



Chester County Stormwater BMP Tour Guide

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BMP: Recharge Trenches (Infiltrator Berms)

Site Name: Yarmouth Stables

Location: London Grove Township, ADC Map Coordinates: 45-G6
Contact site owner to schedule a tour.
Directions: From Route 1, Exit onto Rt 841 (Chatham Road) north; left onto Woodview Rd; left onto Guernsey Road, 426 Guernsey Road on left side. Basins located to left of driveway.

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

Land Use: Recreation/Horse Stables

Description: Recharge trenches, also called shallow recharge basins or infiltrator berms, are shallow depressions created by built up earthen embankments, or berms, that collect and temporarily store stormwater runoff allowing it to infiltrate into the ground and eventually into the water table below. At this site, there are seven shallow recharge trenches that are terraced down the slope; each trench is separated by constructed earthen berm. Each individual trench runs across the slope and is constructed to follow contours of the land. The trenches are graded so that the bottom is level to avoid the development of preferential flow paths. Stormwater overflowing one basin flows over a spillway into the basin immediately below. At this site, the berms separating the trenches are about 5-feet wide to permit access by maintenance vehicles. The trenches and berms are currently vegetated with turf grass, but may be replanted with alternative vegetation and ground cover to reduce maintenance requirements. For trenches to effectively infiltrate stormwater, the soil at the bottom must be permeable and remain uncompacted for the life of the structure. Soil percolation tests must be performed prior to basin construction and at the conclusion of any earth disturbance to ensure soils have sufficient infiltration capacity.

Function: Infiltration structures, like these shallow recharge basins, replenish the water table, help sustain stable base flow in nearby streams, and recharge groundwater supplies. These infiltration structures provide efficient recharge since infiltration occurs close to where the runoff is generated thus limiting evaporative loss and infiltrating more rainfall. These recharge basins primarily provides physical filtration of pollutants in stormwater runoff removing sand and dirt suspended in the runoff. These suspended solids accumulate at the basin bottom. Oil and grease that may be attached to sand and dirt particles, and their heavy metal constituents, can be removed as suspended solids settle and stormwater infiltrates. This structure takes on the appearance of open space at sites like this one where it is integrated into the landscape (i.e. it follows the natural contours, the shallow basins don't have any concrete or metal structural components).

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, like shallow recharge basins, 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: Chester County Conservation District considers shallow recharge basins to have low to moderate maintenance requirements once installed and once site disturbance is completed. Operation and maintenance requirements include the following:

- During site construction and any earth disturbance activities, protect soils in the basins from sediment inundation (at this site, baffle walls were constructed within two of the basins to trap sediment during site development and help control its dispersal)
- At the completion of construction, scrape soils in the basins to remove accumulated sediment and conduct soil percolation test
- Avoid running heavy equipment in the basins to prevent soil compaction
- Inspect recharge basins regularly to ensure they are infiltrating
- Maintain turf in accordance with site maintenance schedule (i.e., meadow maintenance generally calls for mowing once or twice a year)
- Limit mowing to maximize the opportunity for planted vegetation to trap pollutants present in stormwater runoff entering the basin
- Avoid applications of chemical pesticides and fertilizers in and around recharge basins

Cost Factors: Factors influencing the cost of this BMP include the land value and construction costs associated with the installation of multiple infiltration trenches or berms. The Conservation District considers these costs to be comparable to alternative stormwater management methods, which also have construction costs and substantial land requirements. One alternative, a subsurface infiltration structure under the parking lot, was considered to manage site stormwater, but not selected due to the high cost of maintaining a subsurface stormwater structure over the long-term. One factor that might minimize construction cost for this BMP relative to over BMPs is that its construction may not require as much earth disturbance, earth movement, and stockpiling since it closely mimics existing land contours and generally follows existing drainage paths. This BMP is also considered a better investment, since infiltration structures are expected to manage stormwater more effectively than a single large pond. Soil percolation tests performed before and after construction as well as measures taken to protect the infiltration basin from sediment inundation during construction added to project costs, but help protect the structure and ensure its function.

For More Information

Owner: Bulldog Construction Co. Inc., 610- 383-7042 (Robert Reese)

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 13

Site 13 - Yarmouth Stables -- Future Infiltration Trenches/Infiltrator Berms (During Construction)



During site development, efforts are made to protect soils and prevent compaction of soils in future infiltration trenches (here a chain link-filter fabric baffle helps to control sedimentation). When construction is complete, soils will be scraped and percolation tests will be performed to ensure soils permit infiltration.

