

## SECTION 03162 – CONCRETE AND ROCK STABILIZATION STRUCTURES

### PART 1 – GENERAL

#### 1.1 DESCRIPTION:

- A. This section covers vanes, bendway weirs, longitudinal peaked stone toe protection (LPSTP), cross vanes, engineered rock riffles, and check dams to be used at various locations within the project area as shown on the project design sheet. Items include, but are not limited to:
1. Rock gradation, procurement, storage, and handling.
  2. Sub-grade preparation prior to rock installation.
  3. Rock installation.
- B. Types of structures covered by this specification:
1. Vanes
  2. Bendway Weirs
  3. LPSTP
  4. Cross Vanes
  5. Engineered Rock Riffles
  6. Check Dams
- C. Related Work in Other Sections:
1. Excavating, Back Filling, and Grading: Section 02200

#### 1.2 REFERENCES:

- A. The publications listed below form a part of this specification to the extent referenced. The latest revision of the following standards shall apply to work hereunder:
1. ASTM C 88: Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
  2. ASTM C 127-88: Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate
  3. ASTM D 5312-92: Standard Test Method for Evaluation of Durability of Rock for Erosion Control under Freezing and Thawing Conditions

#### 1.3 LINES AND GRADES:

- A. Rock placement shall conform to the lines and grades shown on the technical drawings.

PART 2 – PRODUCTS

2.1 MATERIALS:

- A. Material shall be reasonably free from dirt, clay, sand, rock fines and other materials not meeting the required gradation limits.
- B. Except as otherwise specified, the rock shall be angular to sub rounded in shape. The rock shall be dense, sound and free from cracks, seams and other defects conducive to accelerated weathering. The least dimension of an individual rock fragment shall not be less than one-third the greatest dimension of the fragment. Except as otherwise provided, the rock shall be tested and shall have the following properties:
  - 1. Bulk Specific Gravity (saturated surface-dry basis) shall not be less than 2.4 when tested in accordance with ASTM C 127.
  - 2. Absorption shall not be more than 4 percent when tested in accordance with ASTM C 127.
  - 3. The weight loss in 5 cycles shall not be more than 20 percent when sodium sulfate is used or more than 25 percent when magnesium sulfate is used when tested in accordance with ASTM C 88 for soundness
  - 4. Rock that fails to meet the requirements stated above in 1, 2, or 3 may be accepted only if similar rock from the same source has been demonstrated to be sound after 5 years or more of service under conditions of weather, wetting and drying, and erosive forces similar to those anticipated for the rock to be installed under this specification.
- C. The rock materials shall be reasonably well graded by weight and poorly sorted by size, within the limits stated below or on the Drawings to meet the following requirements:

**Aggregate Gradation A (D<sub>50</sub> = 24 in.)**

Size (lbs)	Percent Heavier
10	90
450	50
1000	10

**Aggregate Gradation B (D<sub>50</sub> = 18 in.)**

Size (lbs)	Percent Heavier
10	85 - 100
100	60-80
250	30-60
600	0

**Aggregate Gradation C (D<sub>50</sub> = 12 in.)**

Size (lbs)	Percent Heavier
5	85 - 100
50	50 - 70
100	5 - 15
400	0

**PART 3 – INSTALLATION**

**3.1 INSTALLING ROCK STRUCTURES:**

- A. The sub-grade surfaces on which the rock, filter, bedding, or geotextile is to be placed shall be cut and graded to the lines and grades shown on technical drawings. The surface to which the rock is to be placed shall be reasonably smooth and free of mounds, dips, or windrows.
- B. The rock shall be placed by equipment on the surfaces and to the depths specified. The rock shall be installed to the full course thickness in one operation and in such a manner as to avoid serious displacement of the underlying material. The rock shall be delivered and placed in a manner that will ensure the rock shall be reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact one to another with the smaller rocks and spalls filling the voids between the larger rocks. Rock shall be placed in a manner to prevent damage to existing structures. Hand placing will be required as necessary to prevent damage to any new and existing structures.
- C. Side slopes should be the natural angle of repose, which approximates 1.5 ft. horizontal to 1 ft. vertical.

**3.2 MAINTENANCE:**

- A. If, at any time before 12 months after the completion and acceptance of the work, there shall be any settlement requiring repairs to be made along the line of work, or should any defect appear in the work due to neglect, carelessness or improper construction on the part of the Contractor, the Contracting Officer will notify the Contractor to make such repairs and remedy any defects. The Contractor shall, within 5 days after such notice, begin and carry out such repairs at no additional cost to the owner.

**PART 4 – MEASUREMENT AND PAYMENT**

**4.1 METHOD OF MEASUREMENT:**

- A. Work will be measured by tons of rock placed.

**4.2 BASIS OF PAYMENT:**

- A. The amount of work completed and approved, as stated above, shall be paid for at the contract unit price.

END OF SECTION 03162