



Chester County Stormwater BMP Tour Guide

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BMP: **Shallow Surface Recharge Basins and Vegetated Swale**

Site Name: Feters Mill Residential Subdivision
Not a Self-Guided Tour Site. See Tour Guidelines below.

Location: East Whiteland Township, ADC Map Coordinates: 22-J6

Watershed: Valley Creek (Stream Designation: HQ)

Land Use: Residential Development

Description: A shallow surface recharge basin is a shallow depression that permits entering stormwater to collect and infiltrate into the ground below. A recharge basin is designed to detain, or store, stormwater until it gradually seeps through the soil into the ground and eventually into the water table. For a recharge basin to properly function, the soil at the basin bottom must be permeable and remain uncompacted for the life of the structure. Soil percolation tests performed prior to basin construction and at the conclusion of earth disturbance verify that soils have sufficient infiltration capacity.

At this site, the recharge basins are terraced in a line successively down a slope with stormwater entering one basin. When the upper basin fills, stormwater will overflow into the basin immediately downslope. A vegetated swale with a gradual slope runs through the center of the recharge basins and conveys stormwater from one basin to the next. A spillway at the base of the slope directs any overflow into a detention basin. Recharge basins will be planted with trees, herbaceous plants, and grasses along their slopes and edges. Vegetation selected will be tolerant of variable soil moisture conditions and tolerate periodic inundation following storm events. The detention basin will be planted with firethorn to discourage access. The shallow recharge basins are designed to infiltrate stormwater runoff from the two-year storm; the basins along with the detention basin provide capacity for the 100-year storm event.

Function: Infiltration structures replenish water table and help sustain stable base flow for streams. Infiltration structures like this one provide efficient groundwater recharge since infiltration occurs relatively close to where the runoff is generated thus limiting evaporative loss and infiltrating more rainfall. An infiltration structure provides primarily physical filtration of runoff removing sand and dirt, which accumulates at the basin bottom. Oil and grease attached to suspended solids, and their constituent heavy metals, may also be removed prior to stormwater infiltrating into the subsurface. This structure designed to follow the natural contours of the land is aesthetically pleasing and takes on the appearance of open space for the development.

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 basins can approximate the following pollutant removal efficiencies:

SITE 5

- 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 basins to have moderate maintenance requirements. Operation and maintenance requirements include the following:

- Inspect infiltration basins regularly to ensure they are infiltrating
- Avoid running heavy equipment over basins to prevent soil compaction
- At the completion of construction, scrape soils to remove accumulated sediment and conduct soil percolation test
- Maintain turf in accordance with site maintenance schedule (meadow maintenance generally calls for mowing once or twice a year)
- Limit mowing to maximize the opportunity for planted vegetation to trap pollutants
- Do not apply chemical pesticides or fertilizers to turf in and around infiltration structures

Cost Factors: Infiltration, or recharge, structures have the potential to be more costly than conventional non-infiltrating stormwater structures, if there is a need to import soils for example. Other factors affecting the construction costs of recharge basins include required soil percolation tests and measures implemented during site development to protect permeability of basin soils. At this site, however, the recharge basins were designed in light of conventional stormwater ponds, which would have otherwise been required, and the cost differential for construction and long-term operation and maintenance appears to be nominal. Establishing vegetated structures can be more costly due to the cost of plants and the labor to do the planting; however, in general, these plantings, once established, have lower operation and maintenance costs.

For More Information

Tour Guidelines: Contact Lee Haller to schedule site visit. Group tours only.
Call Lee Haller at (610) 688-6115.

Designer: Medvecsky Associates 610-363-0830 (Lisa D'Andrea)

Township: Township Engineer: Surrender Kohli, Kohli & Associates

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 5 - Fetters Mill Shallow Surface Recharge Basins (During Construction)



Final construction of shallow surface recharge basins will occur at the completion of site construction.
Note: berm in center (directly above post in picture) forms the bank of the swale, which will be configured into shallow basins with a gradually-sloping swale to convey stormwater between basins.
(Basins will be located behind lots to be developed.)

