

## DIVISION 3

### SECTION 02375 – RIPRAP AND BEDDING, SITTING ROCK AND STEPPING STONES

#### PART 1 GENERAL

##### 1.01 Section Includes

- A. The work of this section shall include excavation, grading and installation of all riprap, bedding, and sitting rocks placed at the locations shown on the Drawings. The materials to be used for the construction of such structures shall be as specified herein.

##### 1.02 Related Sections

- A. Section 02240 – Water Control and Dewatering
- B. Section 02315 – Excavation and Embankment

##### 1.03 Submittals

- A. The CONTRACTOR shall submit certified laboratory test certificates for bedding material. No submittals or testing is required for riprap, sitting rocks and stepping stones.

#### PART 2 PRODUCTS

##### 2.01 Materials

- A. Riprap: Type 2 Gray Riprap. The source of the riprap to be used shall be Granite Canyon Quarry in Wyoming, on Interstate Highway 80 between Cheyenne and Laramie, (888) 638-3582, contact Pete Bovis.
- B. Bedding:
  - 1. Gradation for Granular Bedding

<u>U.S. Standard Sieve Size</u>	<u>Percent by Weight Passing Type I</u>	<u>Square Mesh Sieves Type II</u>
¾ Inch		20 - 90

Granular bedding designation and total thickness of bedding shall be as shown on the Drawings.

- C. Sitting Rock and Stepping Stones: The source of rock for sitting rock and stepping stones shall be City of Fort Collins, Gateway Mountain Park. The park is located on Highway 14, 5 miles west of the intersection of Highway 287 and Highway 14. Rock shall be selected on site by the Owner's Representative. The rock shall be the following approximate sizes:

<b>Quantity</b>	<b>Approx. Size</b>
7	4' x 3' x 2'
5	5' x 4' x 3'
4	6' x 4' x 3'

#### PART 3 EXECUTION

##### 3.01 Construction Requirements

- A. Channel slopes, bottoms, or other areas that are to be protected with riprap shall be free of brush, trees, stumps, and other objectionable material and be graded to a smooth compacted surface. The

CONTRACTOR shall excavate areas to receive riprap to the subgrade for granular bedding. The subgrade for bedding materials shall be stable. If unsuitable materials are encountered, they shall be removed and replaced as Muck Excavation in accordance with Section 02315 of the Specifications. Unsuitable materials shall be disposed of from the site by the CONTRACTOR at his expense. After an acceptable subgrade for granular bedding material is established, the bedding shall be immediately placed and leveled to the subgrade elevation. Immediately following this, the riprap shall be placed. If bedding material is disturbed for any reason, it shall be replaced and graded at the CONTRACTOR's expense. In-place bedding materials shall not be contaminated with soils, debris or vegetation before the riprap is placed. If contaminated, the bedding material shall be removed and replaced at the CONTRACTOR's expense.

### 3.02 Placement

A. Following acceptable placement of granular bedding, riprap placement shall commence as follows:

1. Machine Placed Riprap: Riprap shall be placed on the prepared slope or channel bottom areas in a manner which will produce a reasonably well-graded mass of stone with the minimum practicable percentage of voids. Riprap shall be machine placed, unless otherwise stipulated in the Drawings or Specifications.

When riprap is placed on slopes, placement shall commence at the bottom of the slopes working up the slope. Place the riprap in a stepped fashion with the bottom of the uphill riprap below the top of the downhill riprap by half of the height of the riprap minimum.

The entire mass of riprap shall be placed on either channel slopes or bottoms so as to be in conformance with the required gradation mixtures and to lines, grades, and thickness shown on the Drawings. Riprap shall be placed to its full course thickness at one operation and in such a manner as to avoid displacing the underlying bedding material. Placing of riprap in layers, or by dumping into chutes, or by similar methods shall not be permitted.

All material going into riprap protection for channel slopes or bottoms shall be so placed and distributed that there will be no large accumulations of either the larger or smaller sizes of stone. Some hand placement may be required to achieve this distribution.

It is the intent of these Specifications to produce a fairly compact riprap protection in which all sizes of material are placed in their proper proportions. Unless otherwise authorized by the ENGINEER, the riprap protection shall be placed in conjunction with the construction of embankments or channel bottoms with only sufficient delay in construction of the riprap protection, as may be necessary, to allow for proper construction of the portion of the embankment and channel bottom which is to be protected. The CONTRACTOR shall maintain the riprap protection until accepted. Any material displaced for any reason shall be replaced to the lines and grades shown on the Drawings at no additional cost to the OWNER. If the bedding materials are removed or disturbed, such material shall be replaced prior to replacing the displaced riprap.

2. Hand Placed Riprap: Hand placed riprap shall be performed during machine placement of riprap and shall conform to all the requirements of Section 02375 PART 2 above. Hand placed riprap shall also be required when the depth of riprap is less than 2 times the nominal stone size, or when required by the Drawings or Specifications.

After the riprap has been placed, hand placing or rearranging of individual stones by mechanical equipment shall be required to the extent necessary to secure a flat uniform surface and the specified depth of riprap, to the lines and grades as shown on the Drawings.

3. Soil Replacement In and Over Riprap: Where riprap is designated to be buried, place onsite excavated material that is free from trash and organic matter in riprap voids by washing and rodding. Prevent excessive washing of material into stream. When voids are filled and the surface accepted by the ENGINEER, place a nominal 6 inches of soil over the area, or as designated on the Drawings. Fine grade, seed, and mulch per the Specifications.

4. Rejection of Work and Materials: The ENGINEER shall reject placed riprap which does not conform to this Section and the CONTRACTOR shall immediately remove and relay the riprap to conform with said sections.

Riprap shall be rejected, which is either delivered to the job site or placed, that does not conform to this Section. Rejected riprap shall be removed from the project site by the CONTRACTOR and at his expense.

B. Sitting rock and Stepping Stone placement:

1. Place sitting rocks with flat side up. Bury rock approximately 1/3 the height of the rock. Location to be determined on site by the Owner's Representative.
2. Place stepping stones on bedding material with flat side up. Set stepping stones so that top of stone is a minimum 4" above high water level.

**END OF SECTION**