-threaded zinc plated rod screwed into the appropriate device attached to the building structure. Tube clamps or channels fastened to the rod shall support the tubing.
8. Furnish and install sound insulation on tube where required for noise control. One inch thick, 1/2 pound density, fiberglass insulation with dust cover shall be used. All joints shall be taped

B. Transfer Units:

1. Provide tubing network for routing carriers between station.
2. Install with split sleeves. Sway brace against motion.
3. Allow complete and clear access to service mechanical and electrical components.
4. Include non-contact sensor for notification of carrier location.
5. Direction change through unit shall be gradual using curved tube section, positioned by magnetic proximity sensors.

C. Blower Package:

1. Blower packages shall be factory assembled modules complete with blower, vibration isolators, screen boxes and air shifting valves.
2. Optional sound deadened units with sound insulation and intake and exhaust mufflers shall be provided where the noise level generated must be below 65dbA three feet below a ceiling which has the blower mounted above it.
3. Blower package shall be designed for floor mounting.
4. Regenerative-type blowers shall be provided.
5. Provide one blower package per zone.
6. Blowers shall provide vacuum and pressure in tubing network to maintain average carrier speed of 25 fps.
7. Allow complete and clear access to service mechanical and electrical components.
8. Provide automatic shutdown during low usage periods for energy conservation.
9. Air piping shall be same tubing specified for the carrier lines. Piping shall be complete with all necessary tees and elbows.

D. Stations:

1. Provide wall recessed down receive style stations or console style stations.
2. Provide a self supporting enclosure with a minimum of mechanical and electronic equipment for installation during the initial stages of construction.
3. Mechanical and electrical operating components shall not be installed in the enclosure until the last stages of building construction to prevent damage. A trim frame shall be provided for final mating to the wall.
4. All mechanical and electrical components shall be accessible and removable for repair or replacement.
5. Electronic control units shall be solid state, plug-in units for fast replacement and shall be interchangeable with units in other stations.
6. All visible metal surfaces shall be factory painted. Bright metal finish parts shall be stainless steel, brushed aluminum or chrome plated.
7. Carrier dispatcher shall contain one carrier at a time and be independent of receiver.
8. Carrier receiver shall be independent of dispatcher and contain open storage capability for carriers.
9. Receiver overload shall shut down station's dispatcher and receiver. A message shall indicate overload. Condition shall automatically reset upon carrier removal from receiver.
10. Empty carrier storage shall provide space for not less than four carriers.
11. Provide air-cushion delivery into station.
12. Provide each station with an "IQ" Control Panel containing:
    a. Membrane keypad - for destination and special function selection.
    b. Liquid Crystal Display for message display.
    c. Send/Enter key - to activate dispatch after destination selection or enter data for special functions.
    d. Cancel/Clear Key - to allow for transaction cancellation or clearing of display during special function activation.
    e. Quick Key Panel – configurable as speed dial, or special function indicators.
    f. The standard station dispatcher shall be capable of dispatching a 6.5 pound payload.

E. Carriers:

1. Provide 4 "Eco-Seal" carriers per station.
    a. Clear molded polycarbonate
    b. Full access side opening and self-latching upon closure.
    c. Bi-directional.
    d. Replaceable wear bands, latches and O-rings.
    e. Capable of carrying: specimens, medications, x-ray film, 1,000 ml IV bags filled up to 1100 cc's.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Assemble and install the system and components in strict accordance with Contract Documents, applicable codes and regulations, approved shop drawings, and manufacturer's recommendations.

B. Provide connection and integration of electronic components to existing main computer and Translogic "Matrix" software.

3.2 INSTRUCTION:

A. Provide all necessary instruction in the use, operation, and maintenance of the system to personnel designated by the Owner.

END OF SECTION 14580

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
Bldg: -												
Floor: 02 - Second Floor												
2001A-LO	RCPT	CPT		RUB		PTD/VWC		ACT-1/PTD				
2001-LO	ELEV LOBBY	PORC T		PORC T		PTD/WD		ACT-2/PTD				
2002A-PU	TOIL H/C	PORC T		PORC T		EPXY		ACT-4				
2002-LO	FAM WTG SUITE	CPT		RUB		PTD/VWC/FWC		ACT-1/PTD				
2003A-WS	ALC	LINO		RUB		PTD		PTD				
2003B-WS	ALC	LINO		RUB		PTD		PTD				
2003-WS	CORR	LINO		RUB		PTD		ACT-1				
2004A-WS	SEC'Y	CPT		RUB		PTD		ACT-1				
2004-WS	ASST HD NRS OFF	CPT		RUB		PTD		ACT-1				1
2005A-WS	SEC'Y	CPT		RUB		PTD		ACT-1				
2005-WS	HD NRS OFF	CPT		RUB		PTD		ACT-1				1
2006-WS	EQUIP	VCT		RUB		PTD		ACT-4				
2007A-WS	ALC	LINO		RUB		PTD		PTD				
2007B-WS	ALC	LINO		RUB		PTD		PTD				
2007-WS	CORR	LINO		RUB		PTD		ACT-1				
2008-CF	CONF	CPT		RUB		PTD/FWC		ACT-1				
2009-WS	CORR	VCT		RUB		PTD		ACT-1				
2010A-WS	PRE-NATAL RECORDS	CPT		RUB		PTD		ACT-1				
2010-WS	STAFF STA	LINO		RUB		PTD		PTD				
2011-WS	EQUIP	VCT		RUB		PTD		ACT-4				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
2012A-WS	WHEEL EQUIP	LINO		RUB		PTD		PTD				
2012B-WS	ALC	LINO		RUB		PTD		PTD				
2012-WS	CORR	LINO		RUB		PTD		ACT-1/PTD				
2013-WS	MEDS	VCT		RUB		PTD						
2014A-WS	BED ST	VCT		RUB		PTD		PTD				
2014-WS	CORR	VCT		RUB		PTD		ACT-1				
2015-MA	EMER ELEC	CONC/SEALED										
2016-MA	NORM ELEC	CONC/SEALED										
2017-IN	TEL/DATA	CONC/SEALED										
2018-LI	ANTE	VCT		RUB		PTD		ACT-1				
2019-WS	OFF	CPT		RUB		PTD		ACT-4				
2020-WS	OFF	CPT		RUB		PTD		ACT-1				1
2021A-WS	CONSULT	CPT		RUB		PTD		ACT-1				
2021-WS	STAFF STA	LINO		RUB		PTD		PTD				
2022-WS	MD LOUNGE	CPT		RUB		PTD/VWC		ACT-1				
2023A-WS	ALC	LINO		RUB		PTD		PTD				
2023B-WS	ALC	LINO		RUB		PTD		PTD				
2023-WS	CORR	LINO		RUB		PTD		ACT-1/PTD				
2024-WS	MEDS	VCT		RUB		PTD		ACT-1				1
2025-WS	NOUR	VCT		RUB		PTD		ACT-1				1
2026-WS	CLN UTIL	SHT V		IB		PTD		ACT-4				
2027-ES	HSKPG	SHT V		IB		PTD		ACT-4				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
2028-WS	SOIL HOLD	SHT V		IB		PTD		ACT-4				
2029-WS	SOIL HOLD	SHT V		IB		PTD		ACT-4				
2030A-WS	CONSULT	CPT		RUB		PTD		ACT-1				
2030-WS	STAFF STA	CPT		RUB		PTD		PTD				
2031-WS	EQUIP	VCT		RUB		PTD		ACT-4				
2033-ST	T STAFF H/C	CT		CT		EPXY		ACT-4				
2034-PU	T PUBLIC H/C	CT		CT		EPXY		ACT-4				
2040-LO	SERVICE ELEV LOBBY	CPT		RUB		PTD		ACT-1/PTD				
2041-PO	CORR	VCT		RUB		PTD		ACT-1				
2042-PO	ANEST WKRM	CPT		RUB		PTD		ACT-1				1
2043-WS	IUFD	VCT		RUB		PTD		ACT-4				
2044-ST	STAFF LOUNGE	CPT		RUB		PTD		ACT-1/PTD				
2045-ST	T STAFF	CT		CT		EPXY		ACT-4				
2046-ST	T/SH STAFF	CT		CT		EPXY		ACT-4				
2047-WS	CORR	VCT		RUB		PTD		ACT-1				
2048-ES	HSKPG	SHT V		IB		PTD		ACT-4				
2049-IN	TEL/DATA	CONC/SEALED										
2050-MA	EMER ELEC	CONC/SEALED										
2051-MA	NORM ELEC	CONC/SEALED										
2052-PO	CHNG	CPT		RUB		PTD		ACT-4				
2053-PO	CHNG	CPT		RUB		PTD		ACT-4				
2054-PO	PASS	RUB		RUB		PTD		ACT-4				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
2055-PO	C-SECT	RUB		RUB		EPXY		EPXY				
2056A-PO	SUB-STERILE	RUB		RUB		EPXY		EPXY				
2056-PO	SCRUB	RUB		RUB		PTD		ACT-4				
2057-PO	EQUIP	VCT		RUB		PTD		ACT-4				
2058-PO	C-SECT	RUB		RUB		EPXY		EPXY				
2059-PO	CLN ALC	RUB		RUB		PTD		ACT-1				
2060-PO	EQUIP	VCT		RUB		PTD		ACT-4				
2062-WS	SOIL UTIL CASE CART/LN	SHT V		IB		PTD		ACT-4				
2063A-WS	ALC	LINO		RUB		PTD		PTD				
2063-WS	CORR	LINO		RUB		PTD		ACT-1/PTD				
2064-PO	CLN CASE CART/LN	SHT V		IB		PTD		ACT-4				
2065A-WS	ALC	LINO		RUB		PTD		PTD				
2065-WS	CORR	LINO		RUB		PTD		ACT-1/PTD				
2066A-WS	CONSULT	CPT		RUB		PTD		ACT-1				
2066-WS	STAFF STA	LINO		RUB		PTD		PTD				
2067-WS	EQUIP	VCT		RUB		PTD		ACT-4				
2069-WS	CORR	LINO		RUB		PTD		ACT-1				
2070-WS	MEDS	VCT		RUB		PTD		ACT-4				
2071-WS	NOUR	VCT		RUB		PTD		ACT-1				
2072-WS	CLN UTIL	SHT V		IB		PTD		ACT-4				
2073-ST	T STAFF	CT		CT		EPXY		ACT-4				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
2074-MA	TECH	VCT		RUB		PTD		ACT-4				
2076-WS	W/C STCH HLDING	VCT		RUB		PTD		ACT-1				
2077-WS	EQUIP	VCT		RUB		PTD		ACT-4				
2078-WS	MED DIR OFF	CPT		RUB		PTD		ACT-1				1
2079-WS	RESIDENTS WK RM	CPT		RUB		PTD		ACT-1				1
2080A-ST	T/SH STAFF	CT		CT		EPXY		ACT-4/EPXY				
2080B-ST	T/SH STAFF	CT		CT		EPXY		ACT-4/EPXY				
2080-ST	AISLE	CPT		RUB		PTD		ACT-1				
2081-ST	ON CALL	CPT		RUB		PTD		ACT-1				2
2082-ST	ON CALL	CPT		RUB		PTD		ACT-1				2
2083-ST	ON CALL	CPT		RUB		PTD		ACT-1				2
2084-ST	ON CALL	CPT		RUB		PTD		ACT-1				2
2085-ST	ON CALL	CPT		RUB		PTD		ACT-1				2
2086-ST	ON CALL	CPT		RUB		PTD		ACT-1				2
2087-ST	ON CALL	CPT		RUB		PTD		ACT-1				2
2088-ST	ON CALL	CPT		RUB		PTD		ACT-1				2
2089A-ST	T/SH STAFF	CT		CT		EPXY		ACT-4/EPXY				
2089B-ST	T/SH STAFF	CT		CT		EPXY		ACT-4/EPXY				
2089-ST	AISLE	CPT		RUB		PTD		ACT-1				
2090-ST	ON CALL	CPT		RUB		PTD		ACT-1				2
2091-ST	ON CALL	CPT		RUB		PTD		ACT-1				2
2701A-WS	T-PAT	PORC T		PORC T		PORC T/EPXY		EPXY				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
2701B-WS	ANTE	SHT V		RUB		PTD		PTD				
2701-WS	ISOLATION LDR	SHT V		RUB		PTD/VWC		ACT-1/PTD				
2702A-WS	T/SH H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
2702-WS	LDR	SHT V / PORC T		RUB / PORC T		PTD/VWC/PORC T/WD		ACT-1/PTD				
2703A-WS	T/SH H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
2703-WS	LDR	SHT V / PORC T		RUB / PORC T		PTD/VWC/PORC T/WD		ACT-1/PTD				
2704A-WS	T/SH H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
2704-WS	LDR	SHT V / PORC T		RUB / PORC T		PTD/VWC/PORC T/WD		ACT-1/PTD				
2705A-WS	T/SH H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
2705-WS	LDR	SHT V / PORC T		RUB / PORC T		PTD/VWC/PORC T/WD		ACT-1/PTD				
2706A-WS	T/SH H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
2706-WS	LDR	SHT V / PORC T		RUB / PORC T		PTD/VWC/PORC T/WD		ACT-1/PTD				
2707A-WS	T/SH H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
2707-WS	LDR	SHT V / PORC T		RUB / PORC T		PTD/VWC/PORC T/WD		ACT-1/PTD				
2708A-WS	T/SH H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
2708-WS	LDR	SHT V / PORC T		RUB / PORC T		PTD/VWC/PORC T/WD		ACT-1/PTD				
2709A-WS	T/SH H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
2709-WS	LDR	SHT V / PORC T		RUB / PORC T		PTD/VWC/PORC T/WD		ACT-1/PTD				
2710A-WS	T/SH H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
2710-WS	LDR	SHT V / PORC T		RUB / PORC T		PTD/VWC/PORC T/WD		ACT-1/PTD				
2711A-WS	PAT T/SH	PORC T		PORC T		PORC T/EPXY		EPXY				
2711-WS	TRIAGE	SHT V		RUB		PTD/VWC		ACT-1/PTD				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
2712A-WS	T/SH H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
2712-WS	TRIAGE ADA	SHT V		RUB		PTD/VWC		ACT-1/PTD				
2713A-WS	T/SH H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
2713-WS	TRIAGE ADA	SHT V		RUB		PTD/VWC		ACT-1/PTD				
2714A-WS	T PAT H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
2714B-WS	ANTE ROOM	SHT V		RUB		PTD		PTD				
2714-WS	ISOL TRIAGE	SHT V		RUB		PTD/VWC		ACT-1/PTD				
2715A-WS	PAT T/SH	PORC T		PORC T		PORC T/EPXY		EPXY				
2715-WS	TRIAGE	SHT V		RUB		PTD/VWC		ACT-1/PTD				
2716A-WS	PAT T/SH	PORC T		PORC T		PORC T/EPXY		EPXY				
2716-WS	TRIAGE	SHT V		RUB		PTD/VWC		ACT-1/PTD				
2717A-WS	PAT T/SH	PORC T		PORC T		PORC T/EPXY		EPXY				
2717-WS	TRIAGE	SHT V		RUB		PTD/VWC		ACT-1/PTD				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
Bldg: -												
Floor: 03 - Third Floor												
3001A-LO	RCPT	**CPT**		**RUB**		**PTD/VWC**		ACT-1/PTD				
3001-LO	ELEV LOBBY	**PORC T**		**PORC T**		**PTD/WD**		ACT-2/PTD				
3002A-PU	T H/C	**PORC T**		**PORC T**		**EPXY**		ACT-4				
3002-LO	FAM WTG SUITE	**CPT**		**RUB**		**PTD/VWC/FWC**		ACT-1/PTD				
3003-PU	FAM NOUR	**CPT**		**RUB**		**PTD**		ACT-1				
3004A-CC	ALC	**CPT**		**RUB**		**PTD**		**PTD**				
3004B-CC	SCRUB	**CPT**		**RUB**		**PTD**						
3004-CC	CORR	**CPT**		**RUB**		**PTD**		ACT-1/PTD				
3005-CC	NRS PRACT OFF	**CPT**		**RUB**		**PTD**		ACT-1				1
3006A-CC	SEC'Y	**CPT**		**RUB**		**PTD**		**PTD**				
3006-CC	NICU HD NRS OFF	**CPT**		**RUB**		**PTD**		ACT-1				1
3007-CC	CORR	**CPT**		**RUB**		**PTD**		ACT-1/PTD				
3008-PH	PHARM SAT	**VCT**		**RUB**		**PTD**		ACT-1				1
3009-DI	COMPUTED RADIOGRAPHIC RM	**VCT**		**RUB**		**PTD**		ACT-1				1
3010-CC	EQUIP	**VCT**		**RUB**		**PTD**		ACT-4				
3011-ST	T STAFF	**CT**		**CT**		**EPXY**		ACT-4				
3012A-ST	STAFF T/SH	**CT**		**CT**		**EPXY**		ACT-4				
3012-ST	ON CALL SUITE	**CPT**		**RUB**		**PTD**		ACT-1				
3013-ST	ON CALL	**CPT**		**RUB**		**PTD**		ACT-1				2
3014-ST	ON CALL	**CPT**		**RUB**		**PTD**		ACT-1				2

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
3015-ST	ON CALL	CPT		RUB		PTD		ACT-1				2
3016-ST	ON CALL	CPT		RUB		PTD		ACT-1				2
3017-CC	CORR	VCT		RUB		PTD		ACT-1				
3018A-CC	UNIT SEC'Y	CPT		RUB		PTD		ACT-1				
3018B-CC	CHART	CPT		RUB		PTD		PTD				
3018-CC	STAFF STA	CPT		RUB		PTD		PTD				
3018C-CC	CHART	CPT		RUB		PTD		PTD				
3019A-CC	ALC	CPT		RUB		PTD		PTD				
3019-CC	CORR	CPT		RUB		PTD		ACT-1				
3020-CC	FORMULA BREAST MILK	CPT		RUB		PTD		ACT-1				
3021A-CC	WHL EQUIP	CPT		RUB		PTD		PTD				
3021B-CC	ALC	CPT		RUB		PTD		PTD				
3021-CC	CORR	VCT		RUB		PTD		ACT-1				
3022-MA	EMER ELEC	CONC/SEALED										
3023-MA	NORM ELEC	CONC/SEALED										
3024-IN	TEL/DATA	CONC/SEALED										
3025-LI	ANTE	VCT		RUB		PTD		ACT-1				
3026-RE	STAT LAB	VCT		RUB		PTD		ACT-1				
3027-CC	MEDS	VCT		RUB		PTD		ACT-1				
3028A-CC	CONSULT	CPT		RUB		PTD		ACT-1				
3028B-CC	CHART	CPT		RUB		PTD		PTD				
3028-CC	STAFF STA	CPT		RUB		PTD		ACT-1				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
3028C-CC	CHART	CPT		RUB		PTD		PTD				
3029-CC	CLN SPLY	VCT		RUB		PTD		ACT-4				
3030-RE	RESP THERAPY	VCT		RUB		PTD		ACT-4				
3031A-CC	ALC	CPT		RUB		PTD		PTD				
3031B-CC	ALC	CPT		RUB		PTD		PTD				
3031-CC	CORR	CPT		RUB		PTD		ACT-1				
3032-ES	HSKPG	SHT V		IB		EPXY		ACT-4				
3033-CC	SOIL HOLD	SHT V		IB		EPXY		ACT-4				
3034-CC	SOIL UTIL	SHT V		IB		EPXY		ACT-4				
3035A-CC	CONSULT	CPT		RUB		PTD		ACT-1				
3035B-CC	CHART	CPT		RUB		PTD		PTD				
3035-CC	STAFF STA	CPT		RUB		PTD		PTD				
3035C-CC	CHART	CPT		RUB		PTD		PTD				
3036-PU	T PUBLIC H/C	CT		CT		EPXY		ACT-4				
3037-ST	STAFF H/C	CT		CT		EPXY		ACT-4				
3040-LO	SERVICE ELEV LOBBY	LINO		RUB		PTD		ACT-1/PTD				
3041-CC	NICU EQUIP	VCT		RUB		PTD		ACT				
3042-CC	CORR	CPT		RUB		PTD		ACT/PTD				
3043-CC	CCN MD OFF	CPT		RUB		PTD		ACT-1				1
3044-ST	STAFF LOUNGE	CPT		RUB		PTD		ACT-1				
3045-ST	T STAFF	CT		CT		EPXY		ACT-4				
3046-ST	T STAFF	CT		CT		EPXY		ACT-4				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
3047-CC	CORR	VCT		RUB		PTD		ACT-1				
3048-ES	HSKPG	SHT V		IB		EPXY		ACT-4				
3049-IN	TEL/DATA	CONC/SEALED										
3050-MA	EMER ELEC	CONC/SEALED										
3051-MA	NORM ELEC	CONC/SEALED										
3052-CC	SOIL UTIL	SHT V		IB		EPXY		ACT-4				
3053-CC	SOIL HOLD	SHT V		IB		EPXY		ACT-4				
3054-CC	CCN EQUIP	VCT		RUB		PTD		ACT-1				
3055A-CC	UNIT SEC'Y	CPT		RUB		PTD		ACT-1				
3055B-CC	CHART	CPT		RUB		PTD		PTD				
3055-CC	STAFF STA	CPT		RUB		PTD		PTD				
3055C-CC	CHART	CPT		RUB		PTD		PTD				
3056A-CC	ALC	CPT		RUB		PTD		PTD				
3056-CC	CORR	CPT		RUB		PTD		ACT-1/PTD				
3057A-CC	ALC	CPT		RUB		PTD		PTD				
3057B-CC	ALC	CPT		RUB		PTD		PTD				
3057-CC	CORR	CPT		RUB		PTD		ACT-1/PTD				
3058-CC	FORMULA BREAST MILK	CPT		RUB		PTD/VWC		ACT-1				
3059A-CC	CONSULT	CPT		RUB		PTD/VWC		ACT-1				
3059B-CC	CHART	CPT		RUB		PTD		PTD				
3059-CC	STAFF STA	CPT		RUB		PTD		PTD				
3059C-CC	CHART	CPT		RUB		PTD		PTD				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
3060-CC	CORR	CPT		RUB		PTD		ACT-1/PTD				
3061-CC	EQUIP	VCT		RUB		PTD		ACT-4				
3062-IN	TECH	VCT		RUB		PTD		ACT-4				
3063-CF	CONF	CPT		RUB		PTD/FWC		ACT-1				
3064-SS	SOCIAL WK OFF	CPT		RUB		PTD		ACT-1				1
3065-CC	FAM LACT	CPT		RUB		PTD		ACT-1				
3066-CC	CLN SPLY	VCT		RUB		PTD		ACT-4				
3067-CC	MEDS	VCT		RUB		PTD		ACT-1				
3068-CC	FAM LACT	CPT		RUB		PTD		ACT-1				1
3069-CC	MD CONSULT OFF	CPT		RUB		PTD		ACT-1				1
3070-CC	NICU ASST HD NRS OFF	CPT		RUB		PTD		ACT-1				1
3071A-PU	T/SH	CT		CT		EPXY		ACT-4				
3071B-PU	T/SH	CT		CT		EPXY		ACT-4				
3071C-PU	T/SH	CT		CT		EPXY		ACT-4				
3071-PU	CORR	CPT		RUB		PTD		ACT-1				
3072-PU	WASH/DRY	SHT V		RUB		EPXY		ACT-4				
3073-PU	PARENT RM	CPT		RUB		PTD/VWC		ACT-1				2
3075-PU	PARENT RM	CPT		RUB		PTD/VWC		ACT-1				2
3076-ST	STR	RUB		RUB		PTD						
3077-PU	STR 42	RUB		RUB		PTD						
3078-PU	STR 43	RUB		RUB		PTD						
3701A-CC	ANTE ROOM	SHT V		RUB		PTD		ACT-3				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
3701-CC	ISOL NICU	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3702-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3703-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3704-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3705-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3706-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3707-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3708-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3709-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3710-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3711-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3712-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3713-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3714-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3715-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3716-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3717-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3718-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3719-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3720-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3721-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3722-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
3723-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3724-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3725-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3726-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3727-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3728-CC	NICU	SHT V		RUB		PTD		ACT-3/PTD				
3729-CC	TRANS CARE	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3731-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3732-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3733-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3734-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3735-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3736-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3737-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3738-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3739-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3740-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3741-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3742-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3743-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3744-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3745-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
3746-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3747-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3748-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3749-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				
3750-CC	CCN	SHT V		RUB		PTD/VWC		ACT-3/PTD				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
Bldg: -												
Floor: 04 - Fourth Floor												
4001A-PS	RCPT	CPT		RUB		PTD		ACT-1/PTD				
4001-LO	ELEV LOBBY	PORC T		PORC T		PTD/WD		ACT-2/PTD				
4002A-PU	T H/C	PORC T		PORC T		EPXY		ACT				
4002-LO	FAM WTG SUITE	CPT		RUB		PTD/VWC/FWC		ACT-1/PTD				
4003A-WS	ALC	LINO		RUB		PTD		PTD				
4003B-WS	ALC	LINO		RUB		PTD		PTD				
4003-WS	CORR	LINO		RUB		PTD		ACT-1/PTD				
4004-CF	CLSRM	CPT		RUB		PTD/FWC		ACT-1				
4005-WS	OFF	CPT		RUB		PTD		ACT-1				1
4006A-WS	CLN SPLY/ST	VCT		RUB		PTD		ACT-4				
4006-WS	WORK AREA	VCT		RUB		PTD		ACT-1				
4007-WS	NEW NUR	SHT V		RUB		PTD		ACT-3/PTD				
4008-WS	NEW NUR	SHT V		RUB		PTD		ACT-3/PTD				
4009-WS	PROC	SHT V		RUB		PTD		ACT-1				
4010-WS	CORR	VCT		RUB		PTD		ACT-1				
4011A-WS	UNIT SEC'Y	CPT		RUB		PTD		ACT-1				1
4011-WS	STAFF STA	LINO		RUB		PTD		ACT-1				
4012A-WS	ALC	LINO		RUB		PTD		PTD				
4012-WS	CORR	LINO		RUB		PTD		ACT-1/PTD				
4013-WS	EQUIP	VCT		RUB		PTD		ACT-4				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
4014-WS	CORR	VCT		RUB		PTD		ACT-1				
4015-MA	EMER ELEC	CONC/SEALED										
4016-MA	NORM ELEC	CONC/SEALED										
4017-IN	TEL/DATA	CONC/SEALED										
4018-LI	ANTE	VCT		RUB		PTD		ACT-1				
4019-WS	NOUR	VCT		RUB		PTD		ACT-1				
4020A-WS	CONSULT	CPT		RUB		PTD		ACT-1				1
4020-WS	STAFF STA	LINO		RUB		PTD		PTD				
4021A-WS	ALC	LINO		RUB		PTD		PTD				
4021-WS	CORR	LINO		RUB		PTD		ACT-1/PTD				
4022-WS	EQUIP	VCT		RUB		PTD		ACT-4				
4025-WS	CLN UTIL	VCT		RUB		PTD		ACT-4				
4026-WS	MEDS	VCT		RUB		PTD		ACT-1				
4027-ES	HSKPG	SHT V		IB		EPXY		ACT-4				
4028-WS	SOIL HOLD	SHT V		IB		EPXY		ACT-4				
4029-WS	SOIL UTIL	SHT V		IB		EPXY		ACT-4				
4030A-WS	CONSULT	CPT		RUB		PTD		ACT-1				1
4030-WS	STAFF STA	LINO		RUB		PTD		PTD				
4031-WS	CORR	LINO		RUB		PTD		ACT-1/PTD				
4032-ST	T STAFF	CT		CT		EPXY		ACT				
4033-ST	T STAFF	CT		CT		EPXY		ACT				
4040-LO	SERVICE ELEV LOBBY	LINO		RUB		PTD		ACT-1/PTD				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
4041-WS	EQUIP	VCT		RUB		PTD		ACT				
4042-WS	CORR	LINO		RUB		PTD		ACT-1/PTD				
4043-ST	STAFF LOUNGE	CPT		RUB		PTD		ACT-1/PTD				
4044-ST	T STAFF	CT		CT		EPXY		ACT-4				
4045-ST	T STAFF	CT		CT		EPXY		ACT-4				
4046A-WS	ALC	VCT		RUB		PTD		PTD				
4046-WS	CORR	VCT		RUB		PTD		ACT-1/PTD				
4047-ES	HSKPG	SHT V		IB		EPXY		ACT-4				
4048-IN	TEL/DATA	CONC/SEALED										
4049-MA	EMER ELEC	CONC/SEALED										
4050-MA	NORM ELEC	CONC/SEALED										
4051-WS	SOIL HOLD	SHT V		IB		EPXY		ACT-4				
4052-WS	SOIL UTIL	SHT V		IB		EPXY		ACT-4				
4053-WS	CLN UTIL	SHT V		IB		EPXY		ACT-4				
4054A-WS	CONSULT	CPT		RUB		PTD		ACT-1				1
4054-WS	STAFF STA	LINO		RUB		PTD		PTD				
4055A-WS	ALC	LINO		RUB		PTD		PTD				
4055-WS	CORR	LINO		RUB		PTD		ACT-1/PTD				
4056-WS	CORR	LINO		RUB		PTD		ACT-1/PTD				
4057-WS	MEDS	VCT		RUB		PTD		ACT-1				
4058A-WS	CONSULT	CPT		RUB		PTD		ACT-1				1
4058-WS	STAFF STA	LINO		RUB		PTD		PTD				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
4059-WS	CORR	LINO		RUB		PTD		ACT-1/PTD				
4060-WS	OFF	CPT		RUB		PTD		ACT-4				1
4061-WS	EQUIP	VCT		RUB		PTD		ACT-4				
4062-IN	TECH	VCT		RUB		PTD		ACT-4				
4063-WS	CNSLT	CPT		RUB		PTD		ACT-1				1
4064-WS	ON CALL	CPT		RUB		PTD		ACT-1				2
4065-WS	NOUR	VCT		RUB		PTD		ACT-1				
4066-WS	DIS PLNR OFF	CPT		RUB		PTD		ACT-1				1
4067-SS	SOC WORK OFF	CPT		RUB		PTD		ACT-1				1
4068-MO	SUPPORT STAFF	CPT		RUB		PTD		ACT-1				
4069-MO	OFF	CPT		RUB		PTD		ACT-1				1
4070-MO	OFF	CPT		RUB		PTD		ACT-1				1
4071-MO	OFF	CPT		RUB		PTD		ACT-1				1
4072-MO	DIRECTOR OFF	CPT		RUB		PTD		ACT-1				1
4073-MO	OFF	CPT		RUB		PTD		ACT-1				1
4074-MO	OFF	CPT		RUB		PTD		ACT-1				1
4075-MO	OFF	CPT		RUB		PTD		ACT-1				1
4076-MO	OFF	CPT		RUB		PTD		ACT-1				1
4077-MO	OFF	CPT		RUB		PTD		ACT-1				1
4078-MO	OFF	CPT		RUB		PTD		ACT-1				1
4079-PU	STR 42	RUB		RUB		PTD						
4079-WS	MEDS	VCT		RUB		PTD						

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
4080-PU	STR 43	RUB		RUB		PTD						
4701A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4701B-WS	ANTE ROOM	SHT V		RUB		PTD		PTD				
4701-WS	ISOL POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4702A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4702-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4703A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4703-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4704A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4704-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4705A-WS	T PAT H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
4705-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4706A-WS	T PAT H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
4706-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4707A-WS	T PAT H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
4707-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4708A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4708-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4709A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4709-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4710A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4710-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
4711A-WS	T PAT H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
4711-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4712A-WS	T PAT H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
4712-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4713A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4713-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4714A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4714-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4715A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4715-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4716A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4716-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4717A-WS	T PAT H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
4717-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4718A-WS	T PAT H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
4718-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4719A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4719-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4720A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4720-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4721A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4721-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
4722A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4722-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4723A-WS	T/SH H/C PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4723-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4724A-WS	T/SH H/C PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4724-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4725A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4725-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4726A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4726-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4727A-WS	T PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4727-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4728A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4728-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4729A-WS	T PAT H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
4729-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4730A-WS	T PAT H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
4730-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4731A-WS	T PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4731-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
4732A-WS	T PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
4732-WS	POST PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
Bldg: -												
Floor: 0B - Basement												
B005-ER	ST	CONC/SEALED										
B007-MA	ELEC	CONC/SEALED										
B008-MA	EMER ELEC	CONC/SEALED										
B009-IN	TEL/DATA	CONC/SEALED										
B013-LI	LN CHUTE	CONC/SEALED										
B014-MA	SPRINKLER	CONC/SEALED										
B015-IN	TEL/DATA	CONC/SEALED										
B016-MA	ELEC	CONC/SEALED										
B017-MA	EMER ELEC	CONC/SEALED										
B141-ER	ELEC	CONC/SEALED										

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
Bldg: -												
Floor: 0G - Ground Floor												
G000B-LO	W/C ALC	PORC T		PORC T		PTD		PTD				
G000-LO	CNCRS	PORC T		PORC T		PTD/VWC/WD		ACT-2/PTD				
G001-LO	ELEV LOBBY	PORC T		PORC T		PTD/WD		ACT-1/PTD				
G002B-LO	CNSLT	CPT		RUB		PTD		ACT-1				
G002-LO	RCPT	CPT		RUB		PTD		ACT-1/PTD				
G003-SC	SECUR	CPT		RUB		PTD		ACT-1				
G004-LO	SOLARIUM	CPT		RUB		PTD/VWC		ACT-1/PTD				
G005A-WS	TBA	CPT		RUB		PTD		PTD				
G005-WS	CORR	CPT		RUB		PTD		ACT-1				
G006-WS	LACT CONSULT	CPT		RUB		PTD		ACT-1				
G007-WS	HOME CARE OFF	CPT		RUB		PTD		ACT-1				
G008-CF	CLSRM	CPT		RUB		PTD/FWC		ACT-1				
G009-WS	CORR	CPT		RUB		PTD		ACT-1				
G010A-WS	ALC	LINO		RUB		PTD		PTD				
G010-WS	CORR	LINO		RUB		PTD		ACT-1/PTD				
G011-WS	WASH/DRY	SHT V		RUB		EPXY		ACT-4				
G012-WS	CORR	VCT		RUB		PTD		PTD				
G013A-WS	RESOURCE ROOM	CPT		RUB		PTD		ACT-1				
G013-WS	STAFF STA	LINO		RUB		PTD		ACT-1				
G014-WS	EQUIP	VCT		RUB		PTD		ACT-4				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
G015-WS	CORR	VCT		RUB		PTD		ACT-1				
G016-MA	EMER ELEC	CONC/SEALED										
G017-MA	NORM ELEC	CONC/SEALED										
G018-IN	TEL/DATA	CONC/SEALED										
G019-LI	ANTE	VCT		RUB		PTD		ACT-1				
G020A-WS	ALC	LINO		RUB		PTD		PTD				
G020-WS	CORR	LINO		RUB		PTD		ACT-1				
G021A-WS	MEDS	VCT		RUB		PTD		ACT-1				1
G021-WS	STAFF STA	LINO		RUB		PTD		PTD				
G022-WS	EQP	VCT		RUB		PTD		ACT-1				
G023-WS	ASST HD NRS OFF	CPT		RUB		PTD		ACT-1				1
G024-WS	CLN UTIL	VCT		RUB		PTD		ACT-4				
G025-WS	PERINAT OFF	CPT		RUB		PTD		ACT-1				1
G026-WS	NOUR	VCT		RUB		PTD		ACT-1				
G027-ES	HSKPG	SHT V		IB		EPXY		ACT-4				
G028-WS	SOIL HOLD	SHT V		IB		EPXY		ACT-4				
G029-WS	SOIL UTIL	SHT V		IB		EPXY		ACT-4				
G030-WS	CORR	LINO		RUB		PTD		ACT-1/PTD				
G031-ST	STAFF LOUNGE	LINO		RUB		PTD		ACT-1				
G032A-ST	T H/C	CT		CT		EPXY		ACT-4				
G032B-ST	T H/C	CT		CT		EPXY		ACT-4				
G032C-ST	SHWR H/C	CT		CT		EPXY		ACT-4				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
G032-ST	LKRS M	RUB		RUB		PTD		ACT-4				
G033-WS	CHILD BIRTH OFF	CPT		RUB		PTD		ACT-1				1
G034A-ST	T/SH STA	CT		CT		EPXY		ACT-4				
G034-ST	LKRS F	RUB		RUB		PTD		ACT-4				
G035-ST	T STAFF H/C	CT		CT		EPXY		ACT-4				
G036-PU	T PUBLIC H/C	CT		CT		EPXY		ACT-4				
G037A-WS	T PAT	PORC T		PORC T		EPXY		ACT-4				
G037-WS	PROC	SHT V		RUB		PTD		ACT-1				
G038-WS	PROC	SHT V		RUB		PTD		ACT-1				
G039-WS	NST	VCT		RUB		PTD		ACT-4				
G040-WS	EMP BREAST PUMP	CPT		RUB		PTD		ACT-4				
G041-LO	VEST	WOM		PORC T		PTD		PTD				
G042-WS	LACT CONSULT OFF	CPT		RUB		PTD		ACT-1				1
G043-LO	SERVICE ELEV LOBBY	CPT		RUB		PTD		ACT-1/PTD				
G050A-PU	PHONE	PORC T		PORC T		PTD		PTD				
G050B-PU	VND	PORC T		PORC T		PTD		PTD				
G050-LO	CORR	PORC T		PORC T		PTD		ACT-2/PTD				
G051-LO	VEST	WOM		PORC T		PTD						
G052A-PC	SACRISTY	CPT		RUB		PTD		ACT-1				
G052-PC	MEDIT	CPT		RUB		PTD/VWC		ACT-1/PTD				
G053-LO	CORR	PORC T		PORC T		PTD		ACT-2/PTD				
G054-CF	KIT	VCT		RUB		PTD		ACT-1				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
G055A-CF	ST	VCT		RUB		PTD		ACT-4				
G055-CF	CLSRM	CPT		RUB		PTD/FWC/PWC		ACT-1/PTD				
G056-PU	RESOURCE ST	VCT		RUB		PTD		ACT-4				
G057-MA	EMER ELEC	CONC/SEALED										
G058-IN	TEL/DATA	CONC/SEALED										
G059-ES	HSKPG	SHT V		IB		PTD		ACT-4				
G060-CF	CLSRM	CPT		RUB		PTD/FWC/PWC		ACT-1/PTD				
G061A-CF	ST	VCT		RUB		PTD		ACT-4				
G061B-CF	ST	VCT		RUB		PTD		ACT-4				
G061-CF	ST	VCT		RUB		PTD		ACT-4				
G062-PU	T PUB F	PORC T		PORC T		EPXY		ACT-4				
G063-LO	VEST	PORC T		PORC T		PTD		ACT-1				
G064-CF	ST	VCT		RUB		PTD		ACT-4				
G065-CF	CLSRM	CPT		RUB		PTD/FWC/PWC		ACT-1/PTD				
G066-LO	DISCHARGE	PORC T		PORC T		PTD		ACT-2/PTD				
G067A-PU	FAM WTG	CPT		RUB		PTD/VWC		ACT-1				
G067B-PU	NOUR	CPT		RUB		PTD		ACT-1				
G067C-PU	COMP	CPT		RUB		PTD		ACT-1				
G067-PU	RMH	CPT		RUB		PTD		ACT-1				
G068A-PU	COMP	CPT		RUB		PTD		ACT-1				
G068-PU	RESPIT	CPT		RUB		PTD		ACT-1				
G069-PU	LEARNING CTR	CPT		RUB		PTD		ACT-1				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
G070-LO	CORR	PORC T		PORC T		PTD		ACT-2/PTD				
G071A-PU	CASHIER INFO	CPT		RUB		PTD		ACT-1				
G071B-PU	FITTING	CPT		RUB		PTD		ACT-1				2
G071-PU	RETAIL	CPT		RUB		PTD		ACT-1/PTD				
G072-PU	RETAIL ST	VCT		RUB		PTD		ACT-4				
G073-MA	NORM ELEC	CONC/SEALED										
G074-PU	T PUB M	PORC T		PORC T		EPXY		ACT-4				
G075-PU	STR 42	RUB		RUB		PTD						
G076-PU	STR 43	RUB		RUB		PTD						
G077-RG	SHELL	VCT		RUB		PTD		ACT-1/PTD				
G078-PU	ELEV	RUB		RUB		LP						
G079-PU	ELEV	RUB		RUB		LP						
G080-PU	ELEV											
G081-PU	ELEV	RUB		RUB		LP						
G082-PU	ELEV	RUB		RUB		LP						
G083-LO	FLWR SHOP	PORC T		PORC T		PTD						
G084-LO	REFR	PORC T		PORC T		PTD						
G085-LO	REFR	PORC T		PORC T		PTD						
G086-LO	OFF	CPT		RUB		PTD						
G087-LO	VEST	WOM		PORC T		PTD						
G088-LO	LOBBY	PORC T		PORC T		PTD						
G089-LO	WTG	CPT		RUB		PTD						

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
G090-LO	COFF	CPT		RUB		PTD						
G091-LO	CORR	PORC T		PORC T		PTD						
G092-LO	T M	PORC T		PORC T		EPXY						
G093-LO	T F	PORC T		PORC T		EPXY						
G094-LO	ATM	PORC T		PORC T		PTD						
G095-LO	GIFT SHOP	CPT		RUB		PTD						
G096-LO	CORR	PORC T		PORC T		PTD						
G097-LO	ST	VCT		RUB		PTD						
G098-LO	ADMIN RCPT	CPT		RUB		PTD						
G099-LO	CL J	VCT		RUB		PTD						
G100-LO	CORR	PORC T		PORC T		PTD						
G101-LO	VND	VCT		RUB		PTD						
G102-LO	DIN	PORC T		PORC T		PTD						
G103-LO	OFF	CPT		RUB		PTD						
G104-LO	SECUR	CPT		RUB		PTD						
G105-LO	CORR	PORC T		PORC T		PTD						
G106-LO	LOBBY	PORC T		PORC T		PTD						
G107-LO	CORR	PORC T		PORC T		PTD						
G108-LO	CORR	PORC T		PORC T		PTD						
G701A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
G701B-WS	ANTE ROOM	SHT V		RUB		PTD		PTD				
G701-WS	ISOL ANTE PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
G702A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
G702-WS	ANTE PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
G703A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
G703-WS	ANTE PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
G704A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
G704-WS	ANTE PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
G705A-WS	T/SH H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
G705-WS	ANTE PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
G706A-WS	T/SH H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
G706-WS	ANTE PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
G707A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
G707-WS	ANTE PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
G708A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
G708-WS	ANTE PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
G709A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
G709-WS	ANTE PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
G710A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
G710-WS	ANTE PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
G711A-WS	T/SH H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
G711-WS	ANTE PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
G712A-WS	T/SH H/C	PORC T		PORC T		PORC T/EPXY		EPXY				
G712-WS	ANTE PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
G713A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
G713-WS	ANTE PTRM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
G714A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
G714-WS	ANTE PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				
G715A-WS	T/SH PAT	PORC T		PORC T		PORC T/EPXY		EPXY				
G715-WS	ANTE PRTM	SHT V		RUB		PTD/VWC		ACT-1/PTD				

Room#	Room Name	Floor		Base		Walls		Ceiling		Finish Notes	Mlwk.	Toil. A.
		New	Ex.	New	Ex.	New	Ex.	New	Ex.			
Bldg: -												
Floor: SB - Sub-Basement												
S001-MA	SERVICE ELEV LOBBY	VCT		RUB		PTD		ACT-1				
S002-MA	CORR	VCT		RUB		PTD		ACT-1				
S003-MA	CORR	VCT		RUB		PTD		ACT-1				
S005-MM	BULK ST	CONC/SEALED										
S006-MA	CORR	VCT		RUB		PTD		ACT-1				
S007-MA	EMER ELEC SUBSTATION ROOM	CONC/SEALED										
S008-MA	CORR	VCT		RUB		PTD		ACT-1				
S009-LI	SOIL LN	VCT		RUB		PTD		ACT-1				
S010-IN	TEL/DATA	CONC/SEALED										
S011-MA	MECH	CONC/SEALED										
S012-MA	NORM ELEC SUBSTATION ROOM	CONC/SEALED										
S013-PU	STR 42	CONC/SEALED										