Chester County Stormwater BMP Tour Guide

Published by: Chester County Conservation District

Spring 2002

BMP: **Vegetated Biofiltration Swale**

Site Name: **Oaklands Corporate Center** (Location: 412 Creamery Way)

Location: West Whiteland Township, ADC Map Coordinates: 21-D13 & E13
Directions: Approximately 4 miles west of the intersection of Business Route 30 and Route 100 on the left side. Make left at light onto Whitford Road. Right onto Creamery Way. Locations include: 412 Creamery Way and 436 Creamery Way. Follow road to rear of these locations to see stormwater facilities. (Check with District about additional locations at this site.)

Watershed: East Branch Brandywine Creek (Stream Use Designation: WWF, MF)

Land Use: Commercial/Light Industrial

Description: A vegetated biofiltration swale is an earthen channel that intermittently conveys surges of stormwater runoff after storm events in which the vegetation planted in the channel is selected for its capacity to biologically filter common stormwater runoff pollutants. Biofiltration swales filter pollutants in stormwater through several mechanisms: plants uptake and absorb some pollutants; heavy particles (i.e., sand and grit) settle to the channel bottom; and other pollutants are removed as they come in contact with and infiltrate into surrounding soils. These swales are designed with a very gradual slope (less than 1 percent) to facilitate the slow flow of stormwater and to maximize stormwater contact time with vegetation and soils. Vegetation in swales must tolerate variable soil moisture conditions, including periodic inundation by stormwater and possible ponding.

Biofiltration swales can receive overland flow directly from the parking lot as well as stormwater discharges from site storm drainage system. Instead of solid curbing around parking lot perimeter, parking bumpers and curb-cuts can be used to direct runoff down the bank and directly into the swale. The banks of the swale must remain stabilized to prevent bank erosion.

The 6' wide biofiltration swale at 412 Creamery Way discharges into the wetland area and pond.

Function: Biofiltration swales manage both the quantity and quality stormwater runoff. The plants used in a biofiltration swale are selected for their pollutant-removal capacity as well as for their moisture tolerance.

- Filters stormwater pollutants including dirt and sand; nutrients; oil and grease; and heavy metals (common pollutants found on parking lots and at commercial sites) and discharges cleaner stormwater into the receiving waterway
- Vegetation helps dissipate energy of entering stormwater
- Promotes stormwater infiltration, assuming soils percolate, which recharges groundwater and helps maintain stable base flow in nearby streams
- Provides wildlife habitat
- Vegetation buffer provides aesthetic value once plants are established and grow

- Low maintenance BMP provided it is kept free of excessive sediment (i.e. construction sediment) and debris

Functioning as designed, biofiltration swales should approximate the following pollutant removal efficiencies:

- Total Suspended Solids (TSS): 70% to 81%
- Total Phosphorus: 30% to 34%
- Total Nitrogen: 84%
- Metals (including copper and zinc): 6%
- Bacteria (such as coliform): –25%

Note: *open channels, including biofiltration swales, are prone to bacterial pollution*

Operation and Maintenance: The Chester County Conservation District considers the operation and maintenance requirements for this structure to be moderate.

- Routinely inspect structure to ensure it is functioning properly
- Avoid running heavy equipment into or through the swale during swale construction and site development as well as during the life of the swale
- Only initial planting is required provided plants are successfully established
- Remove invasive plants as necessary (remove shoots and roots)
- Periodically clip plants to ensure their growth does not impede the flow of water through the swale or inlet and outfall pipes (biofiltration swales should not be mowed)
- Routinely remove accumulated trash and debris
- Keep drainage area free of debris to prevent trash and debris from entering the swale

Cost Factors: Biofiltration swales are a less costly stormwater management option than other pre-fabricated pollution control devices. Construction of a biofiltration swale can be less costly to install than construction of a concrete channel and has greater water quality benefits. Plantings needed in a vegetated biofiltration swale are more expensive than seeding costs for a grass-lined swale. Biofiltration swales do not require routine mowing, a long-term cost-savings. Periodic trimming and removal of invasive plants and of plants encroaching on inlet and outfall structures add to long-term maintenance costs.

For more Information

Owner: Brandywine Reality Trust, (610) 325-5600, Barbara Yamarik

Designer: 412 Creamery Way - Chester Valley Engineers, (610) 644-4623 (Angelo Carpuzzi)

Township: West Whiteland Township, (610) 363-9525 (Joe Roscioli)

References

PA Handbook of Best Management Practices for Developing Areas. Prepared by CH2MHILL. Spring 1998.

Approaches to Stormwater Treatment, Watershed Leadership Kit Volume 4. Prepared by Center for Watershed Protection, Inc. Copyright 2001.

Site 21 - Oaklands Corporate Center – Biofiltration Swale

Pictured above: curbcut and parking bumpers direct parking lot runoff down a stabilized bank into the biofiltration swale. Biofiltration swales are well-vegetated, linear channels that filter pollutants in runoff through physical, chemical and biological actions of resident plants, soils and microbes. (gradual slope of less than 1% promotes slow flow of stormwater maximizing contact time with vegetation and soils.