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SECTION 044100

DRY-PLACED STONE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Dry-placed granite retaining walls
2. Dry-placed granite free standing walls
3. Dry-placed dolomitic limestone retaining walls
4. Dry-placed dolomitic free standing walls

5. Dry-placed exterior stone treads

B. Related Sections:

1. Division 03 Section "Cast-in-Place Concrete" for concrete foundations.
2. Division 31 Section "Earthwork" for excavation.
3. Division 33 Section, "Subdrainage" for drainage system preventing accumulation of groundwater in retained soils.

1.2 REFERENCES

- A. ASTM A 123-02: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- B. ASTM C 97-02: Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.
- C. ASTM C 119-04: Terminology Relating to Dimension Stone
- D. ASTM C 170-90 (1999): Test Method for Compressive Strength of Dimension Stone
- E. ASTM C 615-03: Specification for Granite Dimension Stone
- F. ASTM F 593-02: Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
- G. ASTM F 594-02: Specification for Stainless Steel Nuts
- H. National Building Granite Quarries Association (NBGQA) Specifications for Architectural Granite.

1.3 DEFINITIONS

- A. Definitions contained in ASTM C 119 apply to this Section.
- B. Metric Conversions: The following metric conversions shall apply where English measurements are indicated in the text:
 1. 1/16 inch (1.5 mm)
 2. 1/8 inch (3 mm)
 3. 3/16 inch (5 mm)
 4. 1/4 inch (6 mm)
 5. 5/16 inch (8 mm)
 6. 3/8 inch (10 mm)
 7. 1/2 inch (12 mm)
 8. 5/8 inch (15 mm)
 9. 13/16 inch (20 mm)
 10. 1 inch (25 mm)
 11. 1-3/16 inches (30 mm)
 12. 1-1/4 inches (32 mm)
 13. 1-1/2 inches (40 mm)
 14. 1-5/8 inches (40 mm)
 15. 2 inches (50 mm)
 16. 3 inches (75 mm)

17. 4 inches (100 mm)
18. 6 inches (150 mm)
19. 8 inches (200 mm)
20. 12 inches (300 mm)

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. 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.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Stone: Obtain each stone variety from a single quarry.
- B. Visual Mockup: **[At the Owner's Expense]** 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 **[typical exterior stone]** **[areas as shown on Drawings]**.
 2. Size: **[insert size of visual mockup]**
 3. Color consistency: demonstrate color consistency with mockup; color range shall not exceed range of color established by samples.
 4. Included typical components.
 5. Include sealant joints installed as required by Division 07 Section "Joint Sealants."
 6. Mockup may become part of the completed Work if approved at time of Substantial Completion.
 7. Demolish mockup and remove from site after completion of stone cladding work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle materials to prevent deterioration or damage.
 1. Stone shall be carefully packed and loaded for shipment using reasonable care and customary precautions against damage in transit. Material, which may cause staining or discoloration shall not be used for blocking or packing.
 2. The stone shall be stacked on timber or platforms at least 4 inches above the ground. Care shall be taken to prevent staining or discoloration during storage.
 3. If storage is to be for a prolonged period, polyethylene or other suitable plastic film shall be placed between wood and finished surfaces of completely dry stone.

1.7 PROJECT CONDITIONS

- A. Stain Prevention: Remove soil to prevent staining face of stone.

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 granite 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.

2.2 STONE MATERIAL

- A. **[Granite]** Building Stone Standard: ASTM C 615.
- B. **[Limestone]** Building Stone Standard: ASTM C 568, classification as follows:
 - 1. Classification: II (Medium-Density)
 - 2. Density: **[135 - 160 lb/cu. ft.]**
 - 3. Absorption by weight: 5 percent maximum
 - 4. Modulus of rupture: 800 psi minimum
- C. Special Shapes: Provide units of shape and dimensions that will produce walls of dimensions and profiles shown on Drawings and as follows:
 - 1. Batter: Provide units that offset from course below to provide batter of at least:
 - a. [1:24]
 - b. [1:16]
 - c. [1:14]
 - d. [1:8]
 - e. [1:5].
- D. Cap Units: Provide cap units of **[shape shown]** with smooth surfaces.
- E. Special Units: Provide corner units, end units, and other shapes as needed to produce walls of dimensions and profiles shown.

2.3 MISCELLANEOUS MATERIALS

- A. Anchors and Pins: Stainless-Steel: ASTM A 580/A 580M, Type: 304
- B. Fabric: Comply with requirements in Division 33 Section "Subdrainage."

2.4 INSTALLATION MATERIALS

- A. Pins: Stainless steel pins as recommended by stone supplier for use with stone.
- B. Leveling Base: Comply with requirements in Division 31 Section **["Earthwork" for base material]**.
- C. Drainage Fill: Comply with requirements in Division 33 Section "Subdrainage."

- D. Soil Fill: Comply with requirements in Division 31 Section "Earthwork" for satisfactory soils.
- E. Drainage Pipe: Comply with requirements in Division 33 Section "Subdrainage."

2.5 STONE FABRICATION

- A. Fabricate stone in accordance with requirements, including Drawings and Shop Drawings.
 - 1. **[Granite]**: NBGQA's "Specifications for Architectural Granite."
 - 2. **[Dolomitic Limestone]**: **[Marble Institute of America (MIA) "Dimensional Stone--Design Manual IV."]**
- B. **[Cut] [Select]** stone to produce pieces of stone shown on Drawings and recommended by stone source, for faces, edges, beds, and backs.
- C. Thickness of Stone: Provide thickness shown, but not less than the following:
 - 1. Thickness: **[6 inches plus or minus 1/4 inch (6 mm)]**.
- D. Dress joints (bed and vertical) straight and at right angle to face.
- E. Shape stone for type of masonry (pattern) as follows:
 - 1. Sawed-bed ashlar with uniform course heights and uniform lengths as shown on Drawings.
 - 2. Sawed-bed ashlar with uniform course heights as shown on Drawings and with random lengths.
 - 3. Sawed-bed, broken-range ashlar with uniform course heights as shown on Drawings and with random lengths.
 - 4. **[Sawed] [Split]**-bed, random-range ashlar with random course heights and random lengths (interrupted coursed).
 - 5. Coursed rubble.
- F. Finish exposed faces and edges of stone to comply with requirements shown for finish and to match approved samples and mockups.
 - 1. Finish:
 - a. **[Split & Dressed]**
 - b. **[Rock Pitch]**
 - c. **[Rock Face]**
 - d. **[Split (not dressed)]**
- G. Carefully inspect stone at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units before shipment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces and conditions with Installer present.

- B. Surfaces and Conditions: Prior to installing stone, examine the existing surfaces and conditions to receive the cut stone and verify surfaces and conditions are in accordance with the requirements and as shown on Drawings. Do not proceed until defective surfaces are brought into compliance.

3.2 PREPARATION

- A. Prior to setting cut stone, clean all surfaces to remove accumulated dirt and stains. Clean thoroughly by scrubbing with non-metallic brushes followed by a drenching with clean water. Use only mild detergents that do not contain caustic fillers.

3.3 DRY-PLACED STONE

- A. Field trim stone as stone is set.
- B. Sort stone before it is placed in wall. Remove stone that does not comply with requirements or that is unsuitable for intended use.
- C. Ashlar Pattern: Arrange stones for accurate fit in ashlar pattern with course heights as shown, [**uniform**] [**random**] lengths, with offset between vertical joints as shown.
- D. Rubble Pattern: Arrange stones for good fit in [**coursed**] [**uncoursed**] rubble pattern shown.
 - 1. [**Insert small stones into spaces between larger stones as needed to support larger stones.**]
- E. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.
- F. Set stone to comply with requirements shown on Drawings. Set stone accurately in locations shown with edges and faces aligned according to established relationships.

3.4 ADJUSTING

- A. Remove and replace stone not matching final samples and mockups.
- B. Remove and replace stone not complying with requirements.
- C. Replace non-complying stone to match final samples and mockups, comply with specified requirements. Replacement stone shall show no evidence of replacement.
- D. Patching: Minor patching in small areas may be acceptable if the repair does not distract from the overall appearance of the finished project.

3.5 PROTECTION

- A. At the end of each day's work, cover top of walls with a nonstaining waterproof covering. Protect partially finished work when not being worked on.

3.6 CLEANING

- A. Clean stone as work progresses. Remove mortar, sealant, and stains before tooling joints.
- B. Final Cleaning: Clean stone as recommended by fabricator or stone producer.
 - 1. Clean all finished stonework with a mild detergent using a fiber brush.
 - 2. After cleaning, rinse with clean water.
 - 3. Do not use acid or other caustic materials.
- C. When cleaning is completed, remove temporary protection.

END OF SECTION