

Facts About: Swales

Stormwater Best Management Practices (BMPs)

Swales are linear channels that convey stormwater runoff, and provide water quality treatment and flow attenuation (retaining water and slowly releasing it). Swales use soils and vegetation to provide pollutant removal through vegetative filtering, sedimentation, biological uptake, and infiltration into the underlying soil media. Because they are linear, swales are effective at treating runoff from roadways or property boundaries. There are small, micro-scale swales, and larger, open channel swales.

Micro-Scale Swales

Micro-scale practices are small environmental site design (ESD) water quality treatment devices that capture and treat stormwater runoff from impervious areas less than one acre in size. They can be similar to larger structural practices, but unlike larger practices, smaller devices can provide stormwater management at the source, throughout a site, rather than the final treatment for a large drainage area. There are three types of micro-scale swales described below:

Bio-swales are very similar to micro-bioretention practices in that they use vegetation such as plants, shrubs, and small trees to provide filtering. Bio-swales can be used in all soil types. **Grass swales**, which are typically used along roadways and highways, have grass covering the slope and bottom of the swale for filtering. Micro-scale **wet swales** are best suited for treating roadway runoff in low-lying areas with high groundwater. They are designed to remain saturated, maintaining wetland plants and conditions.

Check dams or weirs, which are small barriers across the width of the swale, may be used to enhance storage and slow down the flow of stormwater on its way to a stream or river.



Sinuous bio-swale



Grass swale

Design Variants

- Bio-swales
- Grass swales
- Wet swales

Pollutant Removal Efficiencies

- Sediments 80%
- Phosphorus 66%
- Nitrogen 56% (as part of a system of ESD practices)

Open Channel Swales

Structural swales are vegetated open channels that provide conveyance, water quality treatment, and flow attenuation of stormwater runoff. They treat more runoff from a larger area than their micro-scale counterparts. **Dry swales** are often used for treating parking lots or rooftops or low density residential areas, and are larger versions of micro-scale grass swales. Structural **wet swales** are best-suited for treating highway runoff in low-lying or flat areas. Open channel swales may also use check dams or weirs to enhance storage and slow down the flow of stormwater.



Dry swale



Wet swale

Design Variants

- Dry swale
- Wet swale

Pollutant Removal Efficiencies

- Sediments 90%
- Phosphorus 60%
- Nitrogen 50% (as part of a system of ESD practices)

More Information

For information on specific design criteria, go to Maryland's Stormwater Design Manual:
mde.maryland.gov/programs/water/StormwaterManagementProgram/Pages/stormwater_design.aspx