

Specification For Random And Hand Placed Riprap - 6000

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1 DESCRIPTION

- 1.1 The Work shall consist of the placement of riprap and the installation of nonwoven geotextile fabric on an earth bed. Riprap and nonwoven geotextile fabric shall be placed at the locations and in conformity with the lines, grades and dimensions shown on the Plans or designated by the Engineer.

2 MATERIALS

- 2.1 The Contractor shall supply all materials, including the riprap and nonwoven geotextile fabric placed beneath the riprap materials.
- 2.2 The following requirements shall apply:
- 2.2.1 For geotextile fabric:
- 2.2.1.1 Comply with the requirements of SMM 1101 in the Specifications For Manufactured Materials Manual for nonwoven Type 1 geotextile fabric.
- 2.2.2 For riprap:
- 2.2.2.1 Riprap for culverts and other drainage work shall consist of hard and durable field stones, boulders or quarry rock. For the purpose of this specification, dimension will be defined as being length, width and depth.
- 2.2.2.1.1 The diameter of an individual stone or rock is defined as being its width.

- 2.2.2.1.2 The length of an individual stone or rock is defined as the longest dimension.
- 2.2.2.1.3 The depth of an individual stone or rock is defined as the shortest dimension.
- 2.2.2.2 The desirable ratio of the length to the depth for an individual stone or rock should be 2:1 or less but shall not exceed 3:1.
- 2.2.2.3 Riprap shall be categorized based on standard size ranges for culvert installations, with riprap types as follows:
 - 2.2.2.3.1 Type I Riprap – stone size range is 300 mm to 600 mm. No stone or rock shall be less than 150 mm in its smallest dimension.
 - 2.2.2.3.2 Type II Riprap – stone size range is 150 mm to 300 mm. No stone or rock shall be less than 100 mm in its smallest dimension.
 - 2.2.2.3.3 Type III Riprap – stone size range is 60 mm to 150 mm. No stone or rock shall be less than 50 mm in its smallest dimension.
- 2.2.2.4 The specified riprap diameter range shall consist of a graded mixture of stones and rock. The gradation of the mixture shall be such that 50 percent of the riprap consists of material having at least a minimum diameter of 450 mm for Type I Riprap, 225 mm for Type II Riprap and 100 mm for Type III Riprap.
- 2.2.2.5 Within the size range, 50% of the rock has a weight greater than the median stone, and the remaining 50% has a weight equal to or less than the median stone weight.

3 CONSTRUCTION

3.1 Excavation:

3.1.1 Random Riprap and Hand Placed Riprap

- 3.1.1.1 Aprons and slopes that require riprap shall be excavated to provide adequate foundation upon which the riprap shall be

placed as shown on the Plans or specified by the Engineer. The whole area that requires the placement of riprap shall be trimmed to a uniform and even surface.

3.1.1.1.1 If required, a shelf or ledge shall be excavated to permit dumping of the riprap.

3.2 Placement:

3.2.1 Nonwoven Geotextile Fabric

3.2.1.1 Nonwoven geotextile fabric shall be placed on an earth bed, prepared slope or as shown on the Plans.

3.2.2 Random Riprap

3.2.2.1 Riprap may be placed by dumping, to the required length, width and thickness, with adequate precautions during placement to prevent damage to the underlying nonwoven geotextile fabric or any adjacent structures.

3.2.2.2 Adequate controls shall be taken to ensure a reasonably uniform thickness and well-graded distribution of stone sizes without protrusion of isolated large stones.

3.2.2.2.1 Riprap shall not project more than 50 mm above the stream channel or more than 100 mm above the design line on the Plans.

3.2.2.3 Rearranging of individual stones by mechanical equipment or by hand may be required to produce a uniform surface and the depth shown on the Plans.

3.2.2.4 All individual stones shall interact to produce a stable surface such that no individual rock will move after placement.

3.2.3 Hand Placed Riprap

3.2.3.1 Riprap shall be placed, by hand, to the required length, width and thickness with adequate precautions during placement to prevent damage to the underlying nonwoven geotextile fabric or any adjacent structures.

- 3.2.3.2 Stones shall be placed so that the largest dimension is perpendicular to the slope, unless such dimension is greater than the specified thickness of the riprap.
- 3.2.3.3 Riprap shall be laid closely together and the largest stones shall be placed in the bottom rows.
- 3.2.3.4 No shaping of riprap will be required.
- 3.2.3.5 Riprap shall not project more than 50 mm above the stream channel or more than 100 mm above the design line as shown on the Plans.
- 3.2.3.6 All individual stones shall interact to produce a stable surface such that no individual rock will move after placement.

4 MEASUREMENT

- 4.1 Random Riprap and Hand Placed Riprap will be measured in cubic metres.
- 4.2 The riprap volume will be calculated based on measurements of the surface area of the in place riprap at the design thickness shown on the Plans or as directed by the Engineer.
- 4.3 The volume of riprap dumped or placed into water, or other sites where measurements in place are impractical, will be computed from the volumetric capacity of the vehicle.

5 PAYMENT

- 5.1 Payment for Random Riprap will be at the contract unit price per cubic metre, for the type specified on the Bid Form. The unit price will be full compensation for supplying and furnishing all materials; excavating and preparing the bed; placement of nonwoven geotextile fabric; loading, hauling, unloading, and placing the riprap.
- 5.2 Payment for Hand Placed Riprap will be at the contract unit price per cubic metre, as specified on the Bid Form. The unit price will be full compensation for supplying and furnishing all materials; excavating and preparing the bed; placement of the nonwoven geotextile fabric; loading, hauling, unloading, and placing the riprap.