SANITARY SEWAGE AND STORMWATER MANAGEMENT

Chapter Ten

SANITARY SEWAGE

Chapter Ten A

A. Introduction

The development of the 51.88 acre site will result in the handling and discharge of sanitary sewerage from the proposed Crossroads NYS 312 project located along NYS Route 312 in the Town of Southeast, NY. The site is located along NYS Route 312 opposite the Terravest Corporate Park and Exit 19 of I-84. It is bounded by NYS Route 312 to the west, I-84 to the south, Metro North Railroad to the east, and residential property to the north.

This primary proposal consists of mercantile/retail development, a bank, and a restaurant. Currently there are no buildings of this type on this property.

B. Existing Conditions

According to the project engineers, BVH Integrated Systems, Inc., the proposed site currently has a single family house with a residential septic system. The existing system is old and would not have the capacity for the proposed project. At present there are no municipally owned sewers available for this site.

An existing privately owned wastewater treatment plant is currently serving two buildings in the adjacent Terravest Corporate Park; Ace Endico and Westchester Tractor. The plant was built to serve buildings in and around the Terravest Corporate Park and is approved for a 51,800 GPD flow.

The two buildings currently connected to the treatment plant Ace Endico (T-2 Building 1) and Westchester Tractor (T9) are currently generating an actual flow of between 1000 GPD and 3000 GPD. This is less than a third of the combined approved/allocated flow of 9,440 GPD for T-2 Building 1 (8,104 GPD) and T-9 (1,336 GPD).

There is an existing sanitary lift station constructed on the north side of Zimmer Road that accepts the gravity flow from Terravest Corporate Park and delivers it to the treatment plant.

The existing gravity sewer system in the Terravest Corporate Park extends from a high point in International Boulevard between Westchester Tractor and Ace Endico, northward along International Boulevard, then northwesterly across the Ace Endico property, across Zimmer Road, and into the existing pump station beyond the north shoulder of Zimmer Road.

C. Potential Impacts of the Proposed Project

The proposed project would not have any type of on-site septic system or sub-surface disposal system. Sanitary flows from this project would be conveyed to the existing wastewater treatment plant in the Terravest Corporate Park north of Zimmer Road. This plant has the capacity to receive and treat the flows anticipated from this project.

The development of this site would include a new sanitary piping system with pump stations to convey sanitary flows from this new development to the existing wastewater treatment plant in the Terravest Corporate Park. The development would also extend the existing grey water recycling system from Terravest Corporate Park to this proposed development. This system would bring back recycled water from the treatment plant that can be used to flush toilets and urinals within the development proposed for this site.

In August 6, 2007 a letter of approval was issued by the Putnam County Department of Health for the construction of a new sanitary lift station along International Boulevard across from Unilock near a sag point in the road. This new pump station would collect and convey sanitary flow into the existing gravity system. This pump station would need to be built and connected to convey flows from the Crossroads NYS 312 development. The approvals are in place to build this lift station.

Another sanitary lift station would also be needed on the Crossroads NYS 312 site. This station would supply a force main extending into a manhole near the intersection of International Boulevard and Geneva Road in the Terravest Corporate Park where a gravity line would convey flows to the lift station across from Unilock as shown on Map #43, Sanitary Sewer Plan.

The sanitary flows would then be pumped to an existing gravity system manhole in International Boulevard between Westchester Tractor and Ace Endico. The remainder of the system going to the treatment plant is already constructed and in use. The system has the capacity to accept the proposed flow from this project.

D. Recycled Water (Grey Water) System

The sanitary treatment plant was built with a recycled water (grey water) system. The recycled water system has a separate piping system that runs from the plant back into the Terravest Corporate Park. It is estimated that the proposed grey water usage by the proposed merchantile/retail space and bank would be 70% of their total water usage. It is estimated that the proposed grey water usage by the restaurant would be 30% of their total usage.

E. Design Flow Considerations

For design purposes it is assumed that the sanitary flows will equal the water usage. Water usage data was obtained from similar type facilities that are projected to be constructed on

this site. Actual water usage data is an accepted method listed in the "Design Standards for Wastewater Treatment Works, 1988 issued by the New York Department of Environmental Protection (NYDEC). When used, the actual flows are multiplied by factor of safety 1.5.

Actual water usage data for general retail and retail is 0.011 gallons per square foot of area. This value was obtained from the "Wastewater System Report" prepared by Insite Engineering for the Patterson Crossing development. That submission included water usage for Home Depot, Sam's and BJ's. A copy of that data is included in paragraph F "Supporting Data".

Water usage for the proposed restaurant is based on values listed in table 3 of the "Design Standards for Wastewater Treatment Works" of 35 gallons/day per seat for a 100 seat restaurant.

Water usage for the proposed bank is based on values listed in table 3 of the "Design Standards for Wastewater Treatment Works". This table shows 400 gallons per toilet per day. It is estimated that there will be 2 toilets maximum in the bank building.

The potential water usage for the T2 & T3-non-developed sites is shown in the Wastewater Flow Calculations Table and indicates projected usage based on similar existing facilities. Reference data is included later in this chapter.

The wastewater treatment plant was designed and permitted for 51,800 GPD and is intended to serve Terravest properties. Currently only Ace Endico and Westchester Tractor are connected to the plant. The Terravest master plan shows three lots opposite Ace Endico with new buildings and an elderly housing development around the plant. The 2004 report was developed to show the potential users and flows for the plant and used flows defined in available design standards.

The plant is currently operating with flows that are much lower than the design standards required during the plant design and approval. To date the metered flow information is available for the two current users and no other Terravest properties have taken any steps to connect to the sanitary system. At least one property in Terravest 1 has also replaced their septic system since the 2004 design.

The owner of the plant also owns the three parcels across from Ace Endico. The goal is to maximize the potential of the treatment plant and serve the development in the immediate area. The Crossroads flows have been calculated based on currently available information and have an applied safety factor of 1.5 where metered data was used. The calculations also demonstrate the plant has the ability to accommodate the Crossroads flows.

The calculated flows, contingencies, and allocations, all need to be revisited each time a new development or user connects to the system. If other existing building owners come forward and want to connect to the plant, or other parcels are developed at a later date, then future

development may need to be reduced if the sanitary plant reaches capacity sooner. The owner of the plant and empty parcels understands these scenarios and impacts of each connection. They also understand the need for people to connect to the system and recoup the costs of building the plant and developing the Terravest properties. All flows will continue to be adjusted as metered flow data becomes available from the actual users. Future connections should be considered "first come–first serve" until the plant capacity is reached.

The Primary Proposal for this project consists of:
148,000 square feet of retail, general commercial single tenant or multi-tenant building, a 7,000 square foot restaurant (we assumed 100 seats), a 3,000 square foot bank, and 28,000 square feet of general retail.

Based on the descriptions above, the established design flow is:

Retail (single/multi)	148,000 sf x 0.011 x 1.5=	2,440 gallons per day (gpd)
Restaurant	100 seats x 35 gal./seat=	3,500 gpd
Bank	2 toilets x 400 x .80=	640 gpd
General Retail	28,000 sf x 0.011 x 1.5=	462 gpd
Total		**7,042 gpd**

Based on the descriptions above, the grey water usage would be:

Retail (single/multi)	2,440 gpd x 0.7 =	1,708 gpd
Restaurant	3,500 gpd x 0.3 =	1,050 gpd
Bank	640 gpd x 0.7 =	448 gpd
General Retail	462 gpd x 0.7 =	323 gpd
Total		**3,529 gpd**

The following table outlines the capacity of the existing treatment plant, flows from existing buildings currently using the treatment plant, flows for the future development in the Terravest Corporate Park, flows anticipated from this project, and the remaining capacity for others:

Wastewater Flow Calculations (Primary Proposal):

Development Area/Building	Wastewater Generation (GPD)	WWTP Remaining Capacity (GPD)
Wastewater Treatment Plant (WWTP) Capacity		51,800
Existing Usage:		
Ace Endico & Westchester Tractor (3000 GPD x 1.5)	4,500	47,300
Proposed Development in Terravest Corporate Park		
T2 - Building 2 (16,000 sf x 0.011 x 1.5)	264	47,036
T2 - Building 3 (62,056 sf x 0.011 x 1.5)	1,024	46,012
T2 - Building 4 (41,850 sf x 0.011 x 1.5)	690	45,322
T3 – Elderly Housing (60 units x 80 gpd x 1.5)	7,200	38,122
Proposed Crossroads Primary Development		
Retail (single/multi)	2,440	35,682
Restaurant	3,500	32,182
Bank	640	31,542
Retail (general)	462	31,080
Remaining Capacity		31,080

F. Supporting Data:

The following information was taken from an approved Wastewater System Report for Patterson Crossing, Dated December 23, 2008, as prepared by INSITE Engineering, Surveying & Landscape Architecture, P.C., 3 Garret Place, Carmel, NY. They used lower application rates using the following summary of regional water consumption data gathered for varying sizes of retail establishments:

Small Dry Retail Stores (less than 10,000 s.f.)

Store	Approx. Building Area (s.f.)	Location	Time Period	Avg. Daily Flow (GPD)	Avg. Daily Flow per Bldg. Area (GPD/SF)
Village Paint	2,300	Carmel	7/07-9/07	18	0.0078
Radio Shack	2,300	Carmel	7/07-9/07	18	0.0078
Rockaway Bedding	4,500	Carmel	7/07-9/07	24	0.0053
Pier 1 Imports	9,500	Middletown	4/06-9/07	52	0.0055

Mean 0.0066 GPD/SF

Medium Dry Retail Stores (between 10,000 sq.ft. and 40,000 s.f.)

Store	Approx. Building Area (s.f.)	Location	Time Period	Avg. Daily Flow (GPD)	Avg. Daily Flow per Bldg. Area (GPD/SF)
CVS	10,000	Pawling	1/06-9/07	84	0.0084
Rite Aid	10,000	Carmel	7/07-9/07	303	0.0303
Payhalf	13,000	Wappingers Falls	1/07-11/07	17	0.0013
Michael's	25,000	Newburgh	7/06-9/07	176	0.0070
AC Moore	30,000	Middletown	4/06-9/07	342	0.0114
Linens N Things	32,000	Middletown	4/06-9/07	172	0.0054
Bed Bath & Beyond	35,000	Newburgh	1/07-9/07	148	0.0042
Toys R Us	38,000	Middletown	4/06-9/07	456	0.0120

Mean 0.0108 GPD/SF

Large Dry Retail Stores (greater than 40,000 s.f.)

Store	Approx. Building Area (s.f.)	Location	Time Period	Avg. Daily Flow (GPD)	Avg. Daily Flow per Bldg. Area (GPD/SF)
Best Buy	45,000	Middletown	4/06-9/07	532	0.0118
Dick's Sporting Goods	45,000	Middletown	4/06-9/07	227	0.0050
Kohls	75,000	Middletown	4/06-9/07	932	0.0124
Kohls	75,000	Newburgh	10/06-9/07	596	0.0079
Gander Mountain	123,000	Middletown	4/06-9/07	976	0.0079

Mean 0.0090 GPD/SF

The Mean for all 17 stores listed above (small, medium, and large) is 0.0094 which supports the 0.01 application rate.

Applying 0.01 GPD/SF flow rate and arriving at the 2,870 GPD flow to the WWTP you can see the CODE calculated flows of 5,120 GPD are 1.78 times higher than the measured flows for the dry retailers listed above. We would typically apply a safety factor of 1.50 to a measured flow. In this case the factor safety would be even greater.

If we then go on to consider the Big Box retailers which are typically over 100,000 s.f., the same December 23, 2008 Wastewater System Report for Patterson Crossing, by INSITE Engineering, Surveying & Landscape Architecture, P.C., 3 Garret Place, Carmel, NY, used the following supporting data:

Wholesale Warehouses

Store	Location	Time Period	Avg. Daily Flow (GPD)
BJ's	Wappingers Falls	1/07-11/07	1780
Sam's	Middletown	3/06-10/07	3,500

Home Improvement Centers

Store	Location	Time Period	Avg. Daily Flow (GPD)Lowes
	Newburgh	7/06-9/07	3,000Home Depot
	Newburgh	7/06-9/07	2,118Home Depot
	Middletown	3/06-10-07	2,861Home Depot
	9 Location in NJ	2001-2003	2,548

Considering all this additional supporting data the CODE calculated flows of 5,120 GPD would support these types of retailers or some combination of small, medium, large, and big box retailers.

G. Mitigation Measures Proposed

Water saving fixtures would be used to reduce the amount of water needed for this site and would therefore reduce the overall sanitary flow as well. The toilets and urinals would also be served by the grey water recycled system coming back to the site from the wastewater treatment plant also reducing the amount of fresh potable water needed for daily use.

The non-potable grey water recycled water system creates less demand for fresh water, and puts less water into the Sub-Surface Disposal System at the wastewater treatment plant. This combined with the water saver fixtures will save water.

Although this is not a LEED project, many of the USGBC initiatives and Green Building features are being woven into this project. The recycle water system is just one of the LEED initiatives encouraged by the United States Green Building Council.

STORMWATER
Chapter Ten B

A. Introduction

The 51.88 acre site is located along NYS Route 312 opposite the Terravest Corporate Park and Exit 19 of I-84. It is bounded by NYS Route 312 to the west, I-84 to the south, Metro North Railroad to the east, and residential property to the north.

This approach applies to the Primary Proposal and can be utilized for the RC Zone Alternate and Hotel Alternate with minimal adjustments.

The site soils were investigated using both machine excavated open pits and soil borings to determine subsurface geology. The soils are described in the Geotechnical chapter prepared by the geotechnical engineer.

Currently there are no commercial buildings on the property. The base project would have a retail, restaurant, a bank each with grade level access.

B. Existing Conditions

The existing site is mostly vegetated and slopes from west to east. This site is essentially undeveloped except for a single family house, an open area for wood product processing, and a few simple logging roads which meander through the property.

There is a limited amount of storm drainage on the property. There are two point discharges along NYS Route 312 that drain across this site. Other than a few swales along a driveway and some small drainage piping related to the driveway there are no storm water improvements on this site.

There is evidence of minor erosion related to the point discharges coming from NYS Route 312. These areas have been observed by NYCDEP and the project engineers for this project. The erosion appears to have been created by heavy flows in the past (storm events) and do not exhibit any flow currently or even any evidence of recent flows.

The NYCDEP has determined that there are no water courses on this site.

Existing Conditions are shown on Map #44.

Water Resources and Wetlands are described on Chapter 9. The Geotechnical Engineer has examined the site and provides descriptions in Chapter 8.

C. Proposed Conditions

The proposed development will result in more impervious area on the site than the current conditions. The proposed development is sensitive to the topography of the property, on-site and adjacent wetlands, and the existing zoning regulations of the Town of Southeast. The developer proposes a plan which will limit the disturbed area of the site. Proposed earthwork will not exceed the manufactured slope regulations found in the Town Zoning code. The proposed design is on a horizontal plane with sufficient slope to drain stormwater and also blend with existing grades along Route 312. The proposal meets the zoning requirements of the HC-1 Zone, found in the Town Zoning Regulations, and the particulars of the Large Retail Zoning Code Section 138-63.4 wherein, among other elements, it is required that at least 25% of the parking be proposed as pervious paving. The proposal, to the greatest degree possible, avoids disturbance to all on or off-site wetlands and wetland buffers. Early recommendations from the Town have helped reduce the amount of impervious area.

The proposed storm drainage systems will collect, store, and convey water as required by the NYCDEP and the NYSDEC. Stormwater runoff and water quality will be mitigated by several measures including filters, swales, and ponds.

Ponds will be designed in accordance with the NYSDEC "Stormwater Design Manual" including Chapter 10 "Enhanced Phosphorus Removal Supplement". The design will also comply with the NYCDEP "Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and Its Sources" that require two different methods of treatment if the impervious area covers 20% or more of drainage area. A two foot minimum separation from groundwater or bedrock will be implemented into basin design.

Ponds will be sized and are positioned considering the needs of the project both during and after the construction is complete. In general terms the post development impervious area is approximately 16.0 acres. The combined volume of the six (6) ponds shown in the supporting drawings is estimated at 15 acre-feet. This volume would be sufficient for the water quality storage and would mitigate peak discharges from 1, 10, and 100 year storm events.

The ponds are not designed to infiltrate any water. The ponds would be designed with the appropriate plantings as recommended. Stormwater will be collected through conventional piping systems and conveyed to ponds before being discharged from the site at or below predevelopment rates. The ponds are currently sized to handle all the stormwater from the proposed development. One objective for this DEIS was to define the amount of disturbance needed for this project and make sure everything will fit on the site. The ponds will capture and treat the stormwater in series with vegetated swales and overland flow back to the design points. We anticipate the pond volumes will be reduced by raising the bottom elevations while maintaining the footprints.
There will be infiltration across the undeveloped portions of the site. There will also be

infiltration through porous pavement, porous pavers, vegetated swales, possibly rain gardens, and other "green features" yet to be designed. There will be both infiltration and surface flows. We plan to have surface flows from the ponds through vegetated swales (second means of treatment). The detention time in the ponds will attenuate the peak flows while ensuring the post development flows to the wetlands and design points do not exceed pre-development conditions.

Stormwater calculations were developed to allow the basins to be sized based on the amount of impervious area anticipated. The piping layout and hydraulic calculations will be developed later in the design process. Stormwater will be discharged from the site at a rate that does not exceed the pre-development runoff. Infiltration may be considered in the design if opportunities arise but is not included at this time.

Basic Runoff Calculations

Basins total volume is calculated based on stormwater runoff volume increase between the pre-development and post-development conditions. 16 acres of impervious area is used in calculations. Urban Hydrology for Small Watersheds (TR-55) methodology is used in particular date in the Table 2-1 "Runoff Depth for Selected CN's and Rainfall Amounts" is utilized.

Pre-development weighted CN = 63
Post-development CN = 98
Storage Volume per Figure 6-1, assumed Vs/Vr = 1 => Vs=Vr (most conservative)
Storm event Rainfall "Direct Runoff "Stormwater Runoff Volume increase
CN=63 CN=98 between the Pre- and Post-conditions in Cubic Feet

Storm Event	Inches	Pre	Post	Cubic Feet
1-yr.	3.2	0.53	2.97	170,000
2-yr.	3.5	0.66	3.27	182,000
10-yr.	5.0	1.51	4.76	227,000
25-yr.	6.0	2.18	5.76	250,000
100-yr.	7.5	3.29	7.26	277,000

Runoff Volume example calculation for 100 –yr. storm:
Volume = (7.26-3.29)/12 x 16 acres x 43560 Cu.Ft./acre = 230,578 Cu.Ft.
230,578 Cu.Ft.x1.2 (safety factor) = 276,693
Which was rounded up to: 277,000 Cubic Feet

We then added the water quality volume to 100-yr.storm
(the 2-yr. storm value was used as a conservative approach):
182,000 + 277,000 = 459,000 Cu.Ft. or 10.54 Ac.-Ft.

The 16.8 Ac.-Ft. of storage provided in the ponds is greater than the 10.54 Ac.-Ft. needed

(The tabulated pond volume in the report is the volume at 1.0 feet below overflow spillway)

Aside from the ponds, conveyance features such as piping systems, flow splitters, etc., still need to be designed but we do feel we have enough total storage to accommodate the proposed development stormwater. Once we determine the amount of pervious surfaces and consider any other areas that could infiltrate stormwater, we will then be able to reduce the pond volumes accordingly. The ponds shown also have freeboard above the volume levels which will be controlled with overflow structures, level spreaders, or other appropriate improvements. The undisturbed portions of the site will continue to infiltrate and flow as it does today. Later, when the piping is designed, sized, assigned inverts, etc. the delineation of the areas contributing to various ponds will be become more clear and better defined so that each pond takes an appropriate amount of runoff from the developed portions of the site

Impervious surface calculations, stormwater runoff, and pond sizing has been done to locate and position the buildings and ponds on the site development plan. Volumetric calculations were performed using methodology provided in TR55. Drainage areas are shown on Map # 45 and shown in the table below.

The following ponds and volumes will be created by this project:

Pond	Volume [Ac.-Ft.]	Pond Drainage Area [Acres]
1	1.4	4.0
2	4.1	7.6
3	4.5	6.9
4	2.5	7.0
5	1.5	2.9
6	2.8	6.5
Total	16.8	34.9*

*The remaining 25.9 acres +/- of the site will drain overland directly to the design points as it does presently.

Ponds 4, 5, & 6 will be used as temporary sediment ponds and will later be used for post-development storm water. As sediment ponds these 3 ponds have 6.8 acre-feet of storage, which is sufficient for the disturbance on this site during construction.

New York Standards and Specifications for Erosion and Sediment control have details adapted from details provided by the USDA – NRCS – NY State DOT – NY State DEC – NY State Soil and Water Conservation Committee. Per their standards the volume of sediment storage shall be 3600 cubic feet (cf) per acre (ac) or 134 cubic yards per acre.

That volume was used to confirm the basin sizes as follows (areas are shown on series C-6 drawings):

A. Area 1 (2.6 Ac) + Area 2 (6.2 Ac) + Area 3 (4.9 Ac) + Area 4 (2.8 Ac) + Area 5 (6.8 Ac) + Area 6 (8.6 Ac) + Area 7 (5.4 Ac.) = 37.3 Acres
B. 37.3 Acres x 134 cy/ac = 4,998 cy
C. 4,998 cy x 27 cf/yd = 134,951 cf
D. 134,951 cf / 43,560 = 3.1 acre-feet of storage

Ponds 4, 5, and 6 have 6.5 acre-feet of storage which is almost three times the required (3.1 ac-ft) volume. In addition, the various Areas have smaller temporary sediment ponds and stone swales which will reduce the sediment volume conveyed to Ponds 4, 5, and 6.

The proposed conditions will not increase the peak discharges from this site and therefore will not have negative impacts downstream.

The discharge locations are shown on the survey. Easements may not be necessary since there is no piping or improvements on the property. The existing headwall discharges are within the existing right-of-way and will remain without restriction. If easements become necessary as the design moves forward then they would certainly be provided.

C. Potential Impacts of the Proposed Project

As stated in the geotechnical report, the existing site soils are quite capable of supporting all anticipated construction needs. Soil will be disturbed as shown on the Site Construction phasing plan. Sequential disturbance will allow the contractor to concentrate efforts and avoid large scale erosion issues.

D. Proposed Sequence of Disturbance

As proposed certain areas of disturbance will exceed five (5) acres of disturbance so the owner will be requesting written authorization from the Department as required under General Permit 0-10-001, Part 2.C.3.

During the phased activities in the various work areas the owner will have a qualified inspector that will conduct at least two (2) site inspections in accordance with Part IV.C. every seven (7) calendar days for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

The areas of disturbance reflect a proposed sequence that allows the development to utilize on-site materials (rock) as the areas are cut and filled. In some cases, materials may be stockpiled on-site until needed while other areas may receive material directly.

The areas are defined with the intention that the work would proceed in one area at a time.

In areas where soil disturbance activity is temporarily or permanently ceased measures shall be installed and/or implemented within seven (7) days from the date the soil disturbance activity ceases. The soil stabilization measures selected shall be in conformance with the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control.

Each area will be stabilized before proceeding on to the next area. Exposed rock cuts will be considered stable. Exposed soil areas and surfaces will be stabilized temporarily using a bonded fiber matrix. The bonded fiber matrix is an erosion control measure utilizing a hydroseeding application that includes fiber strands.

The following Areas and sequence are proposed. The areas are shown on Maps #31 through #37.

Area 1 (2.6 Acres):

The existing site has a driveway from Route 312 into a cleared area and a house. This site entrance and working area will be utilized for construction access, staging, and initial site activities. Activities in this area will include:

- Silt fence along the lower sides of the clearing
- The cleared surfaces will be protected with processed gravel and stone.
- Existing drainage will be cleaned and maintained
- A stone anti-tracking pad will be constructed adjacent to Route 312. This stone pad will be cleaned and maintained as needed during activities on this site
- Existing debris will be removed
- A working platform will be established for parking construction related equipment and vehicles
- A temporary sediment basin will be constructed along with a stone swale leading to an existing vegetated swale
- A bonded fiber matrix will be applied to all exposed soil surfaces

Area 2 (6.2 Acres):

This area will be created by constructing access road from Area 1, at the eastern end of the site. The access road will extend to southwest corner of the property. The corner of the property will be cleared to allow the creation of new ponds 4, 5 & 6. Activities in this area will include:

- Silt fence along the lower sides of Area 2. This silt fence will be maintained until the project is completed and all surfaces are permanently stabilized.
- The access road will be surfaced and stabilized with crushed stone.
- Any existing drainage will be maintained.
- Clearing and grubbing.
- Stripping and stockpiling topsoil.
- Three ponds will be created to serve as temporary sediment ponds during the site clearing and construction activities. These ponds will later become permanent ponds.
- The ponds will be stabilized with appropriate vegetation and will be maintained in accordance with published regulations.
- Stormwater from the ponds will be released via a level spreader and/or rip-rap swale leading to overland flow.
- Runoff from the ponds will be monitored along with the maintenance of the ponds. The ponds and swales will be cleaned periodically to maintain their volume and purpose.

- A bonded fiber matrix will be applied to all exposed soil surfaces

Area 3 (4.9 Acres):
The northern part of this area will be a rock cut of the southern end of the proposed building site to the northern edge of Area 2. The cut will be to existing approximately elevation 580. A small section of the parking area and drive lanes will be included in this area. The material on the northern portion of this area will be a cut while the southern portion will be a fill. The soils will be stripped and stockpiled while the rock will be processed to create the fill material. The stone will be processed to various sizes and placed as directed by the geotechnical engineer to create the slopes and fill required. Activities in this area will include:

- Clearing and grubbing.
- Stripping and stockpiling topsoil.
- Creation of a stone swale along the lower edge of the Area leading to temporary sediment ponds in Area 2. Additional stone swales will also be created to bring flows from the temporary sediment basin in Area 3 down to temporary sediment ponds in Area 2 (Ponds 4, 5, & 6).
- Drilling and blasting.
- Processing and placement of stone.
- Slope construction and placement of on-site fill material.
- A bonded fiber matrix will be applied to all exposed soil surfaces.

Area 4 (2.8 Acres):
This area continues construction of the building site and some of the parking areas and drive lanes, to a point where the southern part of the building is included in either area 3 or area 4. The material on the western portion of this area will be a cut while eastern part will be a fill. The soils will be stripped and stockpiled while the rock will be processed to create the fill material. The stone will be processed to various sizes and placed as directed by the geotechnical engineer to create the slopes and fill required. Activities in this area will include:

- Clearing and grubbing.
- Stripping and stockpiling topsoil.
- A temporary sediment basin with stone swales leading to the temporary sediment basin constructed in Area 3.
- Drilling and blasting.
- Processing and placement of stone.
- Slope construction and placement of on-site fill material.
- A bonded fiber matrix will be applied to all exposed soil surfaces.

Area 5 (6.8 Acres):
This area completes construction of the building site, parking areas and drive lanes between areas 1 and 4. The material on the western portion of this area will be a cut while eastern part will be a fill. Soils will be stripped and stockpiled while the rock will be processed to create the fill material. The stone will be processed to various sizes and placed as directed by the geotechnical engineer to create the slopes and fill required. Activities in this area will include:

- Clearing and grubbing.
- Stripping and stockpiling topsoil.
- A temporary sediment basin with stone swales leading to the temporary sediment basin constructed in Area 4.
- Drilling and blasting.
- Processing and placement of stone.
- Slope construction and placement of on-site fill material.
- A bonded fiber matrix will be applied to all exposed soil surfaces.

Area 6 (8.6 Acres):
This area includes construction of new ponds 1, 2 & 3. The cut to the required elevations will happen on the western portion of this area while the eastern portion will be fill. Soils will be stripped and stockpiled

while the rock will be processed to create the fill material. The stone will be processed to various sizes and placed as directed by the geotechnical engineer to create the slopes and fill required. Activities in this area will include:

- Clearing and grubbing.
- Stripping and stockpiling topsoil.
- Creation of a stone swale along lower edge of the area.
- Construction of ponds 1, 2 & 3 and temporarily using them as sediment basins.
- Stone swale with lever spreader leading to existing wetlands.
- Drilling and blasting.
- Processing and placement of stone.
- Slope construction and placement of on-site fill material.
- A bonded fiber matrix will be applied to all exposed soil surfaces.

Area 7 (8 Acres):

This area includes area 1, completion of access roads and access lane along Route 312, and completion of constructed slope per the geotechnical engineer direction. The material on southern portion of this area will be cut while northern and western portions will be fill. Soils will be stripped and stockpiled while the rock will be processed to create the fill material. The stone will be processed to various sizes and placed as directed by the geotechnical engineer to create the slopes and fill required. Activities in this area will include:

- Clearing and grubbing.
- Stripping and stockpiling topsoil.
- Creation of stone swale along lower edge of the area leading to temporary sediment basins in Area 6.
- A temporary sediment basin with stone swales leading to ponds constructed in Area 6.
- Drilling and blasting.
- Processing and placement of stone.
- Slope construction and placement of on-site fill material.
- A bonded fiber matrix will be applied to all exposed soil surfaces.

E. Mitigation Measures Proposed

The proposed ponds will mitigate the impacts of the proposed development by capturing and treating all the stormwater flows. The site drainage system is designed to address detention as well as the stormwater quality requirements of NYCDEP and NYSDEC. A series of low impact development (LID) procedures, required by NYSDEC regulations will be employed. Rain gardens may be constructed in islands in the parking lots, pervious paving may be employed within the parking areas, and green roof technologies will be investigated. This detailed work will occur during the SEQRA Final Environmental Impact Statement and Final Site Plan Phase.

The new ponds at the southwest corner of the site will be constructed early and will be used as temporary sediment ponds during the construction activities to control runoff. Additional temporary sediment traps will also be used in various areas during the construction process in certain areas.

New catch basins will have 4 ft. deep sumps and hoods over the outlet piping. This will restrict sand, leaves, and other debris from entering the discharge piping and will collect this sediment at each structure before it can pass into any of the ponds.

Hydrodynamic separators will also be installed between the catch basins and the ponds to process the stormwater flow before it can enter any of the ponds. The technology and construction of these separators will remove any remaining debris. NYSDEC lists approved manufacturers and design efficiency. These separators typically remove a large percentage of the total suspended solids from the water to enhance the system and provide a better quality of water entering the ponds.

Low Impact Design will be considered where possible and may include features such as pervious pavement (beyond the required 25% minimum), pervious pavers, possibly infiltrator systems for some of the roof drainage under the parking areas, grassy islands, etc. Level spreaders, rip-rap swales, vegetated swales, wetland plantings in the ponds, and other features may be also be incorporated in the stormwater system design.

Although this is not a LEED project, many of the USGBC initiatives and Green Building features are being woven into this project. Pervious pavement is just one of the LEED initiatives encouraged by the United States Green Building Council.