ADDENDUM NO. 3

DATE:	January 25, 2017
INVITATION FOR BID:	IFB J170012535 – Monroe Park Renovations Project
DATED:	December 20, 2016
RECEIPT DATE:	**February 8, 2017**
OPENING DATE:	**February 9, 2017**
SUBJECT:	Specifications, Question/Answer

Ladies/Gentlemen:

Please take note of the following:

Specifications:

1. The following specifications are being reissued from Addendum No. 2, the previous issue had pdf's that were incomplete. Content and intent are unchanged:
    - TABLE OF CONTENTS
    - SECTION 087100 – DOOR HARDWARE
    - SECTION 102800 – TOILET, BATH AND LAUNDRY ACCESSORIES
    - SECTION 081113 - HOLLOW METAL DOORS AND FRAMES
    - SECTION 083323 - OVERHEAD COILING DOORS
    - SECTION 089119 - FIXED LOUVERS
    - SECTION 093013 – CERAMIC TILING
    - SECTION 129310 – GRANITE SITE FURNISHINGS
    - SECTION 042000 - UNIT MASONRY
    - SECTION 040120.64 - BRICK MASONRY REPOINTING
    - SECTION 096723 - RESINOUS FLOORING
    - SECTION 3120090 – EARTHWORK
    - SECTION 321400 - UNIT PAVING

Question/Answer:

2. Per the fixture schedule the part# for MP1 pole does not indicate that it should have a GFCI receptacle as it is stated that it should have a GFCI receptacle per note 2 on sheet E1.1. The fixture is also listed that it is 220V. Should there be a GFCI receptacle in the MP1 pole?
   Answer: Provide a GFCI receptacle in the pole. The Fixture is 220V.

3. Per the fixture schedule the part# for MP2 pole has a GFCI indicated. Please confirm that all MP2 poles are to have a GFCI receptacle.
   Answer: Provide a GFCI receptacle in the pole.

4. Is hot dip galvanizing required on the bike racks prior to powder coat?
   Answer: Galvanizing is not required. Please use following specifications for Powder Coating bike rack: *Part is prepared for painting with hard sandblasting. An epoxy primer is electrostatically applied. A final TGIC, UV resistant polyester powder coat is applied. Final coating thickness shall be no less than 6 mils.*

5. Are there a total of (18) bike racks on this project?
   Answer: Contractor is responsible for quantities.

6. Sheet C3.1 shows the safety fence that the city has installed on the interior perimeter of the sidewalk. Note

3 on the same sheet says the contractor shall maintain perimeter sidewalks to pedestrian traffic at all times and to reroute pedestrian traffic in the street when a sidewalk is closed. There are differing site conditions and the city had the barriers installed on the outside of the sidewalk along Belvidere and Laurel. Please clarify if the drawings are incorrect and we are to figure rerouting pedestrian traffic in the street for the entire duration of the project. The attached picture shows the barriers on Laurel St installed in the wrong position currently closing the sidewalk that is to remain open.
Answer: Note No.3 on drawing C3.1 is changed to read : "The safety barrier/fencing is currently installed against the outside curb line on Laurel St., W. Franklin St. and Belvedere St. and against the back of the sidewalk line along W. Main St. Any movement of the existing safety barrier/fencing based on contractors means & methods shall be the sole responsibility of the contractor and shall meet City of Richmond requirements related to traffic and pedestrian movement."

7. Add. #2 Item #14 Sheet A4.1 says added but no sheet attached with Addendum #2 documents. Can you please provide?
   Answer: Added sheet should be LA4.1. There is no sheet A4.1.

8. Per addendum 1, drawings R100 and R101 were to be issued for further clarifications on the abatement scope for the Checker's House. No drawings were provide from the architect's link, please provide missing drawings?
   Answer: Drawings R100 and R101 are in the original Drawing bid set.

9. Per addendum 2, the revised bid form has now changed all the unit pricings that were listed originally, 13a,15a through 15h, is now listed as part of the of the base bid. Please specify the amount of quantities needed to be figured?
   Answer: GC to obtain takeoffs from the drawings. Scope of work mentioned above is detailed throughout the set.

10. Sheet LA2.3 & LA2.4, shows a pole base that is different from the Robinson Iron Rosemont Lamp standard, Base P-141. Are we to provide an additional custom floral cast piece to the pole?
    Answer: No, provide the Base P-141, as provided by the Manufacturer attached to a standard pole.

Bidders must take due notice and be governed accordingly. This addendum must be acknowledged as indicated in the Bid Book or your bid may not be considered.

Sincerely,

Oscar Knott, CPP, CPPO, VCO
Contract Specialist Supervisor
804/646-7499

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NOT APPLICABLE

DIVISION 41 - MATERIAL PROCESSING AND HANDLING EQUIPMENT

NOT APPLICABLE

DIVISION 42 - PROCESS HEATING, COOLING, AND DRYING EQUIPMENT

NOT APPLICABLE

DIVISION 43 - PROCESS GAS AND LIQUID HANDLING, PURIFICATION AND STORAGE EQUIPMENT

NOT APPLICABLE

DIVISION 44 - POLLUTION CONTROL EQUIPMENT

NOT APPLICABLE

DIVISION 45 - INDUSTRY-SPECIFIC MANUFACTURING EQUIPMENT

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NOT APPLICABLE

DIVISION 48 - ELECTRICAL POWER GENERATION

NOT APPLICABLE

SECTION 040120.64 - BRICK MASONRY REPOINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes repointing joints with mortar.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified.

1.3 QUALITY ASSURANCE

A. Brick Masonry Repointing Specialist Qualifications: Engage an experienced brick masonry repointing firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience in only installing masonry is insufficient experience for masonry repointing work.

B. Mockups: Prepare mockups of brick masonry repointing to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Repointing: Rake out joints in two separate areas, each approximately 36 inches high by 48 inches wide, unless otherwise indicated, for each type of repointing required, and repoint one of the areas.

PART 2 - PRODUCTS

2.1 MORTAR MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or Type II, except Type III may be used for cold-weather construction; white or gray, or both where required for color matching of mortar.

1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.

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

C. Masonry Cement: ASTM C 91/C 91M.

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

a. Lafarge North America Inc.; Lafarge Masonry Cement.
b. Lehigh Hanson, Inc.; [Lehigh Masonry Cement] [Lehigh White Masonry Cement].

D. Mortar Cement: ASTM C 1329/C 1329M.

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

a. Lafarge North America Inc.; Lafarge Mortar Cement.
b. .

E. Mortar Sand: ASTM C 144.

1. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.
2. Color: Provide natural sand or ground marble, granite, or other sound stone of color necessary to produce required mortar color.

F. Mortar Pigments: ASTM C 979/C 979M, compounded for use in mortar mixes, and having a record of satisfactory performance in masonry mortars.

G. Water: Potable.

2.2 MORTAR MIXES

A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.

1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again, adding only enough water to produce a damp, unworkable mix that retains its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.

B. Colored Mortar: Produce mortar of color required by using specified ingredients. Do not alter specified proportions without Architect's approval.

1. Mortar Pigments: Where mortar pigments are indicated, do not add pigment exceeding 10 percent by weight of the cementitious or binder materials, except for carbon black which is limited to 2 percent.

C. Do not use admixtures in mortar unless otherwise indicated.

D. Mixes: Mix mortar materials in the following proportions:

1. Pointing Mortar by Type: ASTM C 270, Proportion Specification, Type N unless otherwise indicated; with cementitious material limited to portland cement and lime . Add mortar pigments to produce mortar colors required.

PART 3 - EXECUTION

3.1 PROTECTION

A. Remove gutters and downspouts and associated hardware adjacent to masonry and store during masonry repointing. Reinstall when repointing is complete.

1. Provide temporary rain drainage during work to direct water away from building.

3.2 REPOINTING MASONRY

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

1. All joints in areas indicated.
2. Joints indicated as sealant-filled joints. Seal joints according to Section 079200 "Joint Sealants."
3. Joints at locations of the following defects:

a. Holes and missing mortar.
b. Cracks that can be penetrated 1/4 inch or more by a knife blade 0.027 inch thick.
c. Cracks 1/8 inch or more in width and of any depth.
d. Hollow-sounding joints when tapped by metal object.
e. Eroded surfaces 1/4 inch or more deep.
f. Deterioration to point that mortar can be easily removed by hand, without tools.
g. Joints filled with substances other than mortar.
h. Joints repointed with mortar that does that match original in size, texture, and gradation.
i. Joints with mortar overrun onto masonry.

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

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

1. Remove mortar from joints to depth of joint width plus 1/8 inch, but not less than 1/2 inch or not less than that required to expose sound, unweathered mortar. Do not remove unsound mortar more than 2 inches deep; consult Architect for direction.
2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
3. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Architect.

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

E. Pointing with Mortar:

1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.
2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Fully compact each layer, and allow it to become thumbprint hard before applying next layer.

3. After deep areas have been filled to same depth as remaining joints, point joints by placing mortar in layers not greater than 3/8 inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry units have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to featheredge the mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.
5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.
6. Hairline cracking within mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

F. Where repointing work precedes cleaning of existing masonry, allow mortar to harden at least 30 days before beginning cleaning work.

3.3 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, applied by low pressure spray.

1. Do not use metal scrapers or brushes.
2. Do not use acidic or alkaline cleaners.

END OF SECTION **040120.64**

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Clay Face Brick

1.2 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

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

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For reinforcing steel. Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.

1.4 QUALITY ASSURANCE

A. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 014000 "Quality Requirements" for mockups.

1. Build sample panels for typical exterior wall in sizes approximately 60 inches long b tallest wall height by full thickness.

1.5 FIELD CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet vertically and horizontally of a walking surface.

2.2 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

B. CMUs: ASTM C 90.

2.3 BRICK

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Clay Face Brick: Facing brick complying with ASTM C 216.

1. Products: Subject to compliance with requirements, provide the following:

a. Seat Wall: Endicott Clay Products, Medium Ironspot 46 Velour Modular or comparable product by one of the following:

b.

1) Yankee Hill Brick, Medium Iron Spot, Velour, Modular

2.4 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

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

C. Masonry Cement: ASTM C 91/C 91M.

D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979/C 979M. Use only pigments with a record of satisfactory performance in masonry mortar.

E. Colored Cement Products: Packaged blend made from portland cement and hydrated lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.

F. Aggregate for Mortar: ASTM C 144.

1. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

G. Aggregate for Grout: ASTM C 404.

H. Epoxy Pointing Mortar: ASTM C 395, epoxy-resin-based material formulated for use as pointing mortar for glazed or pre-faced masonry units (and approved for such use by manufacturer of units); in color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's colors.

I. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

J. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.

2.5 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Masonry-Joint Reinforcement, General: ASTM A 951/A 951M.

1. Exterior Walls: Stainless steel.
2. Wire Size for Side Rods: 0.187-inch diameter.
3. Wire Size for Cross Rods: 0.187-inch diameter.
4. Wire Size for Veneer Ties: 0.187-inch diameter.
5. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
6. Provide in lengths of not less than 10 feet.

C. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder or truss type with single pair of side rods.

D. Masonry-Joint Reinforcement for Multiwythe Masonry:

1. Ladder type with one side rod at each face shell of hollow masonry units more than 4 inches wide, plus one side rod at each wythe of masonry 4 inches wide or less.
2. Tab type, either ladder or truss design, with one side rod at each face shell of backing wythe and with rectangular tabs sized to extend at least halfway through facing wythe, but with at least 5/8-inch cover on outside face.
3. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum horizontal play of 1/16 inch and maximum vertical adjustment of 1-1/4 inches. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face.

2.6 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.
2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.

2.7 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing complying with Section 076200 "Sheet Metal Flashing and Trim" and as follows:

1. Fabricate metal drip edges from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
2. Fabricate metal sealant stops from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
3. Fabricate metal expansion-joint strips from stainless steel to shapes indicated.

B. Solder and Sealants for Sheet Metal Flashings: As specified in Section 076200 "Sheet Metal Flashing and Trim."

C. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.8 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.9 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use portland cement-lime masonry cement mortar unless otherwise indicated.
3. For exterior masonry, use portland cement-lime masonry cement mortar.
4. For reinforced masonry, use portland cement-lime masonry cement mortar.
5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.

1. For masonry below grade or in contact with earth, use Type M or S.
2. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.

D. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C 476, paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

E. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer's written instructions.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

C. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.2 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.3 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

D. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

E. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

A. Lay CMUs as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.
2. Bed webs in mortar in all courses of piers, columns, and pilasters.
3. Bed webs in mortar in grouted masonry, including starting course on footings.
4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.5 ANCHORED MASONRY VENEERS

A. Anchor masonry veneers to concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:

1. Fasten anchors to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
2. Embed in masonry joints.
3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
4. Space anchors as indicated, but not more than 18 inches o.c. vertically and 24 inches o.c. horizontally, with not less than one anchor for each 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.
5. Space anchors as indicated, but not more than 16 inches o.c. vertically and 25 inches o.c. horizontally, with not less than one anchor for each 3.5 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.
6. Space anchors as indicated, but not more than 18 inches o.c. vertically and horizontally. Install additional anchors within 12 inches of openings and at intervals, not exceeding 24 inches, around perimeter.

3.6 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches o.c.
2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

3.7 FLASHING, WEEP HOLES, AND CAVITY VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and through inner wythe to within 1/2 inch of the interior face of wall in exposed masonry. Where interior face of wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches on interior face.
3. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
4. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.

C. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.

D. Install cavity vents in head joints in exterior wythes at spacing indicated.

1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.8 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

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

3.9 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

B. Testing Prior to Construction: One set of tests.

C. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

D. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.

E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for compressive strength.

H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.10 REPAIRING, POINTING, AND CLEANING

A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
3. Protect adjacent surfaces from contact with cleaner.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.11 MASONRY WASTE DISPOSAL

A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

1. Do not dispose of masonry waste as fill within 18 inches of finished grade.

B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION **042000**

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes hollow-metal work.

1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.3 ACTION SUBMITTALS

A. Shop Drawings: Include elevations, door edge details, frame profiles, metal thicknesses, preparations for hardware, and other details.

PART 2 - PRODUCTS

2.1 INTERIOR DOORS AND FRAMES

A. Extra-Heavy-Duty Frames: SDI A250.8, Level 3. At locations indicated in the Door and Frame Schedule.

1. Physical Performance: Level A according to SDI A250.4.
2. Frames:
    a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch.
    b. Construction: Knocked down.
3. Exposed Finish: Prime.

2.2 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.3 MATERIALS

A. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

B. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

C. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

2.4 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Doors:

1. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated.

C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
4. Jamb Anchors: Provide number and spacing of anchors as follows:

a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:

1) Two anchors per jamb up to 60 inches high.
2) Three anchors per jamb from 60 to 90 inches high.
3) Four anchors per jamb from 90 to 120 inches high.
4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

1) Three anchors per jamb up to 60 inches high.
2) Four anchors per jamb from 60 to 90 inches high.
3) Five anchors per jamb from 90 to 96 inches high.
4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.

5. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers.

    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

D. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

2.5 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: SDI A250.10.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

    a. At fire-rated openings, install frames according to NFPA 80.
    b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    c. Install frames with removable stops located on secure side of opening.
    d. Install door silencers in frames before grouting.
    e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
4. In-Place Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.

5. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

    a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

3.2 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow-metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

E. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION **081113**

SECTION 083323 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Overhead Coiling Doors, manually operated.

1.2 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Details of construction and fabrication.
4. Installation methods.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
2. Show locations of controls, locking devices, and other accessories.
3. Include diagrams for power, signal, and control wiring.

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

1.3 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in performing Work of this section with a minimum of five years experience in the fabrication and installation of security closures.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum three years and approved by manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.

C. Store materials in a dry, warm, ventilated weathertight location.

1.6 PROJECT CONDITIONS

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

1.7 COORDINATION

A. Coordinate Work with other operations and installation of adjacent finish materials to avoid damage to installed materials.

PART 2 - PRODUCTS

2.1 DOOR ASSEMBLY

A. Door: Overhead coiling metal counter doors with Integral frame.
B. Basis-of-Design Product: Subject to compliance with requirements, provide Anodized Aluminum Counter Doors with Integral Frame: Overhead Door Corporation, 656 Series or comparable product by one of the following:

1. ACME Rolling Doors.
2. Cornell Iron Works, Inc.
3. Lawrence Roll-Up Doors, Inc.
4. Overhead Door Corporation.

C. Curtain: Interlocking clear anodized aluminum slats with endlock for curtain alignment. Slats, 0.051 inch (1.3 mm) thick, and extruded aluminum bottom bar with lift handle, concealed slide bolts and vinyl astragal.

D. Integral Frame and Sill: Integral steel frame and stainless steel sill. Frame consists of 16 gauge jambs and header, with 14 gauge sill.

E. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03 inch (0.8 mm) per foot of span. Counterbalance shall be adjustable by means of an adjusting tension wheel.

F. Hood: Steel primed with intermediate support brackets as required.

G. Operation:

1. Crank operation.

H. Locking:

1. Cylinder lock.

I. Wall Mounting Condition:

1. Between jambs mounting within an existing opening.

J. Finish:

1. Frame: Field paint to match frames of adjacent Steel windows.
2. Door panel and hardware: Prefinished aluminum. Architect to select from Manufacturers full range of colors.
3. Sill: Stainless Steel.

2.2 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent over-travel of curtain.

2.3 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

1. Exterior-Mounted Doors: Fabricate hood to act as weather protection and with a perimeter sealant-joint-bead profile for applying joint sealant.

2.4 LOCKING DEVICES

A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.

1. Lock Cylinders: Cylinders standard with manufacturer and keyed to building keying system.
2. Keys: Three for each cylinder.

2.5 CURTAIN ACCESSORIES

A. Astragal: Equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.

2.6 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.7 MANUAL DOOR OPERATORS

A. General: Equip door with manual door operator by door manufacturer.

B. Crank Operator: Consisting of crank and crank gearbox, steel crank drive shaft, and gear-reduction unit, of type indicated. Size gears to require not more than 25-lbf force to turn crank. Fabricate gearbox to be oil tight and to completely enclose operating mechanism. Provide manufacturer's standard crank-locking device.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify opening sizes, tolerances and conditions are acceptable.

B. Examine conditions of substrates, supports, and other conditions under which this work is to be performed.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion. Lubricate bearings and sliding parts as recommended by manufacturer. Adjust seals to provide tight fit around entire perimeter.

3.4 ADJUSTING

1. Test for proper operation and adjust as necessary to provide proper operation without binding or distortion.

2. Adjust hardware and operating assemblies for smooth and noiseless operation.

B. CLEANING

1. Clean curtain and components using non-abrasive materials and methods recommended by manufacturer.

2. Remove labels and visible markings.

3. Touch-up, repair or replace damaged products before Substantial Completion.

C. PROTECTION

1. Protect installed products until completion of project.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION **083323**

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Provisions of the Contract and of the Contract Documents apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Commercial door hardware for the following:
    1. Swinging doors. Including aluminum doors.
    2. Other doors to the extent indicated.
2. Cylinders for doors specified in other Sections.

B. Related Sections include the following:

1. Division 8 Sections “Flush Wood Doors” and “Stile and Rail Wood Doors” for wood doors, including integral intumescent seals provided as part of fire-rated assemblies.

C. Products furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.

1. Final replacement cores and keys to be installed by Owner. Owner’s representative will coordinate keying & core installation with the lock manufacturer.

1.3 SUBMITTALS

A. Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Details of electrified door hardware, indicating the following:

1. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.

C. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware. Supplier must have an AHC prepare the shop drawings & must have three years experience in providing materials & shops on this type of work.

1. Format: Comply with scheduling sequence and vertical format in DHI's “Sequence and Format for the Hardware Schedule.”
2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.
    1. Organize door hardware sets in same order as in the Door Hardware Schedule at the end of Part 3.
3. Content: Include the following information:
    1. Type, style, function, size, label, hand, and finish of each door hardware item.
    2. Manufacturer of each item.
    3. Fastenings and other pertinent information.
    4. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    5. Explanation of abbreviations, symbols, and codes contained in schedule.

6. Mounting locations for door hardware.
7. Door and frame sizes and materials.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

D. Keying Schedule: Prepared by or under the supervision of lock manufacturer, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, indicating current products meet requirements.

F. Maintenance Data: For each type of door hardware to include in maintenance manuals specified in Division 1.

G. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed door hardware 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.

1. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Supplier Qualifications: Door hardware supplier with local warehousing facilities and who is or employs a qualified Architectural Hardware Consultant, for preparation of the hardware schedule and can Work to consult with Contractor, Architect, and Owner about door hardware and keying.

1. Scheduling Responsibility: Preparation of door hardware and keying schedules.

C. Architectural Hardware Consultant Qualifications: A person who is currently certified by the Door and Hardware Institute as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.

1. Electrified Door Hardware Consultant Qualifications: A qualified Architectural Hardware Consultant who is experienced in providing consulting services for electrified door hardware installations.

D. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

E. Regulatory Requirements: Comply with provisions of the following:

1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), ANSI A117.1, as follows:

1. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape easy to grasp with one hand and not requiring tight grasping, tight pinching, or twisting of wrist.

2. Door Closers: Comply with the following opening-force requirements:

1) Interior Hinged Doors: Maximum 5 lbf applied perpendicular to door.
2) Fire Doors: Minimum opening force per authorities having jurisdiction.

3. Thresholds: Not more than 1/2 inch high, beveled with maximum slope of 1:2.

2. NFPA 101: Comply with the following for means of egress doors:

1. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
2. Door Closers: Not more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.
3. Thresholds: Not more than 1/2 inch high.

F. Keying Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:

1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2. Requirements for key control system.
3. Address for delivery of keys.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site. Aluminum door hardware should be delivered to jobsite and inventoried by general contractor prior to being turned over to the aluminum door supplier when templates are not adequate to manufacture aluminum doors and frames.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver keys to Construction Manager at the Project site.

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies.

1.7 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

1. Exit Devices: Two years from date of Substantial Completion.
2. Manual Closers: 10 years from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

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

B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies as used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in this Section, door hardware sets indicated in door and frame schedule, and the Door Hardware Schedule at the end of Part 3.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products equivalent in function and comparable in quality to named products.

B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Schedule at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

2.2 HINGES AND PIVOTS

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. Hinges:
    1. Hager Companies (HAG).
    2. Lawrence Brothers, Inc. (LB).
    3. McKinney Products Company; Div. of ESSEX Industries, Inc. (MCK).
    4. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
2. Continuous Geared Hinges: Provide serviceable panels at electric hinges that enable access to wiring without removal of hinge.
    1. Hager Companies (HAG). (Roton)
    2. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
    3. McKinney Products Company; Div. of ESSEX Industries, Inc. (MCK).

B. Quantity: As scheduled.

C. Size: Provide sizes scheduled.

D. Hinge Base Metal: Unless otherwise indicated, provide the following:

1. Exterior Hinges: Brass, with stainless-steel pin body and brass protruding heads.
2. Interior Hinges: Steel, with steel pin.
3. Hinges for Fire-Rated Assemblies: Steel, with steel pin.

E. Hinge Options: Comply with the following where indicated in the Door Hardware Schedule or on Drawings:

1. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the following applications:
    1. Out-swinging exterior doors.
2. Corners: Square.

F. Continuous-Geared Hinges: Overall width of 4 inches; fabricated to full height of door and frame. Fabricate hinges to template screw locations.

G. Fasteners: Comply with the following:

1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
2. Wood Screws: For wood doors and frames.
3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
4. Screws: Phillips flat-head screws; Finish screw heads to match surface of hinges.

2.3 LOCKS AND LATCHES

A. Manufacturers:

1. *Best Locks 93K16C

B. Cylindrical Locks: Stamped steel case with steel or brass parts; BHMA Grade 1, unless Grade 2 is indicated; Series 4000.

C. Auxiliary Locks: BHMA Grade 1, unless Grade 2 is indicated.

D. Certified Products: Provide door hardware listed in the following BHMA directories:

1. Mechanical Locks and Latches: BHMA's “Directory of Certified Locks & Latches.”

E. Lock Trim: Comply with the following:

1. Lever: Cast
2. Escutcheon (Rose): Cast
3. Lockset Designs: Provide the lockset design designated in schedule or, if sets are provided by another manufacturer, provide designs that match those designated.

F. Lock Functions: Function numbers and descriptions indicated in the Door Hardware Schedule comply with the following:

1. Mortise Locks: BHMA A156.13.

G. Lock Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:

1. Mortise Locks: Minimum 3/4-inch latchbolt throw.

H. Backset: 2-3/4 inches, unless otherwise indicated.

2.4 EXIT DEVICES

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

1. *Precision Hardware, Inc. (PH).
2. Von Duprin; an Ingersoll-Rand Company (VD).

B. Certified Products: Exit devices listed in BHMA's “Directory of Certified Exit Devices.”

C. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

D. Fire Exit Devices: Complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.

E. Outside Trim: Lever with cylinder material and finish to match locksets.

1. Match design for locksets and latchsets, unless otherwise indicated.

2.5 KEYING SYSTEM

A. Standard Lock Cylinders: BHMA A156.5**,** Grade 1.

B. Cylinders: Manufacturer's standard tumbler type with removable cores, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:

1. Number of Pins: Seven.
2. Mortise Type: Threaded cylinders with rings and cam as required.
3. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.

C. Construction Keying: Comply with the following:

1. Construction Master Keys: Provide 8 construction cores. Provide 5 construction master keys.

D. Manufacturer: Best Locks – No substitutions. Key to patented key system.

2.6 KEY REQUIREMENTS

A. Upon receipt of approved Hardware Schedule, arrange an interview with the contractor and owner's representative to obtain and determine necessary keying information.

1. Metals: Construct lock cylinder parts from brass, bronze, stainless steel or nickel silver.
2. Cores shall be the Best and identified on the core face.
3. All locksets, exit devices, and padlocks shall accept same.
4. Exterior Doors shall be furnished with a construction core master keying system for interim use during construction.

B. Stamp each key with change number and stamp set symbol; and stamp each master key with set symbol, as applicable.

1. Provide change keys in individual envelopes for each cylinder delivered.
2. Envelopes shall be marked with respective door identification numbers.
3. The inscription "Do Not Duplicate" shall be stamped on all change keys.

C. Keys shall be supplied in the following quantities; confirm with Construction Manager.

1. Construction Keys: Five (5)
2. Grandmaster Keys: Three (3)
3. Masterkeys (each Masterkey set): Five (5)
4. Change Keys per Lock: Three (3)

D. Deliver master keys and key blanks to Construction Manager at the Project site.

2.7 KEY CONTROL SYSTEM – Not required on this project

A. Key Control Cabinet: BHMA A156.5, Grade 1; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.

1. Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock. Locate cabinet per owner's instructions.

B. Cross-Index System: Single-index system for recording key information. Include three receipt forms for each key-holding hook.

1. Available Manufacturers:
    1. Key Control Systems, Inc. (KCS).

2. *Lund Equipment Co., Inc. (LUN).
3. MMF Industries (MMF).
4. Sunroc Corporation (SUN).

2.

2.8 ACCESSORIES FOR PAIRS OF DOORS

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. Removable Mullions:
   1. *Precision Hardware, Inc. (PH).
   2. Von Duprin; an Ingersoll-Rand Company (VD).

2.9 CLOSERS

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

1. Surface-Mounted Closers:
   1. LCN Closers; an Ingersoll-Rand Company (LCN). 4040/4041
   2. *Stanley D4550

B. Surface Closers: BHMA Grade 1

C. Certified Products: Provide door closers listed in BHMA's “Directory of Certified Door Closers.”

D. Size of Units: Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

E. Units to be warranted against defect in material and workmanship for a period of one year from the date of the Installation.

2.10 PROTECTIVE TRIM UNITS

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. Metal Protective Trim Units:
   1. Hager Companies (HAG).
   2. Ives: H. B. Ives (IVS).
   3. *Rockwood Manufacturing Company (RM).

B. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine or self-tapping screws.

C. Furnish protection plates sized 2 inches less than door width on push side and 1 inch less than door width on pull side, by height specified in Door Hardware Schedule.

2.11 STOPS AND HOLDERS

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. Door Controls International (DCI).
2. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
3. Hager Companies (HAG).

4. Ives: H. B. Ives (IVS).
5. *Rockwood Manufacturing Company (RM).

B. Stops and Bumpers: BHMA Grade 1.

C. Combination Overhead Stops and Holders: BHMA Grade 1, unless Grade 2 is indicated.

D. Electromagnetic Door Holders: *Specified in Division 26.

E. Floor Stops: For doors, unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic.

1. Where floor or wall stops are not appropriate, provide overhead holders.

2.12 DOOR GASKETING

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

1. Door Gasketing:
    1. *National Guard Products, Inc. (NGP).
    2. Pemko Manufacturing Co., Inc. (PEM).
    3. Reese Enterprises, Inc. (RE).
    4. Zero International, Inc. (ZRO).
2. Door Bottoms:
    1. *National Guard Products, Inc. (NGP).
    2. Pemko Manufacturing Co., Inc. (PEM).
    3. Reese Enterprises, Inc. (RE).
    4. Zero International, Inc. (ZRO).

B. General: Provide continuous weather-strip gasketing on exterior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
3. Door Bottoms: Apply to door bottom, forming seal with threshold when door is closed.

2.13 THRESHOLDS

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. *National Guard Products, Inc. (NGP).
2. Pemko Manufacturing Co., Inc. (PEM).
3. Reese Enterprises, Inc. (RE).
4. Zero International, Inc. (ZRO).

2.14 MISCELLANEOUS DOOR HARDWARE

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. Hager Companies (HAG).
2. Ives: H. B. Ives (IVS).
3. *Rockwood Manufacturing Company (RM).

B. Boxed Power Supplies: Modular unit in NEMA ICS 6, Type 4 enclosure; filtered and regulated; voltage rating and type matching requirements of door hardware served; and listed and labeled for use with fire alarm systems, where applicable.

C. Auxiliary Hardware: BHMA Grade 1, unless otherwise indicated.

2.15 FABRICATION

A. Manufacturer's Nameplate: Do not provide manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise approved by Architect.

1. Manufacturer's identification will be permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18 for finishes. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.

C. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Steel Machine or Wood Screws: For the following fire-rated applications:
    1. Mortise hinges to doors.
    2. Strike plates to frames.
    3. Closers to doors and frames.
3. Steel Through Bolts: For the following fire-rated applications, unless door blocking is provided:
    1. Surface hinges to doors.
    2. Closers to doors and frames.
    3. Surface-mounted exit devices.
4. Spacers or Sex Bolts: For through bolting of hollow metal doors.
5. Fasteners for Wood Doors: Comply with requirements of DHI WDHS.2, “Recommended Fasteners for Wood Doors.”

2.16 FINISHES

A. Standard: Comply with BHMA A156.18.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if within the range of approved Samples and assembled or installed to minimize contrast.

D. BHMA Designations: Comply with base material and finish requirements indicated by the following:

1. 613: Oil rubbed bronze over brass base.
2. US10B: Oil rubbed plated over steel.
3. BHMA 626: Satin chrome over brass base.
4. 652: Satin chrome over steel.

5. 630: Satin stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

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

3.2 PREPARATION

A. Steel Doors and Frames: Comply with DHI A115 series.

1. Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107.

B. Wood Doors: Comply with DHI A115-W series.

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Door Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. DHI WDHS.3, Locations for Wood Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect.

1. Configuration: Provide the least number of power supplies required to adequately serve doors with electrified door hardware.

D. Thresholds: Set thresholds for exterior doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

3.4 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
2. Door Closers: Adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

B. Six-Month Adjustment: Approximately six months after date of Substantial Completion, Installer shall perform the following:

1. Examine and readjust each item of door hardware as necessary to ensure function of doors, and door hardware, and electrified door hardware.
2. Consult with and instruct Owner's personnel on recommended maintenance procedures.
3. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

SET 1

3	EACH	HINGE	CB168 4.5” X 4.5” US26D
1	EACH	PRIVACY	9K3OL16K 626 S3
1	EACH	DOOR CLOSER	D4551 689
1	EACH	KICK PLATE	K1050 8” X 2” LDW 630
1	EACH	MOP PLATE	K1050 4” X 1” LDW 630
1	EACH	WALL STOP	403 626
3	EACH	SILENCER	SR64

DOOR: 104

SET 2

3	EACH	HINGE	T4B A3386 4 1/2 X 4 1/2 630 NRP
1	EACH	LOCKSET	9K-3-7-IN-16-K-STK-613
1	EACH	DOOR CLOSER	CPS7500 X 689
1	EACH	KICK PLATE	K1050 8” X 2” LDW 630
1	EACH	THRESHOLD	171A
1	EACH	DOOR BOTTOM	345ANB
1	EACH	WEATHERSTRIP	305CR
1	EACH	DRIP CAP	346C

DOOR 106A, 106B

SET 3

3	EACH	HINGE	CB168 4.5” X 4.5” US26D
1	EACH	LOCKSET	9K37D16K 626 S3 PAT
1	EACH	DOOR CLOSER	D4551 689
1	EACH	ARMOR PLATE	K1050 16” X 2” LDW 630
1	EACH	WALL STOP	403 626
3	EACH	SILENCER	SR64

DOOR: 105, 107

SET 4

3	EACH	HINGE	CB168 4.5” X 4.5” US26D
1	EACH	PUSH PLATE	70C 4” X 16” 630
1	EACH	PULL PLATE	110 X 70C 630
1	EACH	DOOR CLOSER	D4551 689
1	EACH	KICK PLATE	K1050 8” X 2” LDW 630
1	EACH	MOP PLATE	K1050 4” X 1” LDW 630
1	EACH	WALL STOP	403 626
3	EACH	SILENCER	SR64

DOORS: 102, 103

SET 5

6	EACH	HINGE	T4B A3386 4 1/2 X 4 1/2 630 NRP
1	EACH	LOCKSET	9K-3-7-IN-16-K-STK-613
1	EACH	LOCKSET	9K-3--1DT-16-K-STK-613
2	EACH	KICK PLATE	K1050 8” X 2” LDW 630
2	EACH	THRESHOLD	171A
2	EACH	DOOR BOTTOM	345ANB
2	EACH	WEATHERSTRIP	305CR
2	EACH	DRIP CAP	346C

DOOR 101, 201

SET 12 – MISC

1	EACH	KEY LOCKSETS TO A PATENTED KEY SYSTEM
1	EACH	EXTRA KEY PER LOCKSET (3 KEYS/LOCK)
2	EACH	CONTROL KEYS
5	EACH	MASTER KEYS
8	EACH	CONSTRUCTION CORES – SUPPLIER’S PROPERY
1	EACH	CONSTRUCTION CONTROL KEY – SUPPLIER’S PROPERTY
5	EACH	CONSTRUCTION MASTER KEYS – SUPPLIER’S PROPERTY

END OF SECTION 087100

SECTION 089119 - FIXED LOUVERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes fixed, louvers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

C. Samples: For each type of metal finish required.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on tests performed according to AMCA 500-L.

PART 2 - PRODUCTS

2.1 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal, Nondrainable-Blade Louver :

1. Louver Depth: 4 inches.
2. Blade Profile: Plain blade without center baffle.
3. Frame and Blade Nominal Thickness: Not less than 0.060 inch for blades and 0.080 inch for frames.
4. Louver Performance Ratings:

a. Free Area: Not less than 7.5 sq. ft. for 48-inch- wide by 48-inch- high louver.

2.2 LOUVER SCREENS

A. General: Provide screen at each exterior louver.

1. Screen Location for Fixed Louvers: Interior face.
2. Screening Type: Insect screening.

B. Louver Screen Frames: Same type and form of metal as indicated for louver to which screens are attached.

C. Louver Screening for Aluminum Louvers:

1. Bird Screening: Aluminum, .011" square mesh, 0.019-inchwire.

2.3 MATERIALS

A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.

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. Fasteners: Use types and sizes to suit unit installation conditions.

1. Use Phillips flat-head screws for exposed fasteners unless otherwise indicated.
2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
3. For color-finished louvers, use fasteners with heads that match color of louvers.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FABRICATION

A. 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.

B. Join frame members to each other and to fixed louver blades with fillet welds , threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.5 ALUMINUM FINISHES

A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

D. Protect unpainted galvanized and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

3.2 ADJUSTING

A. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

END OF SECTION **089119**

SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Glazed wall tile.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples:

1. Each type and composition of tile and for each color and finish required.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required.
3. Stone thresholds.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.4 MAINTENANCE MATERIAL SUBMITTALS

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

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide Standard-grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

2.2 TILE PRODUCTS

A. Ceramic Tile Type **CT-1**: Glazed wall tile.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. American Marazzi Tile, Inc.
    b. American Olean; a division of Dal-Tile Corporation.
    c. Daltile.
    d. Grupo Porcelanite.
    e. Jeffrey Court Inc.
    f. Seneca Tiles, Inc.

2. Alllowance: GC to provide an allowance of $5/sf, not including installation. Architect to select from industries full range of Glazed wall tile that fits within allowance.
3. Face Size Variation: Rectified.
4. Thickness: 5/16 inch .
5. Face: Selected by Architect.
6. Finish: glaze.
7. Tile Color and Pattern: Selected by Architect.
8. Mounting: Factory, back mounted.
9. Mounting: Pregrouted sheets of tiles are factory assembled and grouted with manufacturer's standard white silicone rubber.
10. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

    a. Base: To match wall tile module size, color to be selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

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

3.2 PREPARATION

A. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

B. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

C. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

D. Where accent tile differs in thickness from field tile, vary setting bed thickness so that tiles are flush.

E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Glazed Wall Tile: 1/16 inch .

G. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

I. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

END OF SECTION 093013

SECTION 096723 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes resinous flooring systems.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each type of exposed finish required.

1.4 INFORMATIONAL SUBMITTALS

A. Material certificates.

B. Material test reports.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.

C. Close spaces to traffic during resinous flooring application and for 24 hours after application unless manufacturer recommends a longer period.

PART 2 - PRODUCTS

2.1 PERORMANCE REQUIREMENTS

A. Flammability: Self-extinguishing according to ASTM D 635.

2.2 RESINOUS FLOORING

A. Resinous Flooring System: Abrasion-, impact-, and chemical-resistant, aggregate-filled, and resin-based monolithic floor surfacing designed to produce a seamless floor and integral cove base.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Dur-a-flex: "Dur-a-quartz floor system" or comparable product by one of the following:

    a. BASF Construction Chemicals, Inc.; BASF Building Systems.
    b. Dur-A-Flex, Inc.
    c. International Coatings Inc.
    d. Sherwin Williams

B. System Characteristics:

1. Color and Pattern: As selected by Architect from manufacturer's full range.
2. Wearing Surface: Manufacturer's standard wearing surface.
3. Overall System Thickness: 1/8 inch .

C. Primer: Type recommended by resinous flooring manufacturer for substrate and resinous flooring system indicated.

D. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:

1. Compressive Strength: 12,500 psi minimum according to ASTM C 579.
2. Tensile Strength: 2,600 psi minimum according to ASTM C 307.
3. Water Absorption:0.04 percent maximum according to ASTM D- 570.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

1. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

3.2 APPLICATION

A. Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.

1. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.

B. Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions. Round internal and external corners.

1. Integral Cove Base: 4 inches high.

D. Troweled or Screeded Body Coats: Apply troweled or screeded body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended by manufacturer.

E. Protect resinous flooring from damage and wear during the remainder of construction period.

END OF SECTION **096723**

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Automatic hand dryers.
2. Soap dispensers
3. Sanitary Napkin disposal units.
4. Toilet tissue dispensers
5. Mirrors.
6. Grab bars
7. Waste Receptacles

1.2 ACTION SUBMITTALS

A. Product Data: Submit manufacturer's data sheets for each product specified, including the following:

1. Installation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Cleaning and maintenance instructions.
4. Replacement parts information.

B. Schedule: Submit a toilet accessory schedule, indicating the type and quantity to beinstalled in each washroom. Use room numbers as indicated on the Drawings.

C. Samples: Full size, for each exposed product and for each finish specified.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.4 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

B. Manufacturer's Warranty for Washroom Accessories: Manufacturer's standard 1 year warranty for materials and workmanship.

C. Manufacturer's Warranty for Electric Hand Dryers: Manufacturer's standard 10 yearwarranty on parts, except 3 year warranty on motor brushes from date of purchase.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

A. Basis of Design: Bobrick Washroom Equipment, Inc., www.bobrick.com. Subject to compliance with requirements, provide products indicated below or comparable product by one of the following:
   1. Surface-Mounted ADA QuietDry Series Dryers-7128:
      a. Basis of Design: Bobrick TrimDry Model B-7128 115V.
         1) Cover: 22-gauge galvanized steel with exposed surface, Type 304 stainless steel with vertical grain No. 4 satin finish
         2) Compliance:
            a) Dryer cover projects 4 inches (100mm) from wall to comply with universal/accessibility design, including ADA-ABA and ICC/ANSI.
            b) Comply with EU Directive ‘‘Restrictions of Hazardous Substances (RoHS) requirements.’’
         3) Trim: UL 94-5VA black plastic trim.
         4) Air Inlet/Outlet: Vandal-resistant grilles.
         5) Air Outlets: Dual air outlets that provide a swirling circulation of airflow.
         6) Motor: 1/7 hp; universal type on resilient mounting with sealed ball bearing at drive-shaft end; self-lubricating sleeve bearing at nondrive end; equipped with automatic thermal-overload switch.
         7) Heating Elements: Located on outlet side of fan, heats air without hot spots, is inaccessible to vandals, and is protected by an automatic thermal-overload switch.
         8) Automatic Function: Infrared sensor.
            a) Turns off automatically if an inanimate object is placed over sensor.
            b) After inanimate object is removed, electronic sensor resets itself and dryerautomatically resumes normal operation.

B. Surface-Mounted Soap Dispensers:
   1. Basis of Design: Bobrick ConturaSeries Model B-4112.
   2. Container: Drawn, one-piece, seamless, 20 gauge (0.9mm), stainless steel with satin finish. Front of unit shall have same degree of arc, radius on corners and edges as other Bobrick ConturaSeries washroom accessories.
   3. Valve: Black molded plastic push button and spout, antibacterial-soap-resistant plastic cylinder; soap head-holding mushroom valve, stainless steel spring, U-packing seal and duckbills. Valve dispenses commercially marketed all-purpose hand soaps.
   4. Compliance: Valve operates with one hand, without tight grasping, pinching or twisting of the wrist and with less than 5 pounds of force (22.2 N) to comply with barrier-free accessibility guidelines, including ADA-ABA and ICC/ANSI.
   5. Filling: Locked, hinged filler top opens with key provided.
   6. Refill Indication: Window indicates when refill is required.
   7. Back Plate: 22 gauge (0.8mm) stainless steel with 20 gauge (1.0mm) stainless steel mounting bracket attached.

8. Epoxy Sealed Components: Container body and back plate.
9. Wall Plate: Concealed, 20 gauge (1.0mm).
10. Capacity: 40 fl oz (1.2 L).

C. Surface-Mounted Sanitary Napkin Disposal Units:
1. Basis of Design: Bobrick ConturaSeries Model B-270.
2. Container: All-welded, 18-8, Type 304, 22 gauge (0.8mm) stainless steel with satin finish on exposed surfaces. Front of container shall have same degree of arc, radius on corners and edges as other Bobrick ConturaSeries washroom accessories.
3. over: Drawn, one-piece, seamless, 18-8, Type 304, 22 gauge (0.8mm) stainless steel with satin nish. construction. Front of cover has same degree of arc, radius on corners and edges as other Bobrick ConturaSeries washroom accessories.
4. Hinge: Full-length stainless steel piano-hinge.

D. Surface-Mounted Toilet Tissue Dispensers for Two Rolls With Controlled Delivery:
1. Basis of Design: Bobrick ClassicSeries Model B-265.
2. Materials: Heavy gauge chrome-plated steel with bright polished finish.
3. Mounting Bracket: 18 gauge (1.2mm). Equipped with a vandal-resistant self-locking mechanism and two heavy-duty brake springs.
4. Toilet Tissue Dispensing: Controlled delivery. Toilet tissue rolls will not spin freely. Accommodates two standard toilet tissue rolls up to 4-1/2 inch (115mm) in diameter. Roll cannot be removed from holder until empty.

E. Stainless Steel Channel Frame Mirrors:
1. Basis of Design: Bobrick Model B-165 1836.

a. Overall Size: 18 inches (457mm) W x 36 inches (914mm) H.
2. Channel Frame: One-piece, Type 430 stainless steel channel-frame, 1/2 inch x 1/2 inch x 3/8 inch (13 mm x 13 mm x 9.5 mm), with 90 degree mitered corners; bright polished finish on exposed surfaces.
3. Mirror: No. 1 quality, 1/4 inch (6 mm) float glass, guaranteed for 15 years against silver spoilage.

a. Corners: Protected by friction-absorbing filler strips.
b. Back of Mirror: Protected by full-size, shock absorbing, water-resistant, nonabrasive, 3/16 inch (5 mm) thick polyethylene padding.
4. Mounting: Removable; galvanized steel back with integral horizontal hanging brackets located at top and bottom for mounting on concealed rectangular wall hanger; locking devices secure mirror to concealed wall hanger.
5. Wall Hanger: Concealed, 20 gauge (0.9 mm) galvanized steel; incorporates lower support member to engage lower backplate louvers to keep bottom of mirror against wall.

F. Floor-Standing Open-Top Waste Receptacles:
1. Basis of Design: Bobrick Model B-2300.
2. Receptacle: Not suitable for outside use, 24 gauge (0.6mm) stainless steel with satin finish on exposed surfaces with solid bottom; heavy-duty form fitted vinyl full wrap trim and double external bead. Top edge has 360 degrees wire reinforced inner curl.
3. Dome-Lid: ExLCOAT textured black powder coated fingerprint-proof, 22 gauge (0.8mm) steel, 15 inches (381mm) diameter, with 6 inch (150mm) diameter opening.
4. Waste Container: Removable, galvanized steel with grommet lift holes.
5. Capacity: 18 gallons (68.1 L).

G. GRAB BARS
1. Stainless Steel Grab Bars: With snap flange covers:

a. Satin Finish:

1) Basis of Design: Bobrick Model B-5806X18.

a) Length: 18 inches (457 mm).

2) Basis of Design: Bobrick Model B-5806X36.

a) Length: 36 inches (914 mm).

3) Basis of Design: Bobrick Model B-5806 x 42.

a) Length: 42 inches (1067 mm).

b. Compliance: Barrier-free accessibility guidelines (including ADAAG) for structural strength.

1) Capacity: Designed to support 900 lbs (408 kg) in compliant installations.

c. Description: Clearance between grab bar and finished wall is 1-1/2 inches (38mm).
d. Grab Bar Materials: 18-8, Type 304, stainless steel tubing with satin finish.
e. Grab Bar Construction: 18 gauge (1.2 mm), ends heliarc welded to flanges.
f. Outside Diameter: 1-1/4 inch (32 mm).
g. Mounting Flanges: Concealed, 18-8 S, Type 304, 1/8 inch (3 mm) thick, stainless steel plate.

1) End Flanges: 2 inches x 3-1/8 inches (50 mm x 80 mm) with two holes for attachment to wall.
2) Intermediate Flanges: 2-5/8 inches x 3-1/8 inches (65 mm x 80 mm) widex 3-1/8 inch (80 mm) diameter.

h. Snap Flange Covers: 18-8 S, Type 304, 22 gauge (0.8 mm) drawn stainless steel with satin finish, 3-1/4 inch (85 mm) diameter x 5/8 inches (16 mm) deep; snap over mounting flange to conceal mounting screws.

2.3 FABRICATION

A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in strict compliance with manufacturer’s written instructions and recommendations, including the following:

1. Verify blocking has been installed properly.

2. Verify location does not interfere with door swings or use of fixtures.

3. Comply with manufacturer’s recommendations for backing and proper support.

4. Use fasteners and anchors suitable for substrate and project conditions

5. Install units rigid, straight, plumb, and level, firmly anchored in accordance with manufacturer's installation instructions and in locations and at heights per approved shop drawings.

6. Conceal evidence of drilling, cutting, and fitting to room finish.

7. Test for proper operation.

3.2 CLEANING AND PROTECTION

A. Clean exposed surfaces of compartments, hardware, and fittings.

B. Touch-up, repair or replace damaged products until Substantial Completion.

END OF SECTION **102800**

SECTION 129310

GRANITE SITE FURNISHINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Granite wall cap
2. Granite pylons
3. Granite fountain

B. Related Sections:

1. Division 03 Section "Cast-in-Place Concrete" for installation of anchor bolts cast in concrete.

1.2 REFERENCES

A. ASTM C 119-04: Terminology Relating to Dimension Stone

B. ASTM C 170-90 (1999): Test Method for Compressive Strength of Dimension Stone

C. ASTM C 615-03: Specification for Granite Dimension Stone

D. ASTM C 880-98: Test Method for Flexural Strength of Dimensional Stone

1.3 DEFINITIONS

A. Definitions contained in ASTM C 119 apply to this Section.

1.4 SUBMITTALS

A. Product Data: For each stone type and each manufactured product shown on Drawings or specified.

1. For each stone variety used on Project, include physical property data.

B. Shop Drawings: Show fabrication and installation details for stone:

1. Include dimensions and profiles of stone units.

C. Samples: Submit samples for each stone type required, exhibiting the full range of color characteristics expected.

1. Submit a minimum of 2 each, 12 inches x 12 inches in size, in each color and finish specified.
2. In the case of more variegated stones, color photos shall be submitted in addition to the number of samples to show the full range of color and markings to be expected.
3. Mortar Samples: Full range of exposed color and texture.
4. Sealant Samples: For each type and color of joint sealant required.

D. Preliminary Test Reports: Submit test reports for proposed stones prior to final stone selection. Preliminary test reports shall be indicative of the stone to be proposed for the project.

1. Testing of production stone is required in addition to preliminary test reports.

E. Certification: Submit a letter of certification from the stone fabricator, stating the material being furnished is the specified material and there are sufficient reserves available to supply the project and furnish replacements if needed.

F. Material Test Reports: From a qualified independent testing agency, provide reports for each stone type.

G. Cold-Weather Procedures: Detailed description of methods, materials, and equipment.

1.5 QUALITY ASSURANCE

A. Source Limitations for Stone: Obtain each stone variety from a single quarry.

B. Installer Qualifications: Engage experienced installer that has completed stone installation similar in material, design, and extent to that indicated for the project.

C. Fabricator Qualifications: Engage experienced fabricator that has completed stone fabrication similar in material, design, and extent to that indicated for the project.

D. Preconstruction Stone Testing: Engage an independent testing agency to perform the following testing for each stone variety:

1. Furnish test specimens that are representative of materials.
2. Physical Property Tests: ASTM standards specified for stone type.
3. Flexural Strength Tests: ASTM C 880

E. Visual Mockup: Provide full sized mock-up of the approved stone or stones in the approved finishes, erected at a site agreed to by the Architect, Contractor, and the Fabricator. The approved mock-up shall become the standard for the project.

1. Build mockup of the following:
   a. Granite wall caps: one full size cap.
   b. Pylon: 1’ x 1’ section of corner to show example of carving and joinery.
2. Color consistency: demonstrate color consistency with mockup; color range shall not exceed range of color established by samples.
3. Included typical components and anchors.
4. Include sealant joints installed as required by Division 07 Section "Joint Sealants."
5. Mockup may become part of the completed Work if approved at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 STONE SOURCE

A. Varieties and Source: Subject to compliance with requirements, provide stone from the following source:

1. Granite Source: Coldspring

B. Each color of stone shall come from a single quarry, with sufficient reserves to satisfy the requirements of the project. The granite supplier shall have the capabilities to cut and finish the stone without delaying the project.

C. Stone Source Examination: Make quarried blocks available for examination by Architect.

2.2 STONE MATERIAL

A. Granite: ASTM C 615.

B. Cut stone from one block or contiguous, matched blocks in which natural markings occur.

2.3 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II, except Type III may be used for cold-weather construction.

B. Hydrated Lime: ASTM C 207.

C. Portland Cement-Lime Mix: ASTM C 150, Type I or Type III, and ASTM C 207.

D. Aggregate: ASTM C 144.

E. Mortar Pigments: Natural and synthetic iron oxides. Use only pigments with a record of satisfactory performance in mortar and containing no carbon black.

F. Water: Potable.

G. Nonshrink, Nonmetallic Grout: ASTM C 1107; recommended in writing by manufacturer, for exterior applications.

2.4 ANCHORS AND FASTENERS

A. Anchor Material: Stainless steel, ASTM A 666, Type 304

B. Dowels and Pins Material: Stainless steel, ASTM A 276, Type 304

2.5 STONE BENCHES

A. Granite Benches:

1. Stone Variety: Academy Black by Coldspring.
2. Finish:
   a. Thermal
3. Bench Tops:
   a. Nominal Thickness: 2 inches (50 mm).
   b. Edge: Straight, slightly eased at corners.
   c. Corner Detail: Square, slightly eased
   d. Bottom Surface Finish: Smooth.

2.6 PLANTERS

A. Granite Fountain:

1. Stone Variety: Academy Black by Coldspring.
2. Finish:
   a. Thermal

3. Thickness: Not less than the following:

B. Fountain Size and Shape: Shown on Drawings.

2.7 PYLONS

A. Granite Pylons:

1. Stone Variety: Academy Black by Coldspring.
2. Finish:
   a. Thermal

2.8 STONE FABRICATION

A. Fabricate stone per requirements, as shown on Drawings, and as follows:

1. Granite Fabrication: Comply with NBGQA's "Specifications for Architectural Granite."

B. Arrises: Remove the sharp edge from arrises to slightly blunt edge and to reduce chipping of the finished edge.

C. Fabricate stone to maintain minimum clearance of 1 inch between backs of stone units and surfaces behind stone.

D. Dress joints straight and at 90 degree angle to face. Shape beds to fit supports.

E. Anchor Provision: Cut and drill sink provisions and holes in stone for anchors, fasteners, supports, and lifting devices as indicated or needed to set stone in place.

1. Allow room for expansion of the anchoring devices where necessary.

F. Finish exposed faces and edges of stone, except sawed reveals, to comply with requirements indicated for finish and to match final samples and mockups.

G. Joint Width: Cut stone to produce uniform joints 3/8 inch.

H. Provide reveals, reglets, openings, and similar features as required to accommodate adjacent work.

A. Fabricate molded work, including washes and drips, to produce uniform stone shapes, with precisely formed arrises slightly eased, and matching profile at joints between units.

I. Inspect finished stone units at fabrication plant. Replace defective units.

J. Stone Fabrication Tolerances:

1. Stone thickness 2 inches or less: Plus or minus 1/16 inch of the nominal thickness shown.
2. Stone thicknesses greater than 2 inches: Plus or minus 1/8 inch of the nominal thickness.
3. Overall face size: Plus or minus 1/16 inch in both height and width
4. Out of square: Plus or minus 1/16 inch difference of diagonals.

2.9 INSCRIPTIONS AND DECORATIVE SURFACES

A. Carve and cut inscriptions according to Shop Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions for compliance with requirements for correct and level finished grade, mounting surfaces and other conditions affecting performance.

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

3.2 INSTALLATION, GENERAL

A. Comply with manufacturer's written installation instructions. Complete field assembly of site furnishings where required.

B. Install site furnishings level, plumb, true, and located at locations shown on Drawings.

3.3 CLEANING

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

END OF SECTION 129310

SECTION 312000 - EARTHWORK

PART 1 - GENERAL

1.1 WORK INCLUDED

A. General site excavation, filling, and backfilling.

B. Excavation and backfilling for site structures, and roadways.

C. Excavation and backfilling for utilities.

D. Finish grading.

1.2 RELATED SECTIONS

A. Division 31 Section “Erosion and Sediment Control”

B. Division 31 Section “Water Distribution”

C. Division 22 Section “Sanitary Sewerage“

D. Division 33 Section “Storm Drainage”

E. Division 32 Section “Lawns and Grass”

1.3 REGULATIONS

A. Comply with all codes, laws, ordinances and regulations of governmental authorities having jurisdiction over this part of the work.

B. Work within existing or proposed Virginia State Rights-of-Way shall meet all requirements of the Virginia Department of Transportation.

C. Work within City of Richmond right-of-way and sidewalks adjacent to the City right-of-way shall comply with all requirements of the City of Richmond..

1.4 SUBMITTALS

The Contractor shall submit to the Engineer for approval the following proposed materials to be used on the project:

A. Engineered Fill Materials

B. Granular Material (Bedding)

C. Aggregate Backfill Material

D. Geotechnical Fabric

E. One pound sample of any topsoil provided from off-site sources.

1.5 REFERENCES

A. Virginia Department of Transportation (VDOT) Road and Bridge Specifications, latest edition.

B. American Society of Testing Methods (ASTM)

1.6 EXAMINATION OF SITE AND RECORDS

A. The Contractor shall examine the site, the Drawings, and records of existing subsurface soil conditions for the project available through the Engineer to determine the conditions under which the work will be performed. The Contractor shall formulate his own conclusions as to the subsurface conditions and shall remove all materials to the design subgrades indicated or hereinafter specified.

B. Subsurface soil investigation data, including records of test borings are made available for information only and are not guaranteed to represent all subsurface conditions that will be encountered. Additional test borings or other exploratory operations may be made by the Contractor at no cost to the Owner.

1.7 PROTECTION OF UTILITIES

A. The location of existing utilities, including underground utilities, is indicated on the drawings insofar as their existence and location were known at the time of preparation of the drawings. However, nothing in these Contract Documents shall be construed as a guarantee that such utilities are in the location indicated or that they actually exist, or that other utilities are not within the area of operations. The Contractor shall make all necessary investigations to determine the existence and locations of such utilities.

B. The Contractor shall contact “Miss Utility” (1-800-552-7001) at least three (3) working days in advance of planned work.

C. Report any uncharted or incorrectly charted lines to the Engineer for further direction.

D. Protect all existing service lines and related structures encountered in the excavation work. Where such lines and structures have been undermined due to the excavation work, provide suitable supports. If damaged, repair such lines or structures or arrange for their repair with the proper authorities of companies. The Contractor shall pay for any damage to and for maintenance and protection of existing utilities and structures.

1.8 PROTECTION OF TREES

A. Protect all trees which are indicated on the Drawings to remain or to be relocated..

B. Excavating or extensive grading shall not be performed under such trees within the spread of the branches. If excavation under such trees is necessary, and is approved, roots which are over 1 inch in diameter shall not be cut. Where branches of such trees are removed to facilitate construction, or the trees are inadvertently damaged, all damage to such trees shall be repaired by persons skilled in the care of trees.

C. During the installation of irrigation tree roots smaller than 1” may be excavated and cut as needed for routing of lines. However, all irrigation lines must be marked or flagged in the field for approval by the Landscape Architect prior to any excavation, trenching, or root cutting within the driplines of existing trees.

1.9 PRECAUTIONS

A. The Contractor shall take every precaution to guard against any movement or settlement of existing or new construction, utilities, paving, walks, light standards, piping, conduit, etc., and shall provide at his own expense, all sheet piling, bracing or shoring necessary in connection therewith. The Contractor shall be entirely responsible for the design, and adequacy of any sheet piling, bracing and shoring required.

1.10 SHEETING AND SHORING

A. Sheeting and shoring shall be furnished in accordance with the provisions of VOSHA and as necessary to construct and protect the excavation, existing utilities, structures of all types, and as necessary for the safety of the employees.

B. Sheeting shall not be removed except when such removal will not result in damage to the work or the adjacent property. Sheeting left in place shall be cut off 18 inches below the existing ground surface, and shall be dimensionally located on the set of contract drawings provided by the Contractor showing "Drawing of Record."

1.11 PROTECTION OF UTILITIES IN FILL AREAS

A. New underground utilities shall not be laid in areas of fill prior to the actual performance of the grading operation, unless the depth of the cover over such utilities below existing ground surface is at least 14 inches for steel or ductile iron pipe and 30 inches for pipes of other materials. Such depth of cover requirements may be reduced provided the pipe is protected by concrete encasement or other manner satisfactory to the Engineer.

PART 2 - PRODUCTS

2.1 TOPSOIL

A. On-site surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of weeds, roots, and other deleterious materials.

B. Off-site surface-soil layer containing organic matter and sand, silt, and clay particles meeting gradation requirements of a sandy loam with a least 5% organic material., maximum particle size of 6.0 mm, and, pH range of 6.0 – 7.5.

2.2 SUITABLE MATERIAL

A. General Fill: General Fill material shall be deemed as material that classifies in the ASTM D 2487 soil classification groups SC, GC, GW, GP, GM, SW, SP, and SM, or a combination of these group symbols. The maximum particle size shall be three inches largest dimension, except in the uppermost lift of fill, where the maximum particle size shall be two inches largest dimension. Maximum sized particles shall not be in excess of 20 percent of the volume of fill material, and such particles shall be well distributed throughout the mass.

B. Fill layers in lawn areas up to 6” shall be topsoil as defined above.

2.3 UNSUITABLE MATERIAL

A. Material not meeting the above requirements, including material such as clay mass, frozen materials, cinders, ashes, refuse, and vegetable or organic material shall be construed as unsuitable fill material.

B. Unsatisfactory Soils: ASTM D 2487 soil classification groups MH, CH, OL, OH, and PT, or a combination of these group symbols.

C. Unsatisfactory soils also include satisfactory soils not maintained within 3 percent of optimum moisture content at time of compaction.

2.4 APPROVED GRANULAR MATERIAL

A. Approved granular material shall be well graded crushed stone conforming to Size No. 57 as specified in Section 203 of the VDOT Road and Bridge Specifications.

2.5 APPROVED AGGREGATE BACKFILL MATERIAL

A. Aggregate backfill material shall be VDOT No. 21B as specified in Section 208 of the VDOT Road and Bridge Specifications.

2.6 SEPARATION FABRIC

A. Separation fabric shall be a non-woven, polypropylene fabric meeting the requirements of Mirafi 140N.

2.7 CLASSIFICATION OF EXCAVATED MATERIALS

A. All excavated materials shall be unclassified, and shall be included in the lump sum price.

PART 3 - EXECUTION

3.1 DEMOLITION, CLEARING, AND PREPARATION

A. Existing trees shall be protected during demolition and soil stripping operations, See Division 31 Section “Site Clearing and Demolition” for additional requirements.

B. All clearing and demolition material shall be completely removed from the site, and disposed of by the Contractor, at his expense.

C. Topsoil shall be carefully stripped to its full depth from all areas to be built upon. In lawn areas where the fill material is topsoil, the existing topsoil shall remain, but the existing sod shall be removed as long as tree root are not impacted. Stripped topsoil shall be stored and protected for reuse later.

D. Topsoil, all vegetation, such as roots, brush, heavy sods, heavy growth of grass, and all decayed vegetable matter, rubbish and other debris within the area upon which fill is to be placed, shall be stripped or otherwise removed before the fill is started, except as noted above. In no case will such objectionable material be allowed to remain in or under the fill area.

E. Sloped ground surfaces steeper than one vertical to four horizontal on which fill is to be placed shall be plowed, stepped, benched, or broken up in such manner that fill material will bond with the existing surface, as directed. Before starting the fill, the area shall be proofrolled and approved by the Engineers quality control representative. Any soft, pumping, or rutting spots that are discovered shall have the soft material excavated and the void filled with suitable material, compacted as hereinafter specified.

3.2 EXCAVATION

A. General
   1. All excavations of every description and of whatever substances encountered within the grading limits shall be performed to the grades, slopes, and elevations indicated. All excavated materials which are not considered suitable for fill and any surplus of excavated material which is not required for fill shall be disposed of by the Contractor. Excavations shall extend a sufficient distance away from the walls to permit erection and removal of forms and installation of drains and other permanent work. Excavations shall be carefully made to the depths indicated, with the bottoms level, free of loose material, and free of all loam, organic material and other unsuitable material as hereinafter specified. All excavations shall be approved by the Engineer prior to the placing of any concrete.

B. Rock Excavation

1. All excavation is unclassified. Where rock is encountered as indicated by the Engineer or the Engineer's representative, it shall be excavated, undercut and backfilled in accordance with the following paragraphs. No additional payment will be allowed for undercut or placement of approved granular material.
2. For structures, rock shall be removed to a depth of at least 12 inches below the indicated bottom of the structure foundation, unless the entire foundation rests on the same rock ledge. If the foundation rests on rock, the rock shall be leveled to a hard, clean surface. If rock is excavated below the foundation, the resulting void shall be filled with approved granular material as previously specified. The excavation shall allow 18 inches, horizontally, outside structure walls or outside concrete work for which forms are required.
3. For utility trenches, rock shall be removed to a depth of eight inches below the bottom of the pipe and all undercut trench excavation shall be backfilled with approved granular material.

C. Utility Excavation

1. General: The Contractor shall excavate all materials encountered in the trenches and ditches, detailed on the drawings along the alignments shown on the drawings. Trenches shall be graded to avoid local high points. Trenches shall be graded either level or on a continuous upslope to the high points designated on the drawings. Trenches shall be such a depth to provide the minimum cover shown on the drawings, as measured from the top of the pipe to the existing ground surface or the final grade, whichever is lower.

2. Excavated Material: Excavated suitable material to be utilized for backfilling shall be piled alongside the trench at a distance sufficient to avoid overloading the trench walls and causing caveins, and located to prevent obstruction of driveways, roads and hydrants. All excavated material not suitable for or not required for backfilling, including that from the trenches and the ditches, shall be removed and disposed of by the Contractor at his expense.

3. Dewatering: The Contractor shall utilize means necessary to prevent surface water from washing into the trench. Grading or construction of berms shall be performed as required to prevent surface water from flowing into trenches or other excavations. Any water that accumulates in the trench shall be promptly removed. Where conditions are such that running or standing water occurs in the trench bottom or the soil in the trench bottom displays a "quick" tendency, the water should be removed by pumps and suitable means such as well points or pervious underdrain bedding until the pipe has been installed and the backfill has been placed to a sufficient height to prevent pipe flotation.

4. Trench Width: Trench width at the ground surface may vary with and depend upon depth, type of soils, and position of surface structures. The minimum clear width of the trench, sheeting or unsheeted, measured at the springline of the pipe should be one foot greater than the outside diameter of the pipe. The maximum clear width of the trench at the top of the pipe should not exceed a width equal to the pipe outside diameter plus two feet. If the above defined trench widths must be exceeded or if the pipe is installed in a compacted embankment, pipe embedment should be compacted to a point of at least 2.5 pipe diameters from the pipe on both sides of the pipe or the trench walls, whichever is less. Excavation at manholes and similar structures shall be sufficient to provide 12 inches in the clear between the outside of the structure and the embankment or sheeting.

5. Trench Bottom, General: The trench shall be excavated to the depth required and shall provide a firm, stable, and uniform support for the full length of pipe on solid or undisturbed soil, or as otherwise specified for gravity pipelines. Bell holes and depressions shall be provided to permit proper joint assembly and pipe support. Any part of the trench bottom excavated below the established pipe grade shall be backfilled and compacted as required to provide firm pipe support. Ledge rock, boulders, and large stones shall be removed to provide six (6) inches of soil cushion on all sides of the pipe, including the bottom, and on all sides of accessories.

6. Trench Bottom, Gravity Pipelines: Gravity pipelines are defined as sanitary sewers, storm sewers, culverts, and drains of all material types. The bottom of the trench shall be excavated to a minimum overdepth of four (4) inches below the bottom of the pipe to provide for the hereinafter specified pipe bedding for the entire length of the gravity pipeline. Any part of the trench bottom that is excavated below the required level shall be backfilled with approved granular material.

7. Trench Bottom, PVC Pressure Pipelines: Unless otherwise indicated on the Drawings, trench bottoms for pressurized PVC pipe (water lines and force mains) shall meet the requirements specified for gravity pipelines.

8. Unsuitable Subgrade: When an unstable subgrade condition is encountered, which will not provide adequate pipe support, additional trench depth shall be excavated to a stable foundation under the supervision of the Engineer's quality control representative and backfilled with approved granular material. Backfill, removal, and disposal of unsuitable material shall be at the Contractor's expense.

D. Ditch Excavation

1. Cut ditch, gutter, and channel changes to cross sections and grades indicated on the Drawings. Remove, trim, or dress all roots, stumps, rock and foreign matter in the sides and bottom of each ditch, gutter, and channel to conform to the slope, grade and shape of the section indicated. No excavated material shall be deposited closer than 3 feet to the edge of ditches, unless otherwise indicated. Care shall be taken not to excavate ditches and gutters below the grades indicated. If over-excavation occurs, backfill to grade with suitable material in 9-inch lifts and compact to 95% standard Proctor as determined by ASTM D698.

E. Excess Material

1. Excess material, including but not limited to, excess cut material, unsuitable fill material, and rock or other unsuitable material resulting from excavation or blasting operations, shall be disposed of by the Contractor on-site. On-site excess materials shall be compacted to minimum 85% maximum dry density (ASTM D698 Standard Proctor). All removal, hauling, and re-placeement for disposal of excess material shall be performed at no additional cost to the Owner.

3.3 BEDDING

A. Gravity pipelines shall be bedded in compacted approved granular material in accordance with the paragraph 3.2 C 6 of this section (Trench Bottom, Gravity Pipelines).

B. Bedding for PVC gravity pipe shall extend to four (4) inches over the crown of the pipe.

C. Bedding for Ductile Iron gravity pipe shall extend to the pipe springline.

D. Unless otherwise indicated on the plans, bedding for PVC pressure pipe shall extend to the pipe springline.

E. Bedding for Ductile Iron pressure pipe shall be suitable material.

F. Bedding for storm sewers and culverts shall be in accordance with VDOT Road and Bridge Specifications, and Standards.

3.4 FILLING, BACKFILLING, AND COMPACTING

A. General

1. Suitable material (as described in Part 2 Products) shall be used for fill, backfill and subgrade preparation. Frozen material shall not be used as fill or backfill. Any additional material necessary for establishing the indicated grades shall be furnished by the Contractor and approved by the Engineer as part of this contract. The maximum particle size shall be three inches largest dimension, except in the uppermost lift, where the maximum particle size shall be two inches largest dimension. Fill material shall be placed in successive horizontal layers not to exceed nine (9) inches of loose material, and then thoroughly compacted as hereinafter specified.

2. Fill or backfill adjacent to foundation and retaining walls shall be placed in nine (9) inch horizontal layers, each layer being moistened or dried and compacted as hereinafter specified. Special care shall be taken to prevent wedging action as the backfill proceeds.

3. Embankment slopes shall be constructed by filling one (1) foot beyond the proposed finished slope surface for each lift. Compaction equipment shall work to the edge of each lift. After the entire fill is

placed and compacted, the outside foot of the slope shall be trimmed to the design slope with a dozer. No slopes shall be steeper than 2 horizontal to 1.

B. Off-Site Material

1. Where off-site material is required to provide an adequate suitable material for fill, this material shall be approved by the Engineer prior to use. Off-site material shall be free of large roots, stumps, debris, and all other deleterious materials which may affect the integrity of any fills. In addition, off-site borrow material shall meet the following requirements:
   a. Maximum % finer than a No. 200 sieve: 50%
   b. Maximum Liquid Limit: 80
   c. Maximum Plastic Limit: 50
   d. Minimum Plastic Index 5

2. Provision, hauling, and placement of off-site materials shall be performed at no additional cost to the Owner.

C. Compaction– Structures, Roadways And Grassed Areas

1. Compaction shall be performed by approved compaction equipment adjacent or underlying to the structures. The compaction in grassed areas shall be 70-80 percent of the maximum density as determined by ASTM D698 (Standard Proctor). The compaction under structures, walks and under pavement shall be 95 percent of maximum density as determined by ASTM D698 (Standard Proctor). The materials shall be aerated or moistened, as required to provide a moisture content that falls within 3 percentage points of either side of optimum, unless otherwise approved by the Engineer.

D. Utility Backfilling, Compaction

1. Initial Backfill: Initial backfill shall begin at the top of the bedding and shall be placed in six inch layers up to a level at least one foot above the crown of the pipe. Initial backfill shall be compacted to a minimum 95 percent of the maximum density as determined by ASTM D698 (STANDARD PROCTOR). No lumps greater than one inch in diameter shall be allowed in initial backfill material. Backfill under roadways, driveways, and sidewalks shall be aggregate backfill material, unless otherwise required by VDOT. Each layer shall be thoroughly tamped and compacted by approved equipment. Special care shall be taken in using a mechanical tamper directly over the pipe.

2. Final Backfill: Backfill for trenches not subjected to vehicular traffic shall be placed in layers no greater than one foot thick and compacted to at least 90 percent maximum density as determined by ASTM D698 (Standard Proctor). No lumps greater than five inches in diameter shall be allowed in final backfill material. Each layer shall be moistened or dried as necessary to provide a moisture content that falls within three (3) percentage points of either side of optimum moisture unless otherwise approved in writing by the Engineer. Backfill compaction shall be accomplished by use of equipment designed and suitable for the materials being compacted and their specific location or situation. Compaction by “puddling”, either natural or man-induced, shall not be allowed. Topsoil (in grassed areas) shall be deposited in the final layer of backfill to guarantee the areas will be returned to original or better conditions. Final backfill in grassed areas shall be mounded three (3) inches above surrounding ground to allow for settlement.

3. Final Backfill Under Roadways, Driveways, and Sidewalks: Where excavation has been made through pavement, subgrades of roadways under construction, curbs, driveways, sidewalks, or where structures are undercut by excavation, the backfilling is to be made of the approved aggregate backfill material, or as otherwise specified, in layers not greater than six inches thick, with each layer thoroughly compacted to subgrade. Backfill shall be deposited for the full width of the trench and compacted to 95 percent of the maximum density as determined by ASTM D698 (Standard Proctor). Work within VDOT rights-of-way shall meet all requirements of the VDOT. The trench in paved areas shall be maintained daily, as required, to provide a smooth crossing for vehicles until such time as the final pavement is placed.

E. Placing Of Topsoil

1. Immediately before placing the topsoil, the areas on which it is to be placed shall be deeply and thoroughly raked so as to disturb the surface and provide means for bonding of the topsoil. Spread topsoil over the prescribed area in a uniform layer yielding a minimum settled thickness of 4". Topsoil surface shall be at final grades indicated on plans.

3.5 RESTORATION

A. General

1. Physical conditions disturbed by the Work shall be restored to conditions equal to or better than those existing prior to the Work. Repair of damages to structures and utilities shall be the responsibility of the Contractor. Restoration includes, but is not limited to, fine grading, seeding, pavement replacement, concrete replacement, and drainage structures.

B. Landscape

1. All disturbed areas not covered by pavement, structure, or grassed areas and all areas disturbed by the construction activity shall be fertilized, limed, seeded with the type of seed that produces a stand of grass similar to the existing and mulched.

C. Pavement Replacement

1. Existing pavement which has been cut, damaged, or removed during construction shall be replaced in accordance with the VDOT Road and Bridge Specifications.

3.6 FINISH GRADING AND CLEAN-UP

A. Finish grading shall be done as required to establish the slopes indicated. The grades shall be formed to easy contours sloping toward inlets and ditches. The grading shall eliminate low spots and pockets that do not drain. Ditches shall be excavated to the sections and elevations shown and shall be excavated on smooth slopes to avoid low spots and pockets that do not drain.

B. The surface of all excavations and fill and all disturbed areas shall be finished to a smooth surface, with the grades sloping away from the buildings. Swales and ditches shall be finished so that effective drainage results. Proper allowance shall be made for topsoil and for pavement thickness. Any settling or washing prior to acceptance of the work shall be repaired at no additional expense to the Owner. Topsoil and seeding of all disturbed areas shall be performed in accordance with Section 02920.

C. All lumber, earth clods or rocks larger than four inches and other undesirable materials shall be removed from the site at the completion of construction. Clean up shall be done as promptly as practicable and/or at least once a week. Ditches which are disturbed shall be restored as promptly as practical and/or at least once a week. Establish and maintain sediment and erosion control measures as stipulated in Section 02370.

END OF SECTION 312000

SECTION 321400 - UNIT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Brick pavers set in mortar setting beds.
2. Granite pavers.
3. Steel edge restraints.

1.2 SUBMITTALS

A. Product Data: For materials other than water and aggregates.

B. Samples for unit pavers and edge restraints.

1.3 PROJECT CONDITIONS

A. Cold-Weather Protection: Do not use frozen materials or build on frozen subgrade or setting beds.

B. Weather Limitations for Bituminous Setting Bed: Install bituminous setting bed only when ambient temperature is above 40 deg F and when base is dry.

C. Weather Limitations for Mortar and Grout:

1. Cold-Weather Requirements: Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
2. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602. Do not apply mortar to substrates with temperatures of 100 deg F and higher.

PART 2 - PRODUCTS

2.1 BRICK PAVERS

A. Brick Pavers: Light-traffic paving brick; ASTM C 902, Class SX Type I Application PX. Provide brick without frogs or cores in surfaces exposed to view in the completed Work.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. North Carolina Common Brick.
b. City of Richmond, Virginia standard sidewalk brick.

2. Thickness: As indicated.
3. Face Size: As indicated.

4. Color: As selected by Landscape Architect from manufacturer's full range.

B. Temporary Protective Coating: Precoat exposed surfaces of brick pavers with a continuous film of a temporary protective coating that is compatible with brick, mortar, and grout products.

2.2 STONE PAVERS

A. Granite Pavers: Rectangular paving slabs made from granite complying with ASTM C 615.

1. Products: Subject to compliance with requirements, provide the following:

a. Coldspring Granite, 17482 Granite West Road, Cold Spring, MN 56320

2. Color and Grain: Academy Black, Thermal Finish. Submit samples for review by Landscape Architect.
3. Thickness: As indicated.
4. Face Size: As indicated.

2.3 EDGE RESTRAINTS

A. Steel Edge Restraints: Manufacturer's standard painted steel edging 1/4 inch thick by 9 inches high with loops pressed from or welded to face to receive stakes at 36 inches o.c., and steel stakes 15 inches long for each loop.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Border Concepts, Inc.
b. Collier Metal Specialties, Inc.
c. J. D. Russell Company (The).
d. Sure-loc Edging Corporation.
e. Or Approved Equal.

2. Color: As selected by Landscape Architect from manufacturer's full range.

2.4 ACCESSORIES

A. Cork Joint Filler: Preformed strips complying with ASTM D 1752, Type II.

B. Compressible Foam Filler: Preformed strips complying with ASTM D 1056, Grade 2A1.

2.5 MORTAR SETTING-BED MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II.

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

C. Sand: ASTM C 144.

D. Water: Potable.

2.6 MORTAR AND GROUT MIXES

A. General: Comply with referenced standards and with manufacturers' written instructions Discard mortars and grout if they have reached their initial set before being used.

B. Portland Cement-Lime Setting-Bed Mortar: Type M complying with ASTM C 270, Proportion Specification.

C. Latex-Modified, Portland Cement Setting-Bed Mortar: Comply with written instructions of latex-additive manufacturer and as necessary to produce stiff mixture with a moist surface when bed is ready to receive pavers.

D. Latex-Modified, Portland Cement Bond Coat: Proportion and mix portland cement, aggregate, and liquid latex for bond coat to comply with written instructions of liquid-latex manufacturer.

E. Packaged Grout Mix: Proportion and mix grout ingredients according to grout manufacturer's written instructions.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.

B. Cut unit pavers with motor-driven masonry saw equipment to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible.

C. Joint Pattern: As indicated**.**

D. Tolerances: do not exceed 1/16-inch unit-to-unit offset from flush (lippage) or 1/8 inch in 24 inchesand 1/4 inch in 10 feetfrom level, or indicated slope, for finished surface of paving.

E. Expansion and Control Joints: Provide for sealant-filled joints at locations and of widths indicated. Provide compressible foam filler as backing for sealant-filled joints. Install joint filler before setting pavers.

F. Provide edge restraints as indicated. Install edge restraints before placing aggregate.

G. Joint Treatment: Place unit pavers with hand-tight joints. Fill joints by sweeping sand over paved surface until joints are filled. Remove excess sand after joints are filled.

3.2 MORTAR SETTING-BED APPLICATIONS

A. Saturate concrete subbase with clean water several hours before placing setting bed. Remove surface water about one hour before placing setting bed.

B. Apply mortar-bed bond coat over surface of concrete subbase about 15 minutes before placing mortar bed. Limit area of bond coat to avoid its drying out before placing setting bed. Do not exceed 1/16-inch thickness for bond coat.

C. Apply mortar bed over bond coat; spread and screed mortar bed to uniform thickness at subgrade elevations required for accurate setting of pavers to finished grades indicated.

D. Mix and place only that amount of mortar bed that can be covered with pavers before initial set. Before placing pavers, cut back, bevel edge, and remove and discard setting-bed material that has reached initial set.

E. Wet brick pavers before laying if the initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

F. Place pavers before initial set of cement occurs. Immediately before placing pavers on mortar bed, apply uniform 1/16-inch- thick bond coat to mortar bed or to back of each paver with a flat trowel.

G. Tamp or beat pavers with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances. Set each paver in a single operation before initial set of mortar; do not return to areas already set or disturb pavers for purposes of realigning finished surfaces or adjusting joints.

H. Spaced Joint Widths: Provide 3/8-inchnominal joint width with variations not exceeding plus or minus 1/16 inch

END OF SECTION 321400