



Chester County Stormwater BMP Tour Guide

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BMP: **Infiltration Trenches (Infiltration Berms)**

Site Name: Hills of Sullivan Residential Subdivision

Location: London Grove Township, ADC Map Coordinates: 46-D11
Directions: Rose Hill Road south, Left onto Avondale Rd, Right onto Clay Creek Road, Left onto Angelica Drive. Access this BMP via trail on HOA-owned open space. Follow narrow trail from Angelica Drive just above the bridge; trail is above the creek and below the basins.

Watershed: White Clay Creek (Stream Designation: CWF, TSF)

Land Use: Residential Development

Description: Infiltration trenches, also called infiltrator berms, are narrow, elongated, depressions created by built up earthen embankments, or berms, that promote stormwater infiltration. At this site, the infiltration trenches are elongated, shallow trenches that collect and temporarily store stormwater runoff from the upslope residential lots and streets and promote its infiltration. Stormwater that collects in these narrow depressions on the hillside gradually seeps through the soil into the ground and eventually into the creek and water table below. These berms and their respective trenches run across the slope and follow the contours of the land. There are three 400' long trenches terraced, or stepped, down the slope with one below another. When the uphill trench is filled to capacity, stormwater overflows into the trench below. There is also a single 1000' long trench that functions independently of the three terraced trenches. This large trench receives stormwater through a subsurface pipe. Because stormwater entering this trench is conveyed through a pipe with a steep slope and has high velocity, a concrete chamber is used to dissipate its energy before discharging into the trench. When this trench overflows, stormwater spills over its downslope berm and flows down the bank into the stream below.

For an infiltration trench to properly function, the bottom soil must be permeable and remain uncompacted for the life of the structure. Soil percolation tests performed prior to trench construction and at the conclusion of earth disturbance are used to ensure soil infiltration capacity. Vegetation has naturally established itself in the trenches. The berms, which double as a walking path, consist of gravel and grassy base and are wide enough to permit access for future maintenance of these structures.

Function: Infiltration trenches replenish the water table, recharge groundwater supplies, and stabilize base flow in streams. They provide efficient recharge since infiltration occurs close to where the runoff is generated thus limiting evaporative loss and infiltrating more rainfall. They provide an opportunity for physical filtration of pollutants in stormwater runoff removing suspended solids including dirt and sand particles (solids accumulate in vegetation and bottom soils). Oil and grease bound to suspended particles, and their heavy metal constituents, may also be filtered from runoff. This structure provides natural vegetated open space for wildlife. The berms of the trenches function as a walking trail for the community and provide maintenance access.

This BMP is not advisable for use in drainage areas that have extensive stormwater pollution sources (i.e., hotspots), since independently it has limited pollutant removal capabilities. Functioning as designed, infiltration structures can approximate the following pollutant removal efficiencies:

- Total Suspended Solids (TSS): 95 %
- Total Phosphorus: 70 %
- Total Nitrogen: 51 %
- Metals (copper and zinc): 99
- Bacteria: Not Applicable

Operation and Maintenance: The Chester County Conservation District considers infiltration trenches to have moderate maintenance requirements. Operation and maintenance requirements include the following:

- Regularly inspect to ensure they are infiltrating
- Regularly inspect structural components (i.e. energy dissipater, inlet structure) to ensure they are functioning properly
- Periodically clip plants to ensure their growth does not impede the flow of water through the structure
- Remove invasive plants as necessary (remove shoots and roots)
- Routinely remove accumulated trash and debris
- Avoid running heavy equipment in the trenches to prevent soil compaction
- At the completion of construction, scrape soils to remove accumulated sediment and conduct soil percolation test
- Do not apply chemical pesticides or fertilizers to turf in and around infiltration structures

Cost Factors: In general, the cost to construct and maintain infiltration trenches is comparable to the cost of constructing and maintaining large stormwater basins, which would have otherwise been necessary. Soil percolation tests performed before and after construction as well as measures taken to protect the infiltration basin from sediment inundation during construction add to project costs, but help ensure proper function of the infiltrator berms.

Other Township Sites that Employ this BMP

Ashland Woods. (Map Coordinates: 46-D11) Located near the intersection of Sullivan Road and New Garden Station Road on Jack Reynolds Way. Recharge basins in this development are located on individual lots owned by respective homeowners.

For More Information

Owner: Township-Owned Open Space, 610-345-0100

Township: Township Engineer: URS, 302-791-0700 (Larry Walker)

References

Center for Watershed Protection, *Approaches to Stormwater Treatment*, Copyright 2001.

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

Site 12 - Hills of Sullivan – Recharge Trenches/Infiltrator Berms



View from Clay Creek Rd: trenches at the base of the grassy hill in background; berms barely visible through trees as horizontal undulations.



This grassy path is an embankment, or berm, creating depressions for recharge trenches located to the left of the path.



Narrow, vegetated recharge trenches follow land contours and take on a naturalized appearance.



This trench has a subsurface energy dissipator to reduce the velocity of entering stormwater.