

### Mulching (MU)



#### Practice Description

Mulching is the application of plant residues such as straw or other suitable materials to the soil surface. Mulch protects the soil surface from the erosive force of raindrop impact and reduces the velocity of overland flow. It helps seedlings germinate and grow by conserving moisture, protecting against temperature extremes and controlling weeds. Mulch also maintains the infiltration capacity of the soil. Mulch can be applied to seeded areas to help establish plant cover. It can also be used in unseeded areas to protect against erosion over the winter or until final grading and shaping can be accomplished except in areas of concentrated flow.

#### Typical Components of the Practice

- Site Preparation
- Application of Material
- Verification of Installation

#### Installation

Mulching should be designed by a qualified design professional and plans and specifications should be made available to field personnel prior to start of construction.

#### Site Preparation

Divert runoff water from areas above the site that will be mulched. Remove stumps, roots and other debris from the construction area. Grade area as needed to permit the use of equipment for seeding, mulching and maintenance. Shape area so that it is relatively smooth.

If the area will be seeded, follow seeding specifications in the design plan and apply mulch immediately after seeding.

#### Application of Material

Spread straw or cereal grain mulch uniformly over the area with a power blower, hydroseeder or by hand. Mulch should be uniformly spread and not clumped in piles. In a seeded area, 25% to 35 % of the ground surface should be visible after mulching. It is important when mulching a seeded area that an excessive quantity of straw is not applied - too much mulch will retard or reduce the future stand. When mulch is used for erosion control without seeding, 100% of the soil surface should be covered. Apply at the rates shown in the plan or in Table MU-1 if there is not a plan.

Material	Rate Per Acre and (Per 1000 ft. <sup>2</sup> )	Notes
Straw (with Seed)	1 1/2 - 2 tons (70 lbs - 90 lbs)	Spread by hand or machine; anchor when subject to blowing.
Straw (no seed)	2 1/2 - 3 tons (110 lbs - 150 lbs)	Spread by hand or machine; anchor when subject to blowing.
Wood Chips	5-6 tons (225 lbs - 275 lbs)	Treat with 12 lbs. nitrogen/ton.
Bark	35 cubic yards (0.8 cubic yard)	Can apply with motor blower.
Pine Straw	1-2 tons (45 lbs - 90 lbs)	Spread by hand or machine; will not blow like straw.
Peanut Hulls	10-20 tons (450 lbs - 900 lbs)	Will wash off slopes. Treat with 12 lbs. nitrogen/ton.

#### Anchor straw or wood cellulose mulch by one of the following methods:

- Crimp with a weighted, straight, notched disc or a mulch anchoring tool to punch the straw into the soil.
- Tack with a liquid tackifier designed to hold mulch in place. Use suitable spray equipment and follow manufacturer's recommendations.
- In more erosive areas, cover with netting, using a degradable natural or synthetic mesh. The netting should be anchored according to manufacturer's specifications (see Erosion Control Blanket practice).
- On steep slopes and other areas needing a higher degree of protection, use heavy natural nets without additional mulch, synthetic netting with additional mulch or erosion control mats/blankets. These areas include grassed waterways, swales and diversion channels.
- Install netting and mats/blankets according to manufacturer's specifications making sure materials are properly anchored (see Erosion Control Blanket).

#### Verification of Installation

Check materials and installation for compliance with specifications.

#### Common Problems

Consult with qualified design professional if either of the following occurs:

- Variations in topography on site indicate the mulching materials will not function as intended; changes in plan may be needed.
- Design specifications for mulching materials or seeding requirements cannot be met; substitution may be required. Unapproved substitutions could result in erosion or seeding failure.

#### Problems that require remedial action:

- Erosion, washout and poor plant establishment; repair eroded surface, reseed, re-mulch and anchor mulch.
- Mulch is lost to wind or stormwater runoff; reapply mulch and anchor appropriately by crimping, netting or tacking.

#### Maintenance

Inspect all mulched areas periodically and after rainstorms for erosion and damage to the mulch. Repair promptly and restore to original condition. Continue inspections until vegetation is well established. Keep mower height high if plastic netting is used to prevent netting from wrapping around mower blades or shaft.

### MULCHING

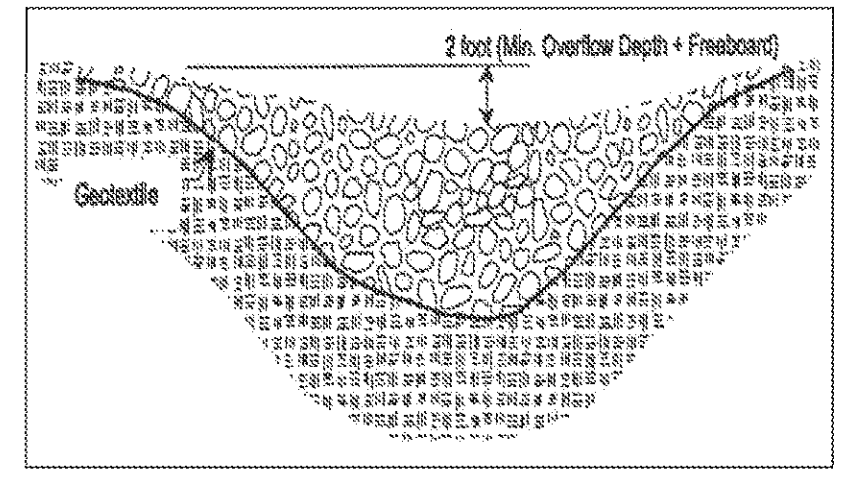


Figure RD-1 Typical Front View of Rock Filter Dam

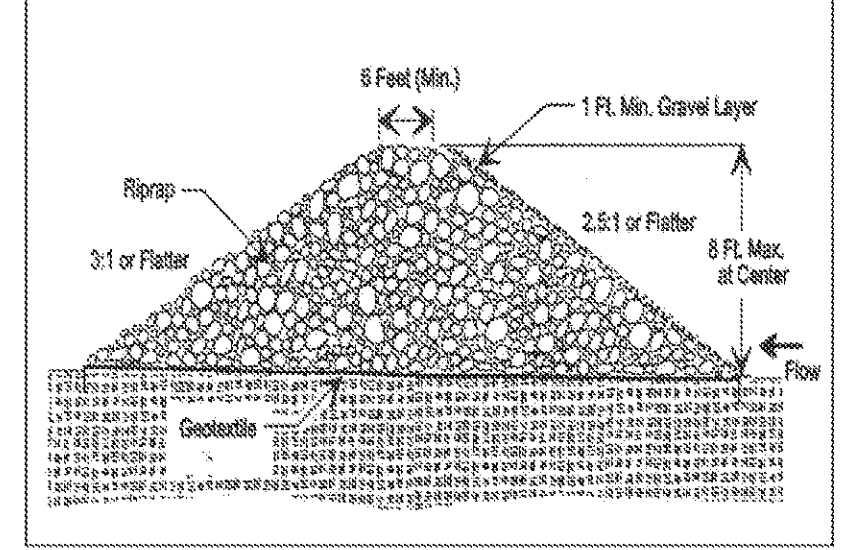
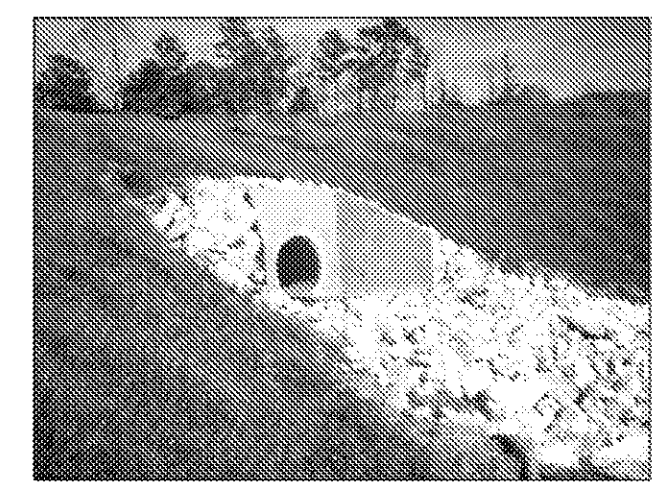


Figure RD-2 Typical Section of Rock Filter Dam

### ROCK FILTER DAM



### Outlet Protection (OP)



#### Practice Description

This practice is designed to prevent erosion at the outlet of a channel or conduit by reducing the velocity of flow and dissipating the energy. Outlet protection measures usually consist of a riprap-lined apron, a reinforced concrete flume with concrete baffles, a reinforced concrete box with chambers or baffles and possibly pre-manufactured products. This practice applies wherever high velocity discharge must be released on erodible material.

#### Typical Components of the Practice

- Site Preparation
- Installation of Riprap Structures
- Installation of Concrete Structures
- Erosion Control
- Construction Verification

#### Construction

Prior to start of construction, the practice should be designed by a qualified design professional. Plans and specifications should be referred to by field personnel throughout the construction process. The structure should conform to the dimensions, grades and alignments shown on the plans and specifications.

#### Site Preparation

Completely remove stumps, roots and other debris from the construction area. Fill depressions caused by clearing and grubbing operations with clean, non-organic soil. Grade the site to the lines and grades shown on the plans. Compact any fill required in the subgrade to the density of the surrounding undisturbed material.

If possible, the alignment should be straight throughout its length. If a curve is required, it should be located in the upstream section of the outlet.

#### Riprap Structures

Ensure that the subgrade for the filter and riprap follows the required lines and grades shown in the plan. Low areas in the subgrade on undisturbed soil may also be filled by increasing the riprap thickness.

Geotextile fabric must meet design requirements and be properly protected from puncturing or tearing during installation. Repair any damage by removing the riprap and placing another piece of filter cloth over the damaged area. All connecting joints should overlap a minimum of 1.5 feet with the upstream edge over the downstream edge. If the damage is extensive, replace the entire geotextile fabric.

Riprap may be placed by equipment. Care should be taken to avoid damaging the filter.

#### Concrete Structures

Reinforcing steel welded wire fabric should be placed in strict accordance with the design plans and maintained in the proper position during the pouring of concrete. Concrete should be placed in horizontal layers not exceeding 24" in thickness or as specified in the design, and consolidated by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping.

Concrete should be placed in sturdy wood or metal forms, adequately supported to prevent deformation. Forms should be oiled prior to placement to prevent bonding between concrete and forms.

If possible, concrete should not be placed during inclement weather or periods of temperature extremes. If temperature extremes cannot be avoided, American Concrete Institute (ACI) guidelines for placement of concrete during such extremes should be consulted.

Concrete should be allowed to cure as required by the plans and specifications.

Typically, the surface should be kept wet during curing by covering it with wet burlap sacks or other means. Design strengths should be confirmed by laboratory tests on representative cylinders made during concrete placement. Form work should not be removed prior to the specified time.

#### Erosion Control

Immediately after construction, stabilize all disturbed areas with vegetation.

#### Construction Verification

Check finished structures for conformance with design specifications.

#### Common Problems

Consult with a qualified design professional if any of the following occur:

- Variations in topography on site indicate measure will not function as intended.
- Design specifications for riprap, filter fabric, concrete, reinforcing steel or backfill cannot be met; substitutions may be required. Unapproved substitutions could lead to failure.
- Problems with the structure develop during or after installation.

#### Maintenance

Inspect riprap outlet structures after heavy rains to see if any erosion around or below the riprap has taken place or if stones have been dislodged. Check concrete structures for cracks and movement. Immediately make all needed repairs to prevent further damage.

When the apron is lined with concrete, the minimum thickness of the concrete shall be 4".

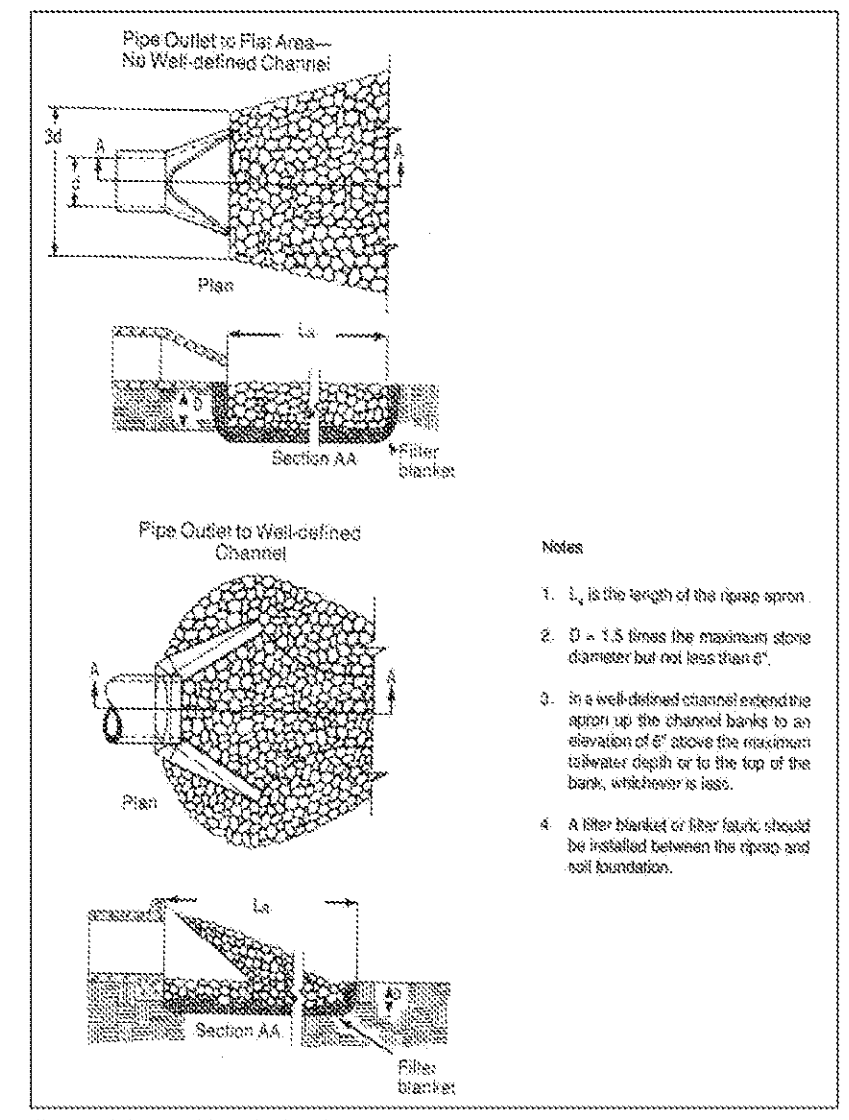
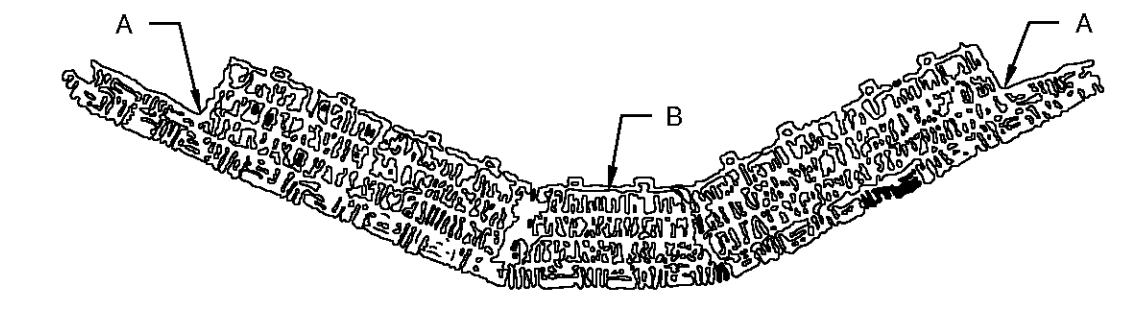
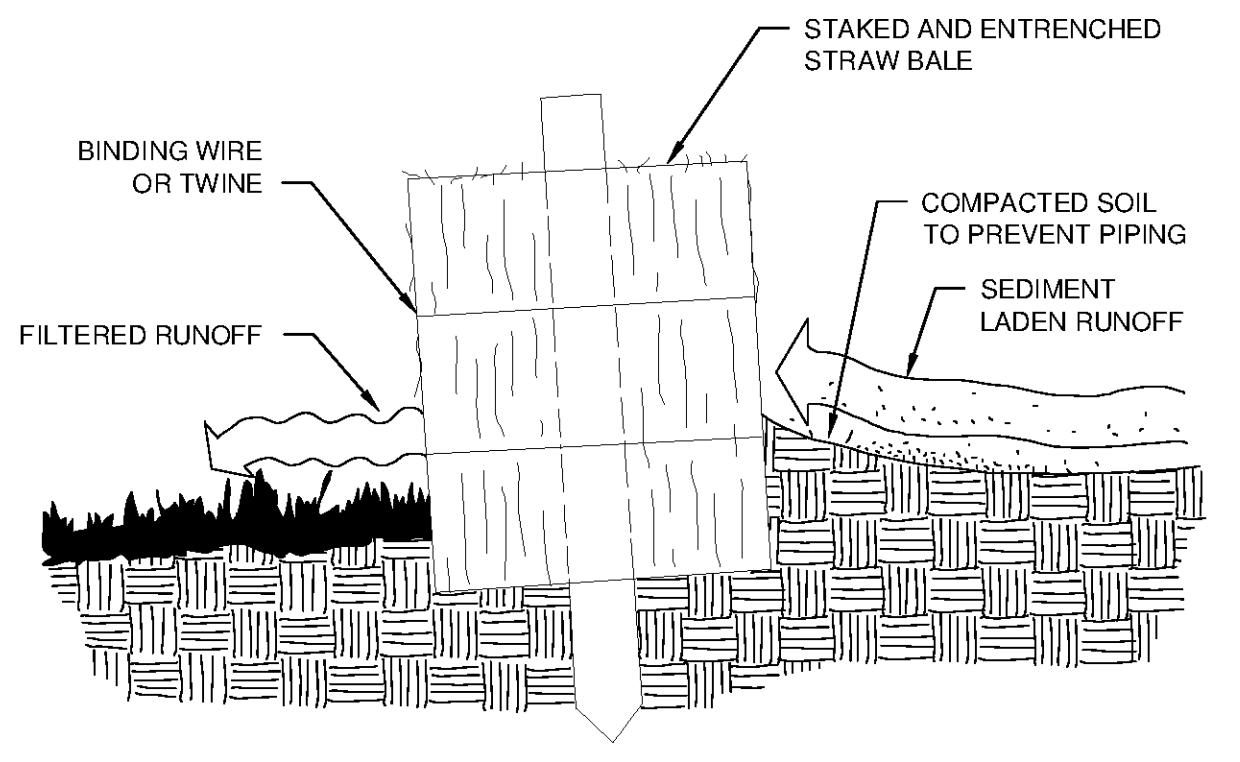


Figure OP-1 Pipe Outlet Conditions



Points A should be higher than point B. PROPER PLACEMENT OF STRAW BALE BARRIER IN DRAINAGE WAY



Note: Embed hay bales a minimum of 4 inches. CROSS-SECTION OF A PROPERLY INSTALLED STRAW BALE

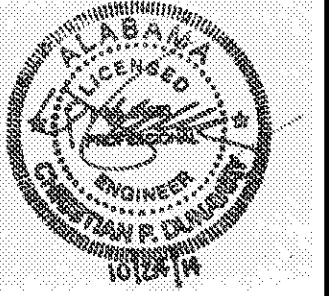
### STRAW BALE BARRIER



### OUTLET PROTECTION



### BID SET



MARK	DATE	DESCRIPTION	BY

HUNTSVILLE UTILITIES  
SOUTHEAST WATER TREATMENT PLANT  
**EROSION CONTROL  
DETAILS**

Project No.: 200-11740-10003  
Designed By: JRW  
Drawn By: WDV  
Checked By: JPT

**C-9520**