

PROJECT NAME:	Mill Brook Basin Retrofit	DATE:	12/14/07
ADDRESS/BLOCK & LOT	Union Township Block 5.1, Lot 40 – Grandin Court		
FACILITY TYPE:	Existing Swales and Detention Basin	PRIORITY:	>6

1. ISSUES AND CONCERNS:

Traditional approaches to stormwater infrastructure design focus on capturing and controlling large stormwater runoff volumes to protect against flooding. These systems were designed to effectively control peak stormwater discharge rates and volumes from developed sites during the 25-yr, 50-yr, and 100-yr storm events. This water “quantity” design approach has been applied and installed throughout New Jersey for the past 30 years and only just recently, have engineers and scientists looked to evaluate the water “quality” impacts associated with new development and the need for stormwater management systems that can protect streams and waterways from nonpoint source pollution.

Based on a preliminary field evaluation to the Mill Brook property, the existing stormwater management system design appears to consist of a series of vegetated swales that capture runoff from the residential development. While the swales seem to be functioning properly, they discharge into a large detention basin with a concrete-lined low flow channel. During small storm events, the low flow channel allows the runoff to completely bypass the basin. The basin also appears to be larger than necessary to manage stormwater from the Mill Brook Development.

2. EXISTING CONDITION BASED ON FIELD EVALUATION:

The existing detention basin on the site of the Mill Brook Development is located in the northeast corner of the site and is approximately 92,000 square feet in size. The area draining to the basin is estimated to be 31 acres. The traditional stormwater management detention approach does little to minimize impacts to water quality. Water is collected off the development and conveyed to a stormwater basin with a concrete-lined low flow channel. This type of channelized flow does not detain runoff, filter pollutants, or allow for infiltration, most significant during smaller water quality storm events. Stormwater is collected from the Development and conveyed via vegetated swales to a detention basin. The basin was one of the largest identified in the watershed, but does not appear to have a very large drainage area. Although the basin was observed after a substantial storm event, there was no evidence that the basin received any water except through the low flow channel. The basin is well maintained and in good condition. The outlet structure is in fair condition, as some erosion, trash, and debris blocked the outlet. There is a child safety concern regarding the existing outlet due to the lack of a grate covering preventing access into the outlet structure.

3. PROPOSED SOLUTIONS:

Several recommended actions have been proposed to upgrade the existing system and improve water “quality” performance of the basin. Actions include removing the existing concrete-lined low flow channel and installing a natural stone channel and infiltration trench. The recommended infiltration BMPs would provide pollutant removal from stormwater runoff generated by the parking lots and playing fields. The BMPs would also reduce runoff volume and increase recharge at the Mill Brook Development. The infiltration bed should be sized to target infiltration of the water quality design storm (1.25”) runoff volume. There also appears to be opportunities to bring stormwater from other areas, such as the adjacent playing fields and Strotz Road. A more detailed hydrologic and hydraulic analysis would be needed to determine all contributing catchment areas to assess how much additional water can be managed by the facility.

4. ANTICIPATED BENEFITS:

Preliminary calculations estimate that the existing detention basin at the Mill Brook Development receives runoff from a 31 acre drainage area that can be predominately classified as urban landscape with an expected Total Suspended Solid (TSS) load of 120 lbs/acre/yr and Total Phosphorus (TP) load of 1 lbs/acre/yr (NJDEP 2004 – The NJSW BMP Manual). Based on mass loading rates, it is estimated that a total of 3,100 lbs/yr of TSS and 19 lbs/yr of TP are generated by the site. The proposed infiltration trench would store, treat, and infiltrate runoff from the development. In evaluating the existing and proposed stormwater management systems, it is estimated that the existing system removes 1,550 lbs/yr of TSS and the proposed detention/infiltration system would remove 2,480 lbs/yr of TSS (60% improvement). In addition, the existing system provides TP reductions of 4 lbs/yr and the proposed infiltration system would reduce TP loads by 11 lbs/yr (200% improvement).

5. MAJOR IMPLEMENTATION ISSUES:

The Mill Brook Development Homeowner’s Association will need to endorse the project and be willing to implement and maintain the retrofit system. One of the most important components of implementing stormwater retrofits is to ensure that routine maintenance is provided and the systems function as they are designed. In addition, any work proposed in the basin located at the rear of the property may be located within areas regulated by the NJDEP Division of Land Use Regulation. Specifically, activities to repair or retrofit the overgrown detention basin may impact wetlands or wetlands transition areas, and any changes or modification to the discharge to receiving waters will be closely monitored by the Division of Land Use Regulation.

TASK	DESCRIPTION			ESTIMATED COSTS	
1	Prepare concept plan and present to Homeowners Association.			\$5,000.00	
2	Complete site topographic survey and soils testing.			\$6,000.00	
3	Conduct pre-application meeting with NJDEP and Hunterdon SCD. Prepare final design plans and permits.			\$15,000.00	
4	Prepare Stormwater BMP Maintenance Plan per NJDEP requirements.			\$2,000.00	
5	Prepare construction documents and solicit quotes from contractors.			\$4,000.00	
6	Install stormwater BMP retrofits				
		QUANTITY	UNITS	UNIT PRICE	
	Mobilization/Erosion Control	1	LS	\$ 15,000.00	\$15,000.00
	Outlet and Piping Repair	1	LS	\$ 7,500.00	\$7,500.00
	Low Flow Channel Removal	1	LS	\$ 2,000.00	\$2,000.00
	Infiltration Trench Construction	1000	SF	\$ 5.00	\$5,000.00
	Vegetation Mngmt/Plantings	1	LS	\$ 10,000.00	\$10,000.00
	Closeout/Contingency (20%)	1	LS	\$ 7,900.00	\$7,900.00
	Total Construction Cost				\$47,400.00
			TOTAL COST:	\$79,400.00	
			ANNUAL O&M COST:	\$1,500.00	



Low flow channel looking towards outlet



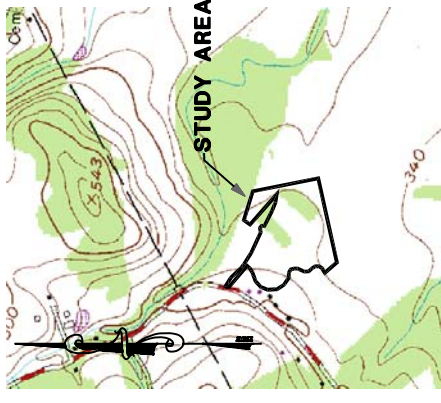
Low flow channel looking away from outlet



Outside orifice of outlet structure



Inside pipe of outlet structure



USGS QUAD LOCATION MAP
(HIGH BRIDGE, NOT TO SCALE)

LEGEND

- - - DRAINAGE AREA
- - - STREAM
- >>> RUNOFF FLOW DIRECTION
- SOILS
- PROPOSED BMP RETROFIT LOCATION

SOILS:

- BhnB - Birdsboro Silt Loam, 2-6% Slopes
- CoaBb - Cokesbury Loam, 0-8% Slopes
- RksB - Riverhead Gravelly Sandy Loam, 3-8% Slopes
- RarB - Raritan Silt Loam, 3-8% Slopes
- WadB - Washington Loam, 3-8% Slopes
- WadC2 - Washington Loam, 8-15% Slopes



SITE PLAN	
MILL BROOK BASIN RETROFITS	
DATE: DECEMBER 14, 2007	BLOCK 5.1, LOT 40 UNION TOWNSHIP HUNTERDON COUNTY, NEW JERSEY
SCALE: 1" = 200'	OMNI ENVIRONMENTAL
SHT. NO. 1 of 1	321 WALL STREET PRINCETON, NJ 08540 PH: (609) 924-8821 FAX: (609) 924-8851