3.2 Surface Water Resources

3.2.1 Existing Conditions

Surface Water Resources

Existing surface water features and drainage areas are shown on Figure 3.2-1. The project site contains a wetland complex that surrounds a perennial watercourse, identified as the South Branch of Minisceongo Creek. The on-site wetlands are a portion of the larger New York State Department of Environmental Conservation (NYSDEC) Wetland TH-13, which extends downstream from the site for a distance of approximately 0.5 miles. The South Branch has a watershed basin of approximately 5.86 square miles, including the 50.87 acres of upland area on the site that drains to the creek. The creek flows north to a confluence with the North Branch Minisceongo Creek, and the combined streams flow as Minisceongo Creek into the Lower Hudson River at the hamlet of Stony Point, New York.

Letter classes such as A, B, C, and D have been assigned to most inland surface waters in the state, with the highest values assigned to "Class A" waters and the lowest to "Class D" waters. Surface water classifications are presented in Title 6 Chapter X of the New York State Conservation Law, Parts 800-941. "Best uses" assigned to various surface water classifications by NYSDEC are described in Table 3.2.-1.

The South Branch (Waters Index Number H-43-1-10) tributary of the Minisceongo is classified as a Class C watercourse. Class C waters are defined in NYS Code Part 701 as having a best usage of fishing and being supportive of fish propagation. The water quality in these streams should also be suitable for primary and secondary contact recreation.

Table 3.2-1
Best Usage of Surface Water

Fresh Surface Water Classification	Section	Best Usage
A	701.6	The best usages are: a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The waters shall be suitable for fish propagation and survival.
B	701.7	The best usages are primary and secondary contact recreation and fishing. These waters shall be suitable for fish propagation and survival.
C	701.8	The best usage is fishing. These waters shall be suitable for fish propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.
D	701.9	The best usage is fishing. Due to such natural conditions as intermittency of flow, water conditions not conducive to propagation of game fishery, or stream bed conditions, the waters will not support fish propagation. These waters shall be suitable for fish survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.

Source: Environmental Conservation Law, NYCRR Title 6, Chapter X.

100-year Floodplain

Figure 3.2-1 reflects the 100-year floodplain as shown on the FEMA Flood Insurance Rate Maps for the Town of Haverstraw (FEMA community Panel Number 360681 0009C) and Town of Ramapo (FEMA community Panel Number 365340 0005C). Other areas of the site are either within FEMA designations of Zone C or Zone X, zones which are described as having "minimal flooding" potential or are fully outside of the 500-year flood areas.

Existing Stormwater Runoff Conditions

Drainage from the site in the existing pre-developed condition is collected into two watershed areas, shown as WS#1 and WS #2 on Figure 3.2-2. Stormwater runoff from the Minisceongo Park site flows in a westerly direction through the wetland complex on-site and is conveyed off-site. Watershed area #1 (WS#1) encompasses approximately 35.70 acres in the central to southern portion of the site, while watershed area #2 (WS#2) encompasses 15.50 acres in the central to northern portion of the site[1]. Runoff from WS#1 drains from east to west to the existing wetland complex on the western portion of the site. Runoff from WS#2 also drains from east to west and into the same wetland complex. Stormwater runoff from both areas drain to the South Branch Minisceongo Creek.

Existing runoff rates and volumes from the project site have been calculated for the 1-year, 2-year, 5-year, 10-year, 25-year, 50-year and 100-year storm events. All assumptions for land cover types, soil groups, slopes and curve number calculations are provided in the project engineer's stormwater management report (Appendix C). Under existing conditions, the site contributes a peak flow of approximately 15.04 cubic feet per second (cfs) for a one-year storm event, to in excess of 132 cfs for the 100-year storm event (Table 3.2-2).

Table 3.2-2
Peak Pre-development Flow Summary for 24-Hour Design Storms
(Cubic Feet per Second)

Design Point	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
WS-1	11.14	22.53	39.24	48.34	67.35	87.46	97.66
WS-2	4.37	8.83	15.37	18.91	26.41	34.21	38.26
Outlet	15.04	30.46	53.06	65.34	91.35	118.58	132.35

Source: Stormwater Management Report, (p.1-26), Aztl, Scatassa & Zigler P.C. , 2008

Detailed information pertaining to the existing watersheds and site drainage features is provided in the stormwater management report prepared for this project (Appendix C). Figure 3.2-2 depicts the existing (pre-development) drainage areas on the project site.

[1] *Note: The acreage of the drainage areas will not coincide with the total site acreage. The drainage area acreages include portions of the Barr Labs property to the north and east of the project site, but exclude the areas of the project site to remain undeveloped located west of the Minisceongo Creek stream.*

3.2.2 Potential Impacts

Direct Impacts to Wetlands and Surface or Ground Waters

No roads, buildings or other direct impacts to existing surface water features are proposed. There would be no disturbance to the 100-year floodplain. Impacts to surface water resources are from the indirect effects resulting from changes to stormwater runoff.

Future Runoff Conditions

The proposed overall increase in impervious coverage on the project site will result in increases in the rate and volume of stormwater runoff in the absence of appropriate stormwater controls. Changes to the existing drainage patterns of the site will also occur as the land is regraded to construct buildings, parking areas, and roads. If not properly mitigated, these activities could cause stream erosion and flooding due to uncontrolled stormwater increases, and change the hydrology of associated wetlands and floodplains. In order to offset these changes, the design of the development incorporates a stormwater management basin (pond) to control and convey stormwater runoff to the South Branch Minisceongo Creek.

Figure 3.2-3 illustrates the post-development drainage areas. The direction of flow for each watershed is shown on the Developed Condition Watershed Map (Appendix C) and will be influenced by the final grading of the site that will establish a general slope of 1% from the southwest corner to the northeast corner.

The proposed detention pond (referred to as the North and South Pond on Figure 2-2) would be located along the western boundary, adjacent to the wetland buffer area.

The pond will discharge to the South Branch Minisceongo Creek via an outlet control structure that will reduce all post-development peak outflows from the basins and lower the overall site peak runoff to equal to or less than the pre-development peak runoff of the unconstrained watersheds (Table 3.2-3), thus satisfying the “zero net increase of peak flow” provisions of state stormwater regulations.

Table 3.2-3
Peak Flow Comparisons for 24-Hour Design Storms:
Pre- and Post-Development Conditions
(Cubic Feet per Second)

	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Pre-Development	15.04	30.46	53.06	65.34	91.35	118.58	132.35
Post-Development	15.04	30.46	53.06	65.34	91.35	118.58	132.35
Change (CFS)	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Aztl, Scatassa & Zigler P.C. , Stormwater Management Report), Consulting Engineers, 2008

The hydrology report provides details on the post-development drainage basin resulting from the proposed development of the project site. Drawings included with the report depict drainage areas associated with the development and provide information on basin sizing and flow control structures.

There would be no flooding of adjacent properties, including Barr Labs and local downstream areas. All proposed stormwater facilities will result in peak flow rates offsite that will be maintained at or below pre-development levels. As indicated by the calculations provided in the stormwater management report, the results of which are summarized in the tables above, the proposed stormwater facilities will meet those standards.

Water Quality

The introduction of impervious surfaces and residential or commercial uses may influence the quality of stormwater runoff compared to a site's undeveloped condition. Concentrations and types of pollutants introduced from automobiles, pet waste, herbicide and pesticide application and atmospheric deposition could increase. The stormwater management plan is required to incorporate structures and methods designed to satisfy provisions specified in the most recent (August 2008) version of the NYSDEC Stormwater Management Design Manual that incorporates Phase II stormwater regulations.

The NYSDEC Stormwater Management Design Manual presents sizing and performance criteria for developing site-specific stormwater management practices (SMP) that can provide acceptable water quality treatment for stormwater runoff. An acceptable SMP will capture and treat 90 percent of the average annual runoff volume from stormwater and is capable of removing 80 percent of the Total Suspended Solids and 40 percent of the Total Phosphorous in runoff.

As the NYSDEC manual requires that 90% of the average annual runoff volume be treated, this requirement was used to determine the water quality storage volumes for the project site. The sizing and design of the water quality ponds and the conveyance systems were based on these calculated volumes.

The NYSDEC requirement of providing 24-hour detention of the 1-year, 24-hour storm event would be met by the stormwater Best Management Practices (BMPs) designed for this project.

The use of an approved erosion and sediment control plan will incorporate Best Management Practices to comply with NYS regulations for suspended sediment control in runoff water from construction sites. With proper stormwater management and the use of erosion control BMPs, site development can occur while minimizing or avoiding impacts to downstream receiving waters. The proposed plans are designed to comply with the requirements of the SPDES General Permit for Stormwater Discharges so that such potential impacts are mitigated prior to stormwater discharge into the receiving stream.

As described under "Mitigation" below, the proposal as submitted will mitigate against potential soil erosion and sedimentation by the phasing of site construction, use of rapid site stabilization after grading, provision of lawn and landscaping in disturbed areas, and the use of extended detention basins and other BMPs. These basins are designed to remove up to 80 percent of the remaining suspended sediment load after site stabilization. Sediment loading post construction is not expected to represent an adverse environmental impact to the receiving waters.

Fertilizer and pesticide applications, as expected to be conducted by state licensed pesticide applicators and landscape contractors, are not anticipated to have an impact on water resources on or in the immediate vicinity of the project site. Applications must be applied by a certified commercial pesticide applicator in a manner that conforms to the requirements of the NYSDEC Regulation 6 NYCRR Part 325 Application of Pesticides. Prior to any pesticide or fertilizer applications, any Homeowners Association and commercial management company should execute a written contract and verify that the certified commercial pesticide applicator has a valid identification card issued by the NYSDEC.

3.2.3 Mitigation Measures

Stormwater Runoff Quality Treatment Measures

The applicant has submitted plans that conform to the criteria established by the NYSDEC. These plans include the use of erosion controls, phased site development and stormwater management practices (SMPs) that are acceptable to the NYSDEC and described in the Storm-water Management Design Manual (August 2008).

The proposed stormwater management design utilizes SMPs to best provide acceptable water quality treatment prior to the stormwater runoff being discharged from the project site. The project proposes to utilize a wet extended detention pond. As detailed in Appendix C, this stormwater pond would employ a forebay, a permanent pool and flow control structure at the pond drain. The wet extended detention pond was designed in accordance with NYSDEC sizing criteria to treat the water quality volume (WQv) by detaining storm flows above a permanent pool for a specified minimum detention time. Also, the proposed wet extended detention pond is capable of achieving the desired goals for pollutant removal (80 percent for suspended solids and 40 percent for phosphorous), have exhibited acceptable longevity in the field, and possess pretreatment mechanisms. The structure was designed to provide channel protection as well as overbank and extreme flood attenuation by moderating runoff flow rates at or below existing rates of discharge. The proposed pond discharge outlet point, where the collected stormwater runoff will be discharged from the pond, would be located along the east bank of the South Branch Minisceongo Creek.

Erosion and Sediment Control Measures

A comprehensive erosion control plan will be employed to minimize the potential adverse impacts resulting from the proposed clearing, excavation and grading necessary to undertake the proposed project. The plan will incorporate various measures to reduce erosion during construction and trap sediment to prevent it from being carried from areas being actively graded. The measures will be installed in accordance with the New York State “Standards and Specifications for Erosion and Sediment Control”, dated April 2005. Several key measures are proposed to improve the quality of stormwater discharged from the site and reduce the impact on downstream waters. These methods address soil stabilization, runoff control, sediment control, and fugitive dust control including:

1. Soil covers/temporary seeding
2. Silt fences
3. Curb inlet protections
4. A stabilized construction entrance

5. Check dams
6. Dust control measures
7. Debris track-out controls.

- **Soil Covers/Temporary Seeding.** Any soils that are exposed and left bare and are not being graded for a period of 15 days will be temporarily stabilized. Mulching or hydroseeding will be applied to ground with low slopes that have been stripped of natural vegetation. Riprapping, matting or sodding will be applied to soils for permanent stabilization if conditions warrant.

- **Silt Fences.** Silt fencing will be installed at the toe of slopes below areas to be graded. Silt fences allow water to pass through the fabric while trapping sediment in the runoff. A double row of silt fences will be installed in locations where the topography is sloped toward wetland areas.

- **Curb Inlet Protections.** All proposed drain inlets will be provided with drain inlet protection during construction. Stone, hay bales, fabric or excavated depressions will be established around inlets to filter sediments from the runoff.

- **Stabilized Construction Entrance.** The construction entrance will be provided with a lined stone pad of appropriate dimensions to reduce the transport of soil to adjacent roads.

- **Check Dams.** Temporary check dams are proposed at locations across the downstream end of the future site of the Wet Pond that will limit erosion by temporarily reducing discharge velocities and capturing sediments within the over-excavated pond storage areas.

- **Dust Control Measures.** Dust during construction activities will be controlled through a combination of temporary stabilization measures, including vegetative cover or spray-on tackifiers for disturbed areas not subject to traffic, mulching (including gravel mulch) and seeding, compaction of disturbed soil, water sprinkling, wind screens erected at right angles to prevailing wind currents and the use of stone covers (crushed stone or coarse gravel) on construction roads. Dust generation will also be limited through phasing of the project that will limit the overall area of exposed soils in each phase. All on-site vehicle speeds will be limited to 15 MPH on unpaved construction roads through the use of traffic controls. When wind gusts exceed 25 MPH all hauling operations would be stopped until high wind conditions subside.

- **Debris Track-Out Controls.** Trucks will be washed, vacuumed, swept or spray-cleaned over a gravel pad before leaving the site in order to prevent track-out of dirt, mud, debris and dust. Trucks will be covered with tarps and freeboard clearance of at least 6 inches maintained on loads to help keep dust from escaping the truck during hauling operations. Macadam surfaces well be swept or vacuumed at the end of each day during construction.

Topsoil will be spread following final grading operations and the ground surface will be promptly revegetated using trees, shrubs, ground covers and grasses as set forth in the landscape plan to be approved as an element of the site plan.

The sediment and erosion control plan will be part of the site plan approval and construction bid documents. Therefore, the contractor will be obligated to provide weekly inspections by a qualified professional to assure the maintenance of each sediment and erosion control measure

throughout all construction phases of the project as specified in the New York State "Standards and Specifications for Erosion and Sediment Control." The inspections will continue until the site has undergone final stabilization and the designated project operator has filed a "Notice of Termination" with the NYSDEC.

Stormwater Pollution Prevention Plan

As noted, the applicant will submit the Stormwater Pollution Prevention Plan (SWPPP) to the NYSDEC for review and approval. The objective of the SWPPP is to control runoff of pollutants from the project site during and after construction activities by complying with the NY State Pollutant Discharge Elimination System (SPDES) Stormwater Permit for construction activities. The SWPPP will implement the following practices:

- Reduction or elimination of erosion and sediment loading to waterbodies during construction;
- Control of the impact of stormwater runoff on the water quality of the receiving waters;
- Control of the increased volume and peak rate of runoff during and after construction, and;
- Maintenance of stormwater controls during and after completion of construction.

The SWPPP will specify the selection, sizing and siting of the SMPs to protect water resources from stormwater impacts. The designs of the proposed SMPs were determined using current engineering methodologies that apply appropriate sizing criteria to avoid the overburdening of stormwater conveyance structures.

Long Term Operation, Maintenance, and Inspection

SMP Stormwater Ponds must be properly operated and maintained if they are to function as intended over a long period of time. The Property Management Company, which will be responsible for the long-term operation and maintenance of the stormwater pond for this project, should use the Stormwater Pond Operation, Maintenance and Management Inspection Checklist forms developed for this project to monitor and document operational conditions. Typical SMP maintenance tasks include routine inspections for structural conditions, debris removal, mowing, structural repairs as well as control of nuisance plant and animal species. Plans can be based on and developed by reference to recent standard regulatory documents, including the NYSDEC Stormwater Management Design Manual (August 2008) and the United State Environmental Protection Agency (USEPA) National Management Measures to Control Nonpoint Source Pollution from Urban Areas (November 2005).

The wet extended detention pond should be inspected monthly for the first six months of operation after construction and on an annual basis thereafter. The structures should also be inspected following any major storm rainfall event. Inspection priorities should include checking the embankments for subsidence, erosion, cracking, tree growth, and the presence of burrowing animals. Also to be inspected should be the condition of the emergency spillways and drains, sediment accumulations, clogging of outlets, erosion control measures in the contributory drainages and channel erosion control measures at the outlet.

Establishment of trees and woody shrubs would be prevented on embankments, emergency spillways and buffer areas through periodic mowing (a minimum of six times per year). Debris and litter should be removed from the surface of the pond, surrounding buffer areas, and riser

and outlet areas in conjunction with the mowing operations. Accumulated debris and litter should also be removed following any major storm event.

Eroding soils in the drainage area that are contributing to the wet pond should be stabilized immediately with vegetation or other erosion control practices. Soils may slump in buffer areas outside the edges of the wet ponds, from the wet pond embankments or emergency spillways. When soils are exposed by erosion or slumping, corrective measures such as regrading and revegetation may be necessary. Similarly, the riprap protecting the channel downstream of the outlet channel may have to be repositioned and stabilized as necessary.

Nuisance insects, weeds, odors and algae may become a problem in wet ponds. Problems such as these are rare in wet ponds except under extremely dry weather conditions. Control of nuisance conditions such as these are preferably enacted by using biological controls rather than by the application of chemicals. Biological controls usually involve the introduction of fish to prey on insect larvae in wet ponds. Any introduction of a fish species to a wet pond should be done with the concurrence and approval of the NYSDEC.

Concrete inlet and outlet control devices and riser structures will deteriorate slowly over time and may need to be repaired or replaced in the long term. Concrete barrels and risers have a useful design life of approximately 50 to 75 years or longer.

Significant quantities of sediment can accumulate in an extended detention facility. Sediment buildup should be properly removed from the forebay areas prior to accumulations reaching fifty percent of the design depth in order to preserve the available stormwater management capacity of the pond. While more frequent clean-out may be needed in the forebay and around outlet control structure, a typical clean-out cycle for the lower stages of an extended detention facility should range from 5 to 10 years.