

PROJECT NAME:	Perryville Office Park Plantings	DATE:	12/14/07
ADDRESS/BLOCK & LOT	Union Township Block 13, Lots 6 & 7 – Route 173 East (Frontage Road)		
FACILITY TYPE:	Existing Detention and Retention Basins	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 are 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 Foster Wheeler property, the existing stormwater management system design consists of two detention and two retention (wet) basins. While the detention basins appear to be functioning as designed, they do little to remove contaminants, such as suspended sediments and nutrients, from stormwater runoff. The basins are maintained as mowed turf, resulting in little water quality benefits from vegetation. The retention basins, while contributing to suspended sediment removal, have very little naturalized or buffer vegetation. Resident geese were observed during site visits and contribute significant nutrient loading to runoff during storm events.

2. EXISTING CONDITION BASED ON FIELD EVALUATION:

Four basins are located on approximately 70 acres on an office park campus off of Route 78 in Union Township, NJ. The basins are owned and maintained by the property management company. Two basins are dry detention basins, while two are designed as wet ponds. PV1 is the first detention basin. The basin is approximately 24,000 square feet. It is well maintained and is designed to have a wet bottom with an underdrain that flows to the outlet structure. Two inlet structures contribute water to the basin, and are in good condition. Some sediment deposition is evident in the grass bottom with stone rip rap near the outlet structure providing erosion protection. PV2 is also a maintained detention basin with a wet bottom. It is approximately 32,000 square feet. The inlet structure, though in good condition, is located within 20 feet of the outlet structure, leaving most of the basin unutilized for water quality treatment. The outlet structure was approximately 10 feet in height and in good condition with a well maintained turf bottom. PV3 is a wet pond. It is approximately 10,000 square feet. The basin is maintained and in good condition. There is no evidence of shoreline erosion or trash and debris, but water appeared to have a high level of suspended solids. No aeration equipment was visible or in use during the site inspection. The outlet structure is in satisfactory condition. PV4 was the second wet pond inspected on the Foster Wheeler site. The pond is approximately 53,000 square feet. It is located at the entrance to the site and contains two aeration fountains. The pond is well maintained and provides a focal point in the landscape at the entry to the campus. The inlet and outlet structures are in good condition. The only visible concern is the presence of resident Canada geese potentially contributing elevated levels of fecal coliform in the outflow.

3. PROPOSED SOLUTIONS:

Recommended actions at the facility focus on replacing turfgrass and routine landscaping with naturalized planting to upgrade the existing system and improve water quality performance of the basins. Native plantings are proposed as buffer areas around the wet ponds. The buffers would block line of sight for geese populations and improve the water quality of runoff flowing overland into the wet ponds. We also propose to modify the detention basin bottoms with improved soils and native wetland plantings. The plantings would add to the aesthetics of the basins and improve the water quality of the outflow through phytoremediation. The plantings would also spread flow throughout the existing basins, thereby increasing residence time and improving the effectiveness of the BMPs.

4. ANTICIPATED BENEFITS:

Preliminary calculations estimate that the existing basins at the development receives runoff from a 35 acre drainage area that can be predominately classified as industrial landscape with an expected Total Suspended Solid (TSS) load of 200 lbs/acre/yr and Total Phosphorus (TP) load of 1.5 lbs/acre/yr (NJDEP 2004 – The NJSW BMP Manual). The traditional stormwater management detention approach does little to minimize impacts to water quality. Water is collected from the development and conveyed to stormwater basins 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. Based on mass loading rates, it is estimated that a total of 7,000 lbs/yr of TSS and 53 lbs/yr of TP are generated by the site. In evaluating the existing and proposed stormwater management systems, it is estimated that the existing system would remove 4,900 lbs/yr of TSS and the proposed detention/infiltration system would remove 6,370 lbs/yr of TSS (30% improvement). In addition, the existing system would provide TP reductions of 26 lbs/yr and the proposed bioretention system is estimated to reduce TP loads by 34 lbs/yr (30% improvement). Along with the water quality benefits of this project, there is also a potential educational benefit. The project could involve the employees of the office park and members of the community in the design and installation of the plantings, as well as provide an educational exhibit on the importance of stormwater management and riparian vegetation.

5. MAJOR IMPLEMENTATION ISSUES:

The property management company will need to endorse the project and be willing to implement and maintain the alternative naturalized plantings. This approach, while reducing costs for weekly mowing, does provide for a change in aesthetic as naturalized plantings must be allowed to grow to heights of up to 2-3 feet to provide the most significant impact for filtering stormwater. While grasses are dominant in much of the naturalized buffer areas, wildflowers, as well as trees and shrubs can be used to provide variety and overall visual impact over the course of a growing season. Once established and accepted, naturalized plantings require minimal maintenance consisting of only occasional noxious weed control and an annual mowing.

TASK	DESCRIPTION			ESTIMATED COSTS	
1	Prepare concept plan and present to Property Management/Ownership			\$5,000.00	
2	Conduct review with Hunterdon SCD. Prepare final design and planting plans.			\$15,000.00	
3	Prepare construction documents and solicit quotes from contractors.			\$4,000.00	
4	Install stormwater BMP retrofits				
		QUANTITY	UNITS	UNIT PRICE	
	Mobilization/Erosion Control	1	LS	\$ 10,000.00	\$10,000.00
	Vegetation Mngmt/Plantings (~1.25 acres)	55,000	SF	\$ 1.25	\$68,750.00
	1-Yr Warranty/Contingency (20%)	1	Percent	\$ 28,250.00	\$13,750.00
	Total Construction Cost			\$92,500.00	
TOTAL COST:				\$116,500.00	
ANNUAL O&M COST:				\$2,000.00	



PV1 inlets (2)



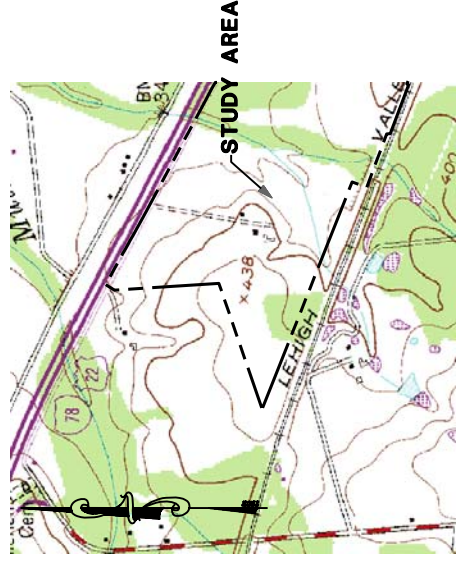
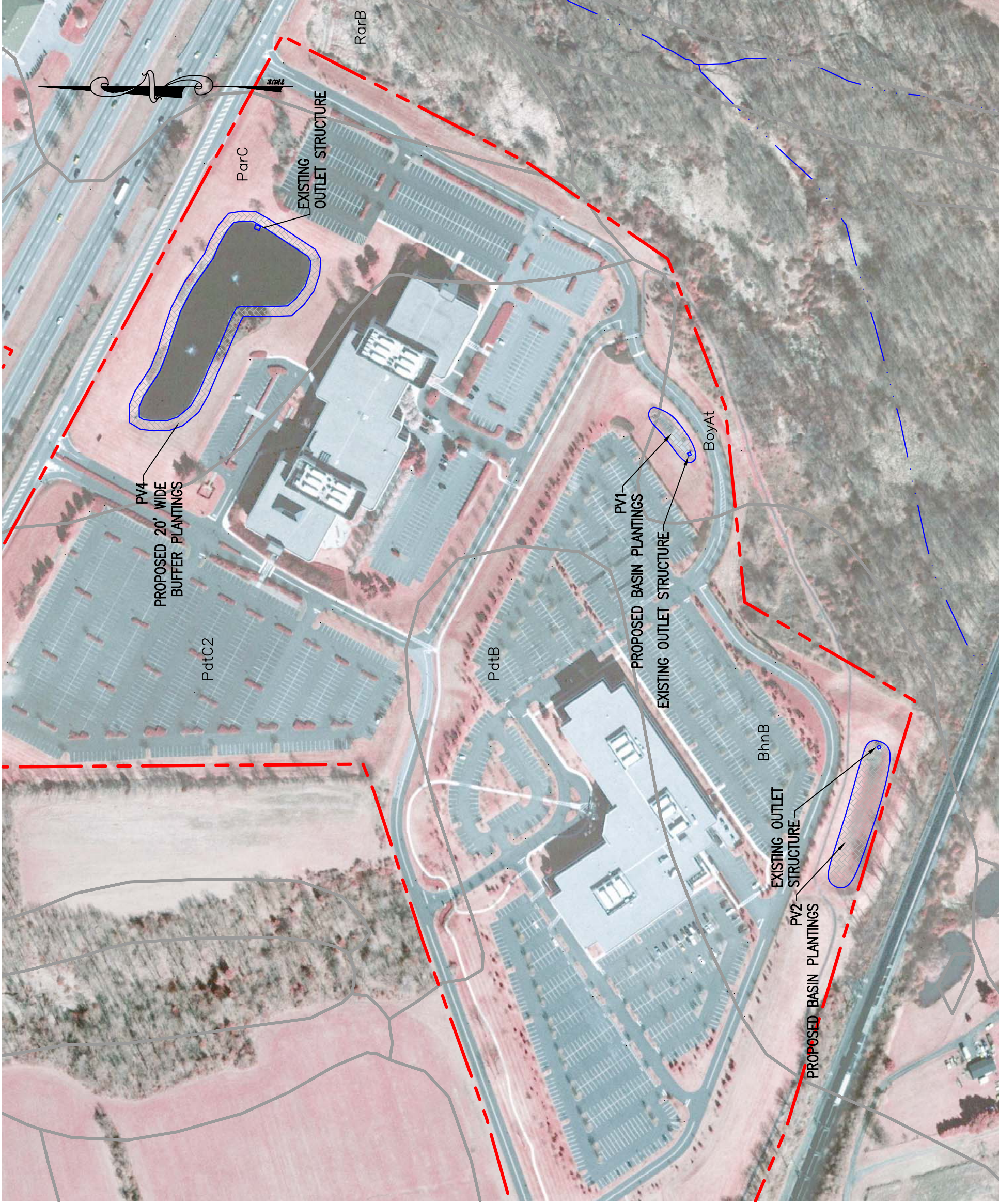
PV2 outlet and inlet (note close proximity)



PV3 wet pond



Geese around PV4 wet pond



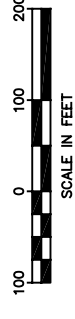
USGS QUAD LOCATION MAP
(HIGH BRIDGE, NOT TO SCALE)

LEGEND

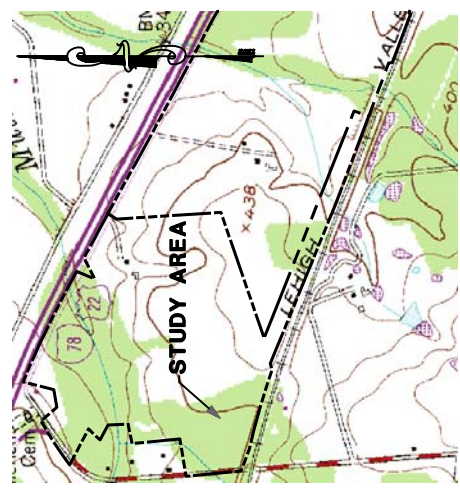
- - - DRAINAGE AREA
- · - · - STREAM
- SOILS
- PROPOSED BMP RETROFIT LOCATION

SOILS:

- BhnB - Birdsboro Silt Loam, 2-6% Slopes
- BoyAt - Bowmansville Silt Loam, 0-2% Slopes
- ParC - Parker Cobble Loam, 3-15% Slopes
- PdtB - Pattenburg Gravelly Loam, 2-6% Slopes
- PdtC2 - Pattenburg Gravelly Loam, 2-6% Slopes, eroded
- RarB - Raritan Silt Loam, 3-8% Slopes



SITE PLAN	
PERRYVILLE OFFICE PARK PLANTINGS	
DATE: DECEMBER 14, 2007	BLOCK 13, LOTS 6 UNION TOWNSHIP HUNTERDON COUNTY, NEW JERSEY
SCALE: 1" = 200'	OMNI ENVIRONMENTAL
SHT. NO. 1 of 2	321 WALL STREET PRINCETON, NJ 08540 PH: (609) 924-8821 FAX: (609) 924-8851

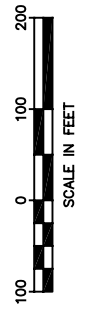


USGS QUAD LOCATION MAP
(HIGH BRIDGE, NOT TO SCALE)

LEGEND

- - - DRAINAGE AREA
- · - · - STREAM
- SOILS
- PROPOSED BMP RETROFIT LOCATION

SOILS:
 CoaBb - Cokesbury Loam, 0-8% Slopes, very stony
 PdtB - Pattenburg Gravelly Loam, 2-6% Slopes
 PdtmB - Pattenburg Gravelly Loam, mod wet, 2-6% Slopes
 GkaoB - Gladstone Gravelly Loam, 3-8% Slopes



SITE PLAN	
PERRYVILLE OFFICE PARK PLANTINGS	
DATE: DECEMBER 14, 2007	BLOCK 13, LOTS 7 UNION TOWNSHIP HUNTERDON COUNTY, NEW JERSEY
SCALE: 1" = 200'	OMNI ENVIRONMENTAL
SHT. NO. 2 of 2	321 WALL STREET PRINCETON, NJ 08540 PH: (609) 924-8821 FAX: (609) 924-8851