

CHAPTER 8 – GUIDE SPECIFICATIONS

The following is a guide specification to be used for rockery projects and should be modified, as necessary, to meet the specifics of each individual project. The Section and Subsection numbers shown below refer to the FLH’s *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-03*. A standard rockery plan is also attached as Appendix C.

Section 252. – ROCKERY

Description

252.01 This work consists of constructing rockery structures at the locations and to the dimensions shown on the plans. Rockeries are formed of interlocking, dry-stacked rocks without reinforcing steel, mortar, or concrete. Rockeries may be constructed as either single structures or in tiers.

Material

252.02 Conform to the following Subsections:

Concrete v-ditch	601
Granular rock backdrain	703.03(c)
Foundation fill	704.01
Base, facing, and cap rocks	705.07
Plastic pipe	706.08(d) and (e)
Geotextile	714.01

Construction Requirements

252.03 Qualifications. Prior to the start of rockery construction, submit the following:

- (a) References citing satisfactory completion of at least three (3) rockeries of similar height and face area.
- (b) A summary of the experience of the primary equipment operator responsible for placement of base, facing, and cap rocks.

252.04 General. Survey according to Section 152.03(i), Construction Surveying and Staking, and verify the limits of the rockery installation.

The following definitions apply to rockery construction:

- (a) **Base Rock:** The base rock is the lowermost rock in the rockery, and bears directly on the soil/rock subgrade.
- (b) **Facing Rock:** The facing rocks comprise the bulk of the rockery and are stacked above the base rock.

- (c) **Cap Rock:** The cap rock is the uppermost rock in the rockery section and “caps” the rockery.

252.05 Rockery Construction.

- (a) **Rockery Foundation Excavation.** Perform the work under Section 209, Structure Excavation and Backfill. Excavate a foundation trench at least 300 millimeters (12 inches) below the bottom of the wall, running the full length of the proposed rockery. Deeper embedment may be required where a toe slope is present or where a leveling pad is specified. Excavate the foundation to a minimum width equal to the specified base rock width (‘B’) plus 300 millimeters (12 inches) to include the granular rock backdrain behind the rockery. Conform to the following:
- (1) Excavate the foundation in sections such that the rockery can be constructed in one shift or one day’s work, unless shoring is provided for the purpose to support the excavation.
 - (2) If the CO determines the back cut is stable as excavated, the requirement of Subsection 252.05(a)(1) does not apply.
 - (3) Exercise care during excavation of the back cut. Stability of temporary cut slopes is the responsibility of the Contractor.
- (b) **Rock Placement.** Place the first course of rock (base rock) on firm, unyielding soil or bedrock with full contact between the rock and the subgrade. Excavate any loose, soft or other wise unsuitable material present at foundation grade and replace with foundation fill as shown in the plans. Compact the foundation fill according to Subsection 204.11, Compaction.. As the rockery is constructed, place the rocks so that there are no continuous joints in either the vertical or lateral direction.

Stockpile a sufficient number of rocks to provide a good selection for placement. To obtain a better fit, place rocks which do not match the spaces offered by the previous course in a different location.

Avoid placing rocks which have shapes that create voids with a linear dimension greater than 300 millimeters (12 inches).

Except in isolated cases, place each rock so that it bears on at least two rocks below it. Locate at least one bearing point a distance no greater than 150 millimeters (6 inches) from the average face of the rockery.

The allowable tolerance for base rock widths is 150 millimeters (6 inches); however, do not place two or more consecutive base rocks with a width less than specified on the plans.

Slope the top surface of each rock towards the back of the rockery at an inclination of at least five (5) percent.

The minimum rockery thickness is based on minimum base rock width, as specified on the plans, and allowable face batter.

Securely place facing rocks so that the rocks are unable to be moved with a pry bar after the rockery is complete.

(c) Voids. Where voids with a minimum dimension of 150 millimeters (6 inches) or greater exist in the face of the rockery, chink the voids with smaller rock.

- (1) If there is no rock contact within the rockery thickness, chink the void with a smaller piece of rock.
- (2) Chinking rocks do not provide primary structural support for the overlying rock.
- (3) Chinking rocks can not be moved or removed by hand after rockery is complete. Reset loose chinking rocks until securely placed or grouted in place. Do not allow grout to be readily visible from the face of rockery.

(d) Rockery Drainage. Install the granular rock backdrain between the rockery and the back cut face being supported. The granular rock backdrain layer is at least 300 millimeters (12 inches) thick, measured horizontally from the back of the base rock to the face of the back cut. Place granular rock backdrain concurrent with rockery so that at no time is either more than 600 millimeters (24 inches) higher than the other.

- (1) Separate the crushed rock from the back cut by Type 1-B non-woven geotextile. Overlap the non-woven geotextile at least 300 millimeters (12 inches) at all seams.
- (2) Place a 100 millimeter (4 inch) diameter perforated drain pipe as shown in the plans. Surround the pipe on all sides by at least 100 millimeters (4 inches) of permeable backfill according to Subsection 703.04, Permeable Backfill.
- (3) Connect the perforated drain pipe to a non-perforated collector pipe at a spacing not to exceed 30 meters (100 feet) center-to-center. Connect the collector pipe to a controlled drain outlet, such as a storm drain, or outlet to a slope using a riprap apron according to Section 251, Riprap.
- (4) Do not connect collector pipes to systems designed for storm water retention in accordance with Best Management Practices design unless approved by the CO.

- (5) Cap the granular rock backdrain with at least 300 millimeters (12 inches) of native, relatively impermeable soil. Place non-woven geotextile between the soil cover and the granular rock backdrain.
- (6) Construct a concrete v-ditch along the top of the rockery as shown in the plans and according to Section 601, Minor Concrete Structures.

252.06 Acceptance. Rock for rockery will be evaluated under Subsection 106.02, Visual Inspection.

Survey work will be evaluated under Section 152, Construction Surveying and Staking.

Structure excavation will be evaluated under Section 209, Structure Excavation and Backfill.

Granular rock backdrain will be evaluated under Subsection 703.03(c), Granular Backfill. Foundation fill will be evaluated under Subsection 704.01, Foundation Fill.

Material for plastic pipe and geotextiles listed under Subsections 706.08, Plastic Pipe, and 714.01, Geotextile, will be evaluated under Subsections 106.02, Visual Inspection, and 106.03, Certification.

Construction of rockeries will be evaluated under Subsections 106.02, Visual Inspection, and 106.04, Measured or Tested Conformance.

Measurement

252.07 Measure rockeries by the square meter of rockery front face. Measure the rockery front face vertically from the bottom of the base rock elevation to the top of the cap rock. Compute the area using rockery heights measured at a maximum horizontal spacing of 10 meters (30 feet).

Granular rock backdrain, 100 millimeter (4 inch) drainage pipes (perforated and non-perforated), geotextile, and non-woven geotextile will not be measured for payment and are considered incidental to the rockeries.

Measure foundation fill under Section 208, Structure Excavation and Backfill for Selected Major Structures.

Payment

252.08 The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05, Scope of Payment.

Section 703. – AGGREGATE

703.03.Granular Backfill. Furnish aggregate for the following installations.

- (a) **Granular Rock Backdrain.** Furnish granular rock backdrain conforming to Table 703-A.

**Table 703-A
Granular Rock Backdrain Gradation**

Opening or Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T 27 & T 11)
150 mm (6 in.)	100
100 mm (4 in.)	0.0 – 25
19.0 mm (3/4 in.)	0.0 – 15
4.75 mm (No. 4)	0.0 – 5.0
75 µm (No. 200)	0.0 – 2.0

Section 705. – ROCK

705.07 Rock for Rockeries.

- (a) **General.** Furnish hard, angular, and durable rock that consists of intact blocks without open fractures, foliation, or other planes of weakness. Conform to the following:

- (1) Rock has sufficient hardness so that it cannot be scratched with a knife or scratched only with difficulty
- (2) Apparent specific gravity, AASHTO T 85 2.5 min.
- (3) Absorption, AASHTO T 85 4.2% max.
- (4) Los Angeles abrasion, AASHTO T 96 (500 rev) 40% max.
- (5) Coarse durability index, AASHTO T 210 50 min.
- (6) Sodium sulfate soundness (5 cycles), AASHTO T 104 10% max.
- (7) Freeze-thaw loss (12 cycles), AASHTO T 103 10% max.

- (b) **Sizes and shapes.** Furnish angular rocks that are generally cubical, tabular, or rectangular in shape. Conform to the following:

- (1) The minimum rock length is shown in the Rockery Design Schedule in the plans.
- (2) Rock width and height are greater than or equal to one-third of the rock length.

- (3) The minimum rock dimension is 450 millimeters (18 inches).
- (4) The minimum cap rock weight is 90 kilograms (200 pounds).
- (c) **Color.** Furnish rocks with a color indigenous to the area. Submit at least three (3), 300 mm (12 in) samples of rock to be used for rockery facing that are representative of rock color for approval by the CO. Furnish rocks free of machine-made scratches, mars, or other damage to the visible face

Section 714. – GEOTEXTILE AND GEOCOMPOSITE DRAIN MATERIAL

714.01 Geotextile. For rockery construction with retained soil that has between 15 and 50% passing the 0.075 μm (No. 200) sieve, furnish Type I-B geotextile. If the fines content is outside this range, type I-C geotextile may be required.