Diversion dikes can be used to contain stormwater onsite

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Temporary Diversion Channel

Description

An earthen perimeter control usually consists of a channel or a combination dike and channel constructed along the perimeter of and within the disturbed part of a site. An earthen perimeter control is a ridge of compacted soil, often accompanied by a ditch or swale with a vegetated lining, at the top or base of a sloping disturbed area. These control practices are called temporary diversion channels or ditches, earth dikes, and interceptor dikes. Temporary diversion channels are constructed to control the velocity or route (or both) of sediment-laden stormwater runoff.

When on the upslope side of a site, a temporary diversion channel helps prevent surface runoff from entering a disturbed construction site. An earthen structure located upslope can improve working conditions on a construction site. It can prevent an increase in the total amount of sheet flow runoff traveling across the disturbed area and thereby lessen erosion on the site. Temporary diversion channels also can be located on the down-slope side of a site to divert sediment-laden runoff created onsite to onsite sediment-trapping devices, preventing soil loss from the disturbed area.

Selection Criteria

Diversion channels apply where it is desirable to divert flows away from disturbed areas such as cut or fill slopes and to divert runoff to a stabilized outlet (USEPA, 1992). The channels can be erected at the top of a sloping area or in the middle of a slope to divert stormwater runoff around a disturbed construction site. In this way, earth channels can be used to reduce the length of the slope across which runoff travels, reducing the erosion potential of the flow. If diversion channels are placed at the bottom of a sloping disturbed area, they can divert flow to a sediment-trapping device. Diversion channels are usually appropriate for drainage basins smaller than 5 acres. With modifications they can service areas as large as 10 acres. Regular maintenance is required for this BMP to function as designed. Diversion channels can be very useful when combined with other appropriate BMP's.

To prevent stormwater runoff from entering a site, earthen perimeter controls can be used to divert runoff from areas upslope around the disturbed construction site. A continuous, compacted earthen mound is constructed along the upslope perimeter of the site. As an additional control measure, a shallow ditch can accompany the earthen mound.

Design Considerations

The siting of a diversion channel depends on the topography of the area surrounding the construction site. Another factor is whether the goal is to prevent sediment-laden runoff from entering the site or to keep stormwater runoff from leaving the site. When determining the appropriate size and design of earthen perimeter controls, consider

the shape and drainage patterns of the surrounding landscape. Also consider the amount of runoff to be diverted, the velocity of runoff in the diversion, and the erodibility of soils on the slope and in the diversion channel or swales (WA State Dept. of Ecology, 2005).

Construct diversion channels and fully stabilize them before any major land disturbance begins. This approach makes the diversion measure effective as an erosion and sediment control device.

The top of earthen perimeter controls designed as flow diversion measures should be at least 2 feet wide. The bottom width at ground level is typically 6 feet. The minimum height for earth channel should be 18 inches, with side slopes no steeper than 2:1. At points where vehicles will cross the channel, make sure the slope is no steeper than 3:1 and make the mound gravel rather than soil. This design makes the channel last longer and strengthens the point of vehicle crossing.

The excavated channel shape should be parabolic, trapezoidal, or V-shaped. Before any excavating or mound-building, remove all trees, brush, stumps, and other objects in the path of the diversion structure. Till the base of the dike before laying the fill. The maximum design flow velocity should range from 1.5 to 5.0 feet per second, depending on the vegetative cover and soil texture.

Maintenance

Inspect temporary diversion channels after each rainfall to ensure continued effectiveness. Maintain channels at their original height. Repair any decrease in height due to settling or erosion immediately. To remain effective, earth channels must be compacted at all times. Regardless of rainfall frequency, inspect channels weekly and after every rain event of .10 of an inch for evidence of erosion or deterioration.

Limitations

Earth channels are an effective means of diverting sediment-laden stormwater runoff around a disturbed area. But the concentrated runoff in the channel or ditch has increased erosion potential. Diversion channels should direct flow to sediment-trapping devices, where sediment can settle out of the runoff before it is discharged to surface waters. Sediment-trapping devices that work with diversion structures include sediment basins, check damns, and any other structures designed to allow sediment to be collected for proper disposal.

If a diversion dike crosses a vehicle roadway or entrance, its effectiveness can be reduced. When possible, design diversion dikes to avoid crossing vehicle pathways.

When properly placed and maintained, earth dikes used as diversions can control the velocity and direction of stormwater runoff. Used by themselves, they do not have any pollutant removal capability. They must be used with an appropriate sediment-trapping device at the outfall of the diversion channel.

Figure 1
Diversion Ditch Diagram

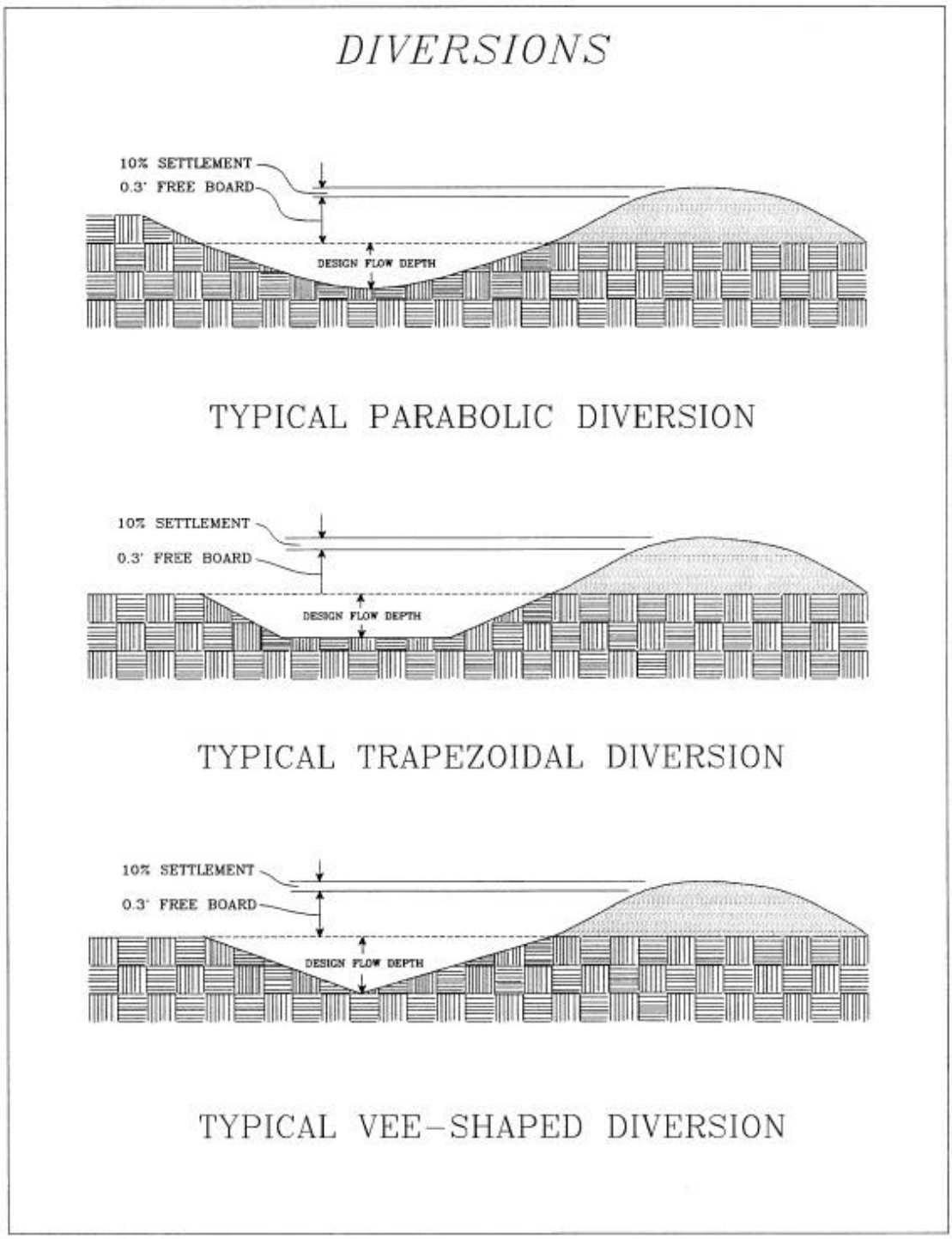

Photo 1
Diversion Ditch

References

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