11560.3110 M – PRECAST CONCRETE WALL PANELS WITH INTEGRALLY CAST STONE VENEER

Reason for DisApproval:

The manufacturer is not on the “precast product” approved list as per section 704-03.

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DESCRIPTION

This work shall consist of furnishing and installing stone clad reinforced Portland cement concrete panels with granite coping as indicated in the contract drawings.

The panels shall consist of fabricated precast concrete units with an integrally cast masonry stone facing of the type, color, dimension, and pattern as shown in the contract drawings. Only minor masonry repair and masonry work at the unit end sections and in constructing joints will be allowed at the site.

MATERIALS

Materials shall meet the following requirements of the Standard Specifications:

Portland cement Concrete - General	501
Dimensional Stone Masonry	560-2, 3
Stone Masonry	560-2
Cement Based Grout Materials for Shear Keys	701-06
Precast Concrete - General	704-03
Epoxy Coated Bar Reinforcement, Grade 420	709-04

Stone Masonry and Dimensional stone masonry shall be from a Department approved source or approved stockpile, and of the type and color indicated on the plans. Obtain each variety of stone from a single quarry. Stone shall be Granite Building Stone Standard ASTM C615-03.

Stone faces shall have no spalls or excessive pitting.

Stone finishes for facing precast panels shall be fine point for upper stones and split face for lower stones as shown on contract drawings and as defined by Table 560-1 of the Standard Specifications. The degree of roughness of exposed faces shall be measured with a straight edge supported between adjacent projections on the stone face. The maximum joint face and depth between stones shall be 25 mm. The stone dimensions shall be as follows:

- Design depth - 50 mm minimum, allowable depth of 100 mm
- Height and length vary, shall be as indicated on the contract drawings and approved shop drawings.

Dimensional stone for wall coping finish shall be smooth finish (As defined by table 560-1 of the Standard Specifications). The stones shall be cut to profiles indicated on contract drawings.

The minimum 28 day concrete compressive strength for the panel core shall be 28 MPa.

Epoxy coated reinforcement shall be as shown on the plans.

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The grout for voids between the panels and the existing wall shall be from the approved list of materials for §701-06 Cement Based Grout Materials for Shear Keys.

The Basis of Acceptance requirements of 704-03 shall apply to the precast component. The panels shall be manufactured by:

Stonecast, Inc.®
P.O. Box 4621
Queensbury, New York 12804
Tel. (518) 745-8035

Sealant for joints at coping stones and for general use at other masonry-to-masonry joints.

- One-part silicone sealant; ASTM C920 classifications type S, grade NS, class 25, uses NT, M, G, A and O: Pecora 890; Tremco Spectrum-1 or approved equal.

Sealant for concealed bedding of flashing.

- One-part butyl rubber sealant; Pecora's BC-158, PTI's 707, Bostik's Chem-Calk 300, or Tremco Butyl, or approved equal.

Sealant for use at coping stone dowel and railing post penetrations through flashing. For railing posts see Item 123.15 M – Stainless Steel Railing.

- One part cold applied, non-sagging silicone sealant; Dow Corning 795 Silicone Building Sealant or approved equal.

CONSTRUCTION DETAILS:

A. SUBMITTALS / MOCKUPS:

1. Product Data: For each variety of stone, stone accessory, and other manufactured products specified.

   - For stone varieties proposed for use on Project, include data on physical properties required by referenced ASTM standards.

2. Shop Drawings: Shop drawings shall be submitted to the Engineer in accordance with the Precast Concrete Construction Manual. Show details of fabrication and installation of dimension stone cladding, including dimensions and profiles of stone units; arrangement and details of jointing, supporting, anchoring, and bonding dimension stone cladding; and details showing relationship with, attachment to, and reception of related work.

- For installed stone anchorages and supports indicated to comply with certain design loads and deflection limits, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

3. Stone Samples for Verification: Sets for each color, grade, finish, and variety of stone required; not less than 300 mm square. Include two or more samples in each set showing the full range of variations in appearance characteristics expected in completed Work.

4. Colored Pointing Mortar Samples for Verification: For each color required, showing the full range of exposed color and texture expected in completed Work.

5. Sealant Samples for Verification: For each type and color of joint sealant required.

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

7. Test Reports: Indicate and interpret test results for compliance with performance requirements.

8. Provide a 2- by 2-meter sample section of wall panel at a location designated by the Engineer. Do not construct additional panels before the sample is approved. Upon approval of the sample panel, the Contractor shall furnish and install panels to conform to the approved sample panel.

B. PERFORMANCE REQUIREMENTS:

1. Individual sections of the panel shall be connected by a detail that has been successfully crash tested under NCHRP 350 standards at a minimum of Test Level 2.

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

a. Wind Loads: Determine loads based on the following minimum design wind pressures:

- Uniform pressure of 1,915 Pa (40 lbf/sf)

3. Thermal Movements: Provide dimension stone cladding system that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing displacement of stone, opening of joints, overstressing of components, failure of joint sealants and connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.

   a. Temperature Change (Range): 67 deg C, ambient; 100 deg C, material surfaces.

4. Design stone supports and anchors, including panel framing systems, metal-grid systems, and connections to building structure, to withstand loads indicated without exceeding allowable stresses established by the following:

   a. For Cold-Formed Stainless Steel: ASCE 8, "Specification for the Design of Cold-Formed Stainless Steel Structural Members."

5. Water Penetration: No uncontrolled water penetration beyond plane of back of stone that is not contained or drained back to exterior, as measured by testing mockup per ASTM E 331 at a differential pressure of 20 percent of design wind load, but not less than 480 Pa (10 lbf/sq. ft.).

6. Control of Corrosion and Staining: Prevent galvanic and other forms of corrosion as well as staining by isolating metals and other materials from direct contact with incompatible materials. Use materials that are nonstaining to exposed surfaces of stone and joint materials.

C. QUALITY ASSURANCE:

1. Installer Qualifications: Engage an experienced installer who has completed dimension stone cladding similar in material, design, and extent to that indicated for Project that has resulted in construction with a record of successful in-service performance.

   a. Installer shall assume responsibility for engineering, fabricating, and installing dimension stone cladding system.

   b. Engineering Responsibility: Engage a qualified professional engineer to prepare or supervise the preparation of data for dimension stone cladding system including drawings and comprehensive engineering analysis that shows the system's compliance with specified requirements.

D. FABRICATION:

1. Cut stone to produce pieces of thickness, size, and shape indicated and to comply with fabrication and construction tolerances recommended by applicable stone association or, if none, by stone source, for faces, edges, beds, and backs.

   a. Dress joints (bed and vertical) straight and at right angle to face, unless otherwise indicated.

   b. Cut stone to produce joints of uniform width and in locations indicated.
      - Joint Width: 10 mm, unless otherwise indicated.

   c. Clean sawn backs of stone to remove rust stains and iron particles.

2. Pattern Arrangement: Fabricate and arrange panels with veining and other natural markings to comply with the following requirements:

   a. Arrange panels in blend pattern.

3. The stone masonry shall be placed in the specified pattern and integrally cast into each precast unit at the fabrication site. The stones shall be offset to prevent continuous vertical joints. The stones shall be placed in a neat and skillful manner.

4. Cast fully threaded anchor rods (or other anchorage) into precast panel. Mounting to be designed to anchor the precast panels to existing concrete wall and meet performance requirements.

5. Curing: Precast units shall be wet cured for 7 days. The units may be removed from the forms once a minimum compressive strength of 16.8 MPa (2400 psi) is achieved.

E. INSTALLATION

1. Inspection, Storage and Handling of Panel Sections:
   The precast sections will be inspected at the installation site for the following:
   - Damage during shipment
   - Conformance to the material requirements
   - Quality of the placement of the stone masonry
   - Dimensional tolerances as mentioned under materials.

   An additional inspection will be made prior to placement of the panel sections to determine any damage during storage.

2. INSTALLATION OF PANEL SECTIONS:

   a. Existing Wall Surface Preparation. Blast-clean the concrete surfaces to remove laitance, curing compounds and contamination, and provide a roughened surface prior to installing panels.

   b. Placement of Wall Panels. Install the panels in accordance with the procedure shown on the approved shop drawings. The fully threaded anchor rods for the veneer panel shall be drilled and grouted into the concrete substrate. Drilling and grouting of the fully threaded anchor rods shall be in accordance with Section 586 - Miscellaneous Structural Reconstruction.

3. INSTALLATION OF COPING STONES AND THROUGH WALL COPING FLASHING:

   Coordinate installation of through wall coping flashing with coping stone anchor dowels and railing posts, see Item 123.15 M – Stainless Steel Railing. Set the flashing in 9.525mm full bed in mortar. Lap all end joints so they interlock at the first raised rib. Apply sealant between the mating surfaces of the built – in portion of flashing before interlocking end joints and provide water tight seals at penetrations, for appropriate sealants see article titled "Materials" above. Rake joint to allow for sealant installation. Set another 9.525mm full mortar bed on top of flashing and place stone. Lead, plastic or hard rubber buttons shall be used in setting large units to sustain the weight until mortar has set. Install weeps and fill joints solid as units are set. After stones are set and mortar cured, install bond breaker tape and sealant under flashing. All joints in coping units shall be raked out 10mm deep, have bond breaker tape installed, and shall be filled with joint sealant, see "Materials" above.

4. EXPANSION JOINTS:

   a. Provide expansion, control, and pressure-relieving joints of widths at locations indicated, and as required by precast panel fabricator.

   b. Match joint spacing of wall panel and coping stone expansion joints.

   c. Provide filler seal, bond breaker tape, and joint sealers at expansion joints as required for proper installation.

5. INSTALLATION TOLERANCES:

   a. Variation from plumb: Do not exceed 3mm in 3m / 6mm in 6m or more.

   b. Variation from level: Do not exceed 3mm in 3m / 6mm in 6m or 9mm maximum.

c. Variations in joint width: Do not vary joint thickness more than 3mm in 900mm or one fourth of the nominal width, whichever is less.

d. Variations in plane between adjacent (lipping): Do not exceed 1.5-mm differences between planes of adjacent units or adjacent surfaces indicated to be flush with units.

6. REPAIR OF DAMAGED SECTIONS:

Panel sections or coping stones that are damaged or disturbed prior to acceptance of the contract shall be repaired, realigned or replaced as directed by the Engineer. Sections which cannot be satisfactorily repaired or do not meet dimensional tolerance as determined by the Engineer will be rejected and shall be replaced with acceptable sections. The party responsible for bearing the cost of repair or replacement work will be determined by the Department according to Section 107-09 "Damage."

METHOD OF MEASUREMENT

This work will be measured as the number of actual square meters of the stone clad precast concrete panels with coping and flashing actually furnished and installed, as specified in the contract documents. The measurements will be taken along the front face of the wall. Measurement will not include any sample wall sections not incorporated into the work.

BASIS OF PAYMENT

The unit price bid shall include the cost of all labor, materials and equipment necessary to satisfactorily complete the work, including the cost of any repairs required.

No payment will be made for panels that are replacements for panels that have been rejected.