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Stabilized Outlets

Definition

Outlets are areas which receive discharge water. Stabilized outlets are outlets which reduce the velocity of discharge water to non-erosive velocities.

Other Terms Used to Describe

Outlet Protection
Energy Dissipators

Pollutants Controlled and Impacts

Stabilized outlets help reduce erosion in the area in which the water is released. Some outlets may also provide treatment of various types of pollutants. See the "Specifications" section for the type of pollutants controlled per each type of outlet.

Application

Land Use
This practice is applicable to all land uses.

Soil/Topography/Climate
Each type of outlet has limitations based on soil and topography. See the "Specifications" section.

When to Apply
Stabilized outlets should be installed before runoff is directed to them.

Where to Apply
Apply at the down-slope end of all areas in which runoff is directed.

Relationship With Other BMPs

See the "Specifications" section.

Specifications

Planning Considerations:
If the outlet is a county or inter county drain, permission to discharge must be obtained from the drain commissioner or drain board. The actual structure may require a MDNR permit if the outlet is in a watercourse or if wetlands are impacted.

Design Considerations:
Stabilized outlets should be designed by registered professional engineers.

The specific type of outlet needed depends on the velocity of the water being discharged, the pollutants in the water and the type of soil. The following is a brief discussion of several types of outlets, most of which are BMPs.

Conveyance Outlets:

1. Grassed Waterway or swale. Used most often in rural areas where flows are 6 cfs or less and water is not laden with sediment or other pollutants.

2. Stone Filters. Used at the outlets of small Sediment Basins and other areas where flows are maintained at low velocities.

3. Stormwater Conveyance Channels. Used in both urban and rural areas to contain flows at non-erosive velocities.

Water Storage Outlets:

1. Sediment Basins are used on construction sites where water is laden with sediment. They can serve as outlets for Diversions and areas of bare soils and concentrated runoff.

2. Infiltration Basins are used in areas where the water is such that it would not contaminate groundwater, and where soils are such that water will infiltrate into the ground. They should be used as one of the final stops in a "treatment train."

3. Detention/Retention Basins are used on many development sites, as well as in-stream, to obtain an in-stream hydrology that is similar to the pre-construction conditions.

4. Oil/Grit Separators are used in urban areas and industrial sites where oil and grit is contained in the runoff.

5. Wet ponds and wetlands. Like infiltration basins, these are used as the "final treatment" in a series of BMPs, where water up-slope/up-stream has been treated with other BMPs.

Conduits:
Outlets from stormwater basins, sediment basins and any other conduit structures which release water to watercourses, should be designed as part of the structural BMP. Conduits which release water into watercourses should be stablilized with riprap to three feet above the ordinary high water mark. Follow specifications in the Riprap BMP.

Outlet Protection:
The maximum allowable velocity at the outlet should be determined using Table 1, below. When the velocity at the outlet exceeds the allowable velocity given in Table 1, riprap outlet protection should be used to dissipate energy. Follow specifications in the Riprap BMP.

Maintenance

All of the BMPs cited in the section above require regular maintenance. Follow the maintenance

sections in the outlet (BMP) selected.

Table 1

Maximum Allowable Velocities for Various Soils

Soil Texture	Maximum Allowable Velocity (ft/sec)
Sand and sandy loam	2.5
Silt loam	3.0
Sandy clay loam	3.5
Clay loam	4.0
Clay, fine gravel, graded loam to gravel	5.0
Cobbles	5.5
Shale	6.0

Source: Connecticut Guidelines for Soil Erosion and Sediment Control, Connecticut Council for Soil and Water Conservation, 1985.