8-15 RIPRAP

8-15.1 Description

This Work consists of furnishing and placing riprap protection of the type specified at the locations and in conformity with the lines and dimensions shown in the Plans or established by the Engineer.

Riprap will be classified as heavy loose riprap, light loose riprap, hand placed riprap, and sack riprap.

8-15.2 Materials

Materials shall meet the requirements of the following sections:

Filter Blanket ____ (shall meet the gradation requirements for Shoulder Ballast)	9-03.9(2)
Gravel Backfill for Drains	9-03.12(4)
Heavy Loose Riprap	9-13.1(1)
Light Loose Riprap	9-13.1(2)
Hand Placed Riprap	9-13.2
Sack Riprap	9-13.3
Quarry Spalls	9-13.6

8-15.3 Construction Requirements

8-15.3(1) Excavation for Riprap

The foundation for riprap shall be excavated below probable scour or to the elevation shown in the Plans, and no stone shall be laid or concrete placed until the footing is approved by the Engineer. Excavation below the level of the intersection of the slope to be protected and the adjacent original ground or the channel floor or slope shall be classified, measured, and paid for as ditch excavation in accordance with Section 2-10. All excavation or backfill above the level of the above described intersection and all dressing of the slope to be protected shall be included in the Contract price for the class of riprap to be placed. Before placing riprap, the slopes shall be dressed to the lines and grades as staked.

8-15.3(2) Loose Riprap

Loose riprap shall be placed in such a manner that all relatively large stones shall be essentially in contact with each other, and all voids filled with the finer materials to provide a well graded compact mass. The stone shall be dumped on the slope in a manner that will ensure the riprap attains its specified thickness in 1 operation. When dumping or placing, care shall be used to avoid disturbing the underlying material. Placing in layers parallel to the slope will not be permitted. A 12-inch tolerance for loose riprap will be allowed from slope plane and grade line in the finished surface.

8-15.3(3) Hand Placed Riprap

The stones shall be laid by hand on prepared slopes to such thickness as may be ordered by the Engineer. The riprap shall be started at the toe of the embankment by digging a trench and placing a course of the largest stones therein. Each stone shall be placed so that it shall rest on the slope of the embankment and not wholly on the stone below, and it shall be thoroughly tamped or driven into place. The exposed face of all hand placed riprap shall be made as smooth as the shape and size of the stones will permit and shall not vary more than 3-inches from a plane surface on the required slope.

8-15.3(4) Sack Riprap

Sack riprap conforming to the requirements of Section 9-13.3 shall be deposited in the trench and on the slope of the embankment to be protected in accordance with the Plans or as ordered by the Engineer in accordance with Section 1-04.4.

The concrete shall be placed in the sacks to a uniform volume leaving sufficient room for effectively tying the sacks. The sacks shall then be placed in longitudinal rows in the trench and on the slope to lie parallel with the slope. In placing the sacks on the slope, their outside faces shall be laid against a heavy timber header or screed so that each layer will be true to line and grade. The tied end of the sack shall be turned under and the sack firmly pressed into place against the header or screed. Sacks in the longitudinal rows shall be placed with the bottom of 1 sack adjacent to the top of the next sack. Joints shall be staggered in succeeding rows. Sack riprap shall not be placed in freezing weather, and Work damaged by frost shall be removed and replaced at the Contractor's expense.

8-15.3(5) Vacant

8-15.3(6) Quarry Spalls

Quarry spalls shall be placed in ditches and on slopes to be protected, in accordance with the Plans or as staked by the Engineer. After placement, the quarry spalls shall be compacted to be uniformly dense and unyielding.

8-15.3(7) Filter Blanket

When required, a filter blanket shall be placed on the prepared slope or area to the full thickness specified in the Plans using methods which will not cause segregation of particle sizes within the bedding. The surface of the finished layer shall be even and free from mounds or windrows. Additional layers of filter material, when required, shall be placed using methods that will not cause mixing of the materials in the different layers.

8-15.4 Measurement

Loose riprap will be measured by the ton or per cubic yard of riprap actually placed.

Hand placed riprap will be measured by the cubic yard of riprap actually placed.

Filter blanket will be measured by the ton or cubic yard of filter blanket actually placed.

Sack riprap will be measured by the cubic yard. The number of cubic yards of sack riprap placed shall be computed from the number of sacks of cement actually used in the concrete mix and the yield per batch of concrete as determined by the Engineer from actual predetermined measurement.

Quarry spalls will be measured by the ton or per cubic yard of spalls actually placed.

Ditch excavation will be measured by the cubic yard as specified in Section 2-10.

Excavation for toe walls and trenches will be measured by the cubic yard as ditch excavation in accordance with the provisions of Section 2-10.

8-15.5 Payment

Payment will be made in accordance with Section 1-04.1, for each of the following Bid items that are included in the Proposal:

"Heavy Loose Riprap", per ton or per cubic yard.

"Light Loose Riprap", per ton or per cubic yard.

"Hand Placed Riprap", per cubic yard.

"Sack Riprap", per cubic yard.

The unit Contract price per ton or per cubic yard for the class or kind of riprap specified above shall be full pay for furnishing all labor, tools, equipment, and materials required to construct the riprap protection, except for excavation. When it is necessary to dump and sort individual loads, payment will be made only for that portion accepted by the Engineer.

"Quarry Spalls", per ton or per cubic yard.

The unit Contract price per ton or per cubic yard for "Quarry Spalls" shall be full pay for all costs in furnishing, placing, and compacting spalls.

"Ditch Excavation", per cubic yard.

"Filter Blanket", per cubic yard or per ton.