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Erosion Prevention and Sediment Control Handbook

4.2.2 Diversion Channel



Source: TNWRRC

Definition and Purpose

Diversion channels, also known as diversion swales, are earthen or lined wet weather conveyances designed to manage stormwater runoff on construction sites. Typically constructed along the perimeter of a construction site, they function by intercepting and redirecting runoff to prevent erosion and protect downstream areas and adjacent properties. These channels can be paired with soil diversion berms or dikes (compacted soil ridges), reinforced mats, vegetative linings, conventional riprap, etc. to control water flow and reduce sediment transport (VDEQ, 2024).

Appropriate Applications

Diversion channels are commonly placed at the top of slopes to prevent runoff from entering disturbed areas or at the bottom to direct runoff toward sediment control measures. These measures are most effective for drainage basins under five acres but can be modified for larger areas. Diversion channels also help protect lower-lying areas from erosion, safeguard vegetation, and control runoff near sensitive areas like sinkholes in karst landscapes. They also help maintain stable working conditions by keeping excessive runoff from entering the



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construction site and can be used to divert clean water around environmentally sensitive or disturbed areas.

Limitations and Maintenance

If not stabilized prior to construction activities, runoff will likely erode the channel and become a source of sediment. These channels should be inspected with special attention given to erosion, sediment buildup, and structural integrity. Sediment should be promptly removed from the flow path, and any signs of settling or erosion should be repaired immediately to maintain the original depth and capacity of the channel. By themselves, diversion channels do not have any pollutant removal capability. They must be used in series with an appropriate sediment control measure at the outfall of the diversion channel, while ensuring the outfall is also properly maintained. Reseed or enhance protection on areas that continually fail or fail to establish vegetative cover (VDEQ, 2024). If a diversion dike crosses a roadway, its effectiveness can be compromised, so placement should minimize conflicts with vehicle pathways. Channels should be compacted immediately upon construction and once the construction area is permanently stabilized the ridge and channel should be removed to blend with natural ground cover and appropriately stabilized.

Planning and Design Considerations

Before land disturbance begins, diversion channels should be fully stabilized to prevent erosion and ensure long-term functionality. Construction of diversion swales involves removing all trees, brush, stumps, and obstructions that could interfere with functionality.

The excavated channels often have a parabolic, trapezoidal, or V-shaped cross-section. Cross-sections are to be sized adequately to convey peak flows from the design storm specified in the CGP or local regulations. Refer to Table 2-A for sizing and geometries of square, trapezoidal, V-shaped, and circular cross-sections. Limit side slopes to no steeper than 2H:1V wherever possible. At vehicle crossings, a 3H:1V slope is recommended, with conventional riprap placed with geotextile lining for reinforcement. Refer to Tables 3.3.2.1-A and 3.3.2.1-B and manufacturer specifications for velocity thresholds of various channel linings. The recommended top width of the adjacent berm is at least two feet with a minimum freeboard of 0.3 feet (VDEQ, 2024). To prevent sediment buildup and ensure proper drainage, grades should be uniform or gradually increasing, as sudden changes in grade can lead to sediment accumulation and overtopping.

Runoff from disturbed areas should be directed to sediment traps, basins, or other sediment control measures while flow from undisturbed areas should be discharged in a way that prevents erosion and scour. The discharge location should accommodate the flow from both the diversion and other contributing areas, this is to reduce sediment-laden water from being released off site (NCDEQ, 2013).



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Example Application

Refer to Sections 3.3.2.3 and 4.3.2 for an example regarding the sizing of a channel and Section 4.2.6.1 for lining the channel.

References

- City of Albany. (2024). *Erosion Prevention and Sediment Control Manual*.
- NCDEQ. (2013). *Erosion and Sediment Control Planning and Design Manual*.
- VDEQ. (2024). *Virginia Stormwater Management Handbook*.