

Runoff Diversion Measures (Diversion Berms/Dikes and Swales)

Plan Symbol



Description

Diversion dikes and berms (ridges of compacted soil) and diversion swales (excavated depressions) are used to divert upslope runoff from crossing areas where there is a high risk of erosion. Use runoff conveyance structures as temporary clean water diversions, temporary sediment laden diversions, or permanent clean water diversions. Use runoff control measures as either temporary or permanent storm water control structures.

When and Where to Use It

Runoff conveyance measures are installed around the perimeter of a construction sites before major disturbing activities takes place. When constructed along the upslope perimeter of a disturbed or high-risk area (though not necessarily all the way around it), clean water diversions prevent clear water runoff from flowing over unprotected down slope areas. Sediment laden diversions located on the downslope side of a disturbed or high-risk area prevent sediment-laden runoff from leaving the site before sediment is properly removed. For short slopes, runoff control measures at the top of the slope reduce the amount of runoff reaching the disturbed area. For longer slopes, several dikes or swales are placed across the slope at intervals. This practice reduces the amount of runoff that accumulates on the face of the slope and carries the runoff safely down the slope. In all cases, runoff is guided to sediment trapping area or a stabilized outfall before release.

General Design Requirements

Runoff conveyance measures are used in areas of overland flow. Direct runoff channeled by diversion dikes or swales to an adequate sediment trapping structure or stabilized outfall. Provide enough channel slope for drainage but not too much slope to cause erosion due to high runoff flow velocities. Temporary runoff control measures may remain in place as long as 12 to 18 months (with proper stabilization). Diversion dikes or swales remain in place until the area they were built to protect is permanently stabilized. Design permanent controls to handle runoff after construction is complete. Permanent controls should be permanently stabilized, and should be inspected and maintained on a regular basis.

Diversion Dike and Berm General Design Requirements

- Top Width. 2 foot minimum.
- Height of Dike or Berm 1.5 foot minimum measured from upslope toe.
- Side Slopes. 2H:1V or flatter.
- Grade. Limit grades between 0.5 percent and 1.0 percent.
- Stabilization. Stabilize slopes immediately using vegetation, sod, and erosion control blankets or turf reinforcement mats to prevent erosion.
- Outlet. Provide positive drainage to the upslope side of the dike so no erosion occurs at the outlet. Provide energy dissipation measures as necessary. Discharge sediment-laden runoff through a sediment trapping facility.
- Other. Minimize construction traffic over diversion dikes and berms.

Diversion Swale General Design Requirements

- Bottom Width. 2 foot minimum, with a level bottom.
- Depth. 1.5 foot minimum.
- Side Slope. 2H:1V or flatter.
- Grade. Maximum 5 percent, with positive drainage to a suitable outlet.
- Stabilization. Stabilize with erosion control blankets or turf reinforcement mats immediately.
- Outlet. Level spreader or riprap to stabilize outlet/sedimentation pond.

Installation

Stabilized using vegetation, sod, and ECBs or TRMs before any major land disturbing activity takes place.

Install the top width of diversion dikes at least 2-feet wide. Install the bottom width at ground level at least 8-feet wide.

The minimum height for earthen dikes is 18-inches, with side slopes no steeper than 2H:1V.

Minimize construction traffic over diversion dikes and berms. However, for points where vehicles must cross the dike, the slope should be no steeper than 3H:1V and the mound should be constructed of gravel rather than soil.

Prior to swale excavation or dike building, clear and grub all trees, brush, stumps, and other objects in the path of the diversion structure.

Ensure the minimum constructed cross section meets all dimensions shown on the plans.

Immediately after construction establish vegetation by placing an Erosion Control Blanket on the diversion dikes and silt ditches.

Provide positive drainage to the upslope side of the dike so no erosion occurs at the outlet. Provide energy dissipation measures as necessary. Discharge sediment-laden runoff through a sediment trapping facility.

Inspection and Maintenance

- The runoff control measure should be inspected, every 7 calendar days and within 24-hours after each rainfall event that produces ½-inches or more of precipitation and repairs made as necessary.
- Damage caused by construction traffic or other activity must be repaired before the end of each working day.



Diversion Berm



Diversion Berm

Preventive Measures and Troubleshooting Guide

Field Condition	Common Solutions
Dikes wash out.	Re-grade, compact, and stabilize the soil used to build earthen dikes.
Area behind dikes eroded.	Stabilize the area. Use other BMPs to stabilize the uphill side of the dike.
Concentrated flow causes erosion.	Stabilize area and use check dams, ECBs, TRMs or riprap to prevent erosion.
Ditches and swales erode due to high velocity flows.	Stabilize and use check dams, ECBs, TRMs or riprap to prevent erosion.
Swales and ditches fill up with sediment.	Remove accumulated sediment from ditches and swales. Stabilize upstream contributing areas with appropriate erosion prevention BMPs.
Ditches and swales are overtaken by flows.	Determine the upstream contributing areas and size ditches and swales to handle anticipated flow velocities.
Outlet erodes.	Re-grade and stabilize outlet with ECBs, TRMs or riprap.