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CONSULTING & ENVIRONMENTAL ENGINEERS

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MUNICIPAL STORMWATER MANAGEMENT PLAN

ATLANTIC HIGHLANDS BOROUGH
MONMOUTH COUNTY, NEW JERSEY

ATLANTIC HIGHLANDS PLANNING BOARD

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STORMWATER MANAGEMENT PLAN
BOROUGH OF ATLANTIC HIGHLANDS

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1.0 INTRODUCTION

The Atlantic Highlands Stormwater Pollution Prevention Plan committee has consulted Birdsall Engineering to devise a Stormwater Management Plan for the Borough. This Municipal Stormwater Management Plan (MSWMP) outlines a strategy for Atlantic Highlands to alleviate stormwater related impacts imposed on the Borough through the incorporation of more stringent policies within their Land Use Regulations. Further, pursuant N.J.A.C. 7:14A-25 Municipal Stormwater Regulations, the New Jersey Department of Environmental Protection has issued a new set of regulations related to stormwater management. Also included in the plan are proposed ordinance amendments that would incorporate both the goals of this plan and the new stormwater management standards into the existing Borough regulations. This plan incorporates all of the required elements described in N.J.A.C. 7:8 Stormwater Management Rules as well as the nine planning goals that should be addressed when devising municipal level stormwater management plans (NJAC 7:8-2.2). Further, the plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new development proposals. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides baseflow to receiving water bodies.

Also, the proposed amendments and initiatives contained within this plan will incorporate the six control measures proposed to reduce the discharge of pollutants to the maximum extent practicable and protect water quality as outlined within the Phase II New Jersey Pollutant Discharge Elimination System Stormwater Regulation Program Rules (N.J.A.C. 7:14A).

To incorporate more stringent stormwater management techniques, Birdsall Engineering, Inc. has completed a review of Atlantic Highlands existing ordinances, its Master Plan, the existing land use regulations, and other planning documents. Pursuant N.J.A.C. 7:8 4.2, municipalities that feature a total vacant and agricultural land area greater than one square mile are required to include a build-out analysis within their Municipal Stormwater Management Plan. According to the current Master Plan, Atlantic Highlands Borough contains a total of .138 square miles of vacant and agricultural land and therefore a build-out analysis has not been included in this report.

2.0 GOALS AND OBJECTIVES

To improve water quality, reduce the risk of flooding, and in turn improve the quality of life for residents of Atlantic Highland. The incorporation of more stringent stormwater management techniques has been identified as a priority by both state and local level government agencies. Both the New Jersey Department of Environmental Protection and the Borough of Atlantic Highlands itself have included additional stormwater management techniques and best management practices into their overall goals and objectives. Twelve Borough goals have been identified within the Reexamination Report of the Atlantic Highlands Master Plan, which was prepared by a sub-committee of the Atlantic Highlands Planning Board, and adopted on October 10, 2002. The goals that have an impact on stormwater management include:

- To secure safety from fire, flood, panic, and other natural and manmade disasters.
- To prevent the degradation of the environment through improper use of land, streams and stream corridors, wetlands, the bay front, and woodlands, and through reduction of tree cover and vegetation on the land.
- To preserve and protect the Borough's steep slopes in order to ensure the public's safety and protect the environment.
- To promote redevelopment projects within the Borough that incorporate stormwater best management practices to the maximum extent practical, so as to improve the Borough's stormwater management infrastructure through the future.

Further, the New Jersey Department of Environmental Protection (NJDEP) has established a minimum set of goals and objectives that all municipal stormwater management plans should follow, they include to:

- reduce flood damage, including damage to life and property;
- minimize, to the extent practical, any increase in stormwater runoff from any new development;
- reduce soil erosion from any development or construction project;
- assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- maintain groundwater recharge;
- prevent, to the greatest extent feasible, an increase in nonpoint pollution;
- maintain the integrity of stream channels for their biological functions, as well as for drainage;

- minimize pollutants in stormwater runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water; and
- protect public safety through the proper design and operation of stormwater basins.

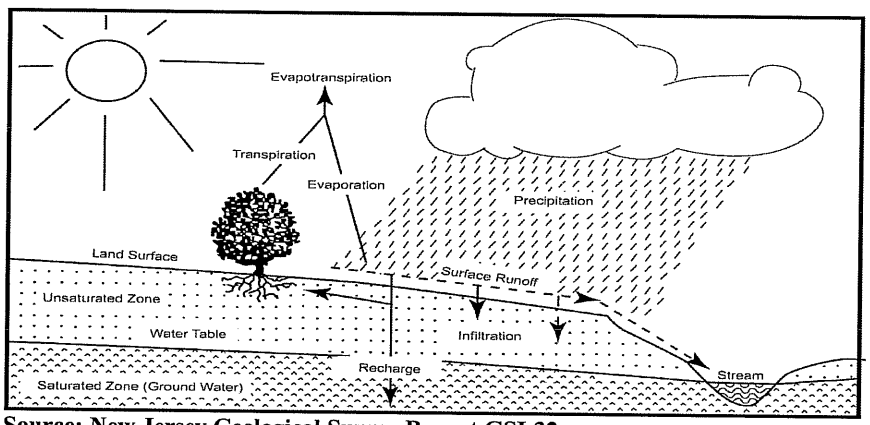
This Municipal Stormwater Management Plan will also incorporate the Goals and Objective that have been established for municipalities within Watershed Management Area 12. These goals include:

- Providing healthy and naturally diverse habitats to support plants and wildlife
  that will enrich the lives of residents.
- Maintaining safe and plentiful drinking water supplies.
- Preserving the integrity of the freshwater and tidal benthic communities that
  support commercial and recreational water-related uses including boating, bathing, fishing and sightseeing.
- Development and redevelopment in Area 12 will be well-planned and environmentally responsible while maintaining, enhancing and integrating the historic, cultural, scenic, recreational and open space resources that define and strengthen the unique identities of each community.

To achieve these goals, this plan examines the most pressing stormwater related issues facing Atlantic Highlands, and in turn proposes possible amendments to the Borough's design and performance standards to incorporate a more comprehensive code for managing stormwater within the Borough. By examining the Borough's history, demographics, and current conditions concerning water quality, water quantity, and flooding issues, a clearer picture can be drawn in regards to what the stormwater management issues are at this time, and what type of policy amendments should be taken to improve them. This plan also calls for additional stormwater management regulations to be adopted by the Borough in order to ensure that preventative and corrective maintenance strategies have been formulated to ensure the long-term efficacy of stormwater management facilities. It should be noted that this MSWMP serves to supplement the existing environmental reports that have been completed by the Borough in the past including "Our Town's Environment", which is a comprehensive Natural Resource Inventory of the Borough and also examines environmental issues in Atlantic Highlands. Copies of this report are available from the Borough Clerk's office, which is located in Borough Hall.

3.0 EFFECTS OF STORMWATER RUNOFF

The hydrologic cycle is defined as the constant cyclical movement of water from the ground to the atmosphere and back to the ground. As illustrated by the figure below, this process includes evaporation, transpiration, evapotranspiration, condensation, transport, precipitation, infiltration, percolation, surface runoff, interflow, and groundwater flow. Land development has a dramatic effect on the natural function of this process.



Source: New Jersey Geological Survey Report GSI-32

Prior to development, native vegetation acts to both intercept falling precipitation, and return water that has infiltrated into the ground through evapotranspiration. By clearing vegetation, compacting soil, and replacing it with impervious cover, lawns, or landscaping, the development process serves to reduce the natural rate of water that may infiltrate into the soil, and in turn evapotranspiration.

In developed areas, following a precipitation event, both the volume and the rate of stormwater runoff will increase in proportion to the amount of additional impervious cover generated through a given development. Often gutters, channels and storm sewers, are the tools with which this additional stormwater is carried to local waterways. These man-made stormwater management tools transport water more quickly which causes the stormwater flows in downstream waterways to peak faster and higher than would be produced in a natural state. The increased peak flow during and shortly after a precipitation event produce greater fluctuations between normal and storm flow rates, which can increase channel erosion.

Table 1: The Effect of Impervious Cover on Runoff

Share of Land With Impervious Cover	Share of Rainwater that Becomes Runoff
0% (natural state)	10 %
10-20%	20%
35-50%	30%
75-100%	55%

Source: New Jersey Department of Environmental Protection (NJDEP) *Planning for Clean Water: The Municipal Guide* Trenton, NJ 2000.

Understanding the concept of impervious cover is essential to understanding how stormwater is managed and how it effects waterways. Impervious cover is defined as the sum total of all hard surfaces within a watershed including rooftops, parking lots, streets, sidewalks, driveways, and surfaces that are impermeable to infiltration of rainfall into underlying soils/groundwater. Impervious cover changes the natural landscape and is a major influence on aquatic resources because instead of allowing precipitation to permeate the ground, it runs off. Figure 5-Groundwater Recharge Map, illustrates the recharge rates for lands within Atlantic Highlands.

Generally the more impervious surface that is present within a watershed, the less stormwater is able to permeate back into the soil and eventually back into the groundwater table. As the amount of impervious coverage expands, so to does the amount of runoff that is discharged into adjacent waterbodies and sediment that is deposited into these streams. Further, studies show a direct correlation between the percentage of impervious cover in a watershed and the level of degradation to aquatic organisms. Streams that are degraded due in part to the high percentage of impervious surfaces within their watersheds are often prone to larger and more frequent floods (which cause property damage as well as ecological harm) and lower base flows (which degrades or eliminates fish and other stream life, as well as diminishes the aesthetic of the stream). Impervious surfaces also raise the temperature of runoff, which reduces dissolved oxygen in the stream, harms some gamefish populations, and promotes excess algal growth. In sum, the unintended results of urban development attributed to imperviousness include:

- Removal of natural storage, retention, and recycling of precipitation
- Significant increases in overland runoff into surface waters
- Decreases in stream base flow and groundwater recharge
- Widening of stream channels
- Increases in floodwater velocities
- Increases in the magnitude and frequency of flooding
- Channel morphology changes because of the altered hydrology

Not only does the development process increase the peak rate of stormwater flows, the addition of impervious cover also results in water pollution. Pollutants carried within stormwater runoff can take the form of nutrients such as nitrogen and phosphorous which encourage the growth of algae in downstream water ways, or trash and oils that accumulate on sidewalks and roadways between precipitation events. In locations where stormwater sewers discharge runoff directly into a stream, the aggregate accumulation of sediment and pollutants that are carried within it are dumped directly into local waterways. In addition to the chemical and physical contaminants, runoff from impervious systems also requires another form of pollution, heat. When rain falls on pavement that has collected heat through the day, the temperature of runoff can reach as high as 83 degrees Fahrenheit, which is sufficiently warm enough to damage sensitive plant and animal species. Table 2 below, includes a comprehensive list of the possible pollutants contained within untreated stormwater flows.

Table 2: Pollutants Carried in Stormwater
The following pollutants collected and carried in stormwater runoff can seriously degrade water quality in the community:
Nutrients- Include nitrogen and phosphorous, which plants need to grow. However, high levels can cause a health hazard in drinking water and stimulate excessive aquatic plant growth, which can ultimately lower dissolved oxygen levels in the water, causing fish and other aquatic life to smother. Algae blooms are examples of how excess nutrients pollute. Sources of excess nutrients include animal waste, fertilizers, septic systems, road salt applications and auto emissions. About half of the fertilizers applied to lawns in the New Jersey coastal zone enter streams and head to the bay and ocean.
Pathogens- Are disease causing bacteria and viruses associated with the presence of fecal matter. They affect human health directly when people contact contaminated water and consume shellfish. Sources include failing septic systems, animal waste, and boat sanitation facilities.
Sediment- Is fine particles of eroded soil or sand. Common origins are concentrated, excessive stormwater runoff from construction sites. Sediment smothers aquatic habitat, carries pollutants bound to soil particles, makes water cloudy and inhibits the breeding and movement of aquatic species.
Toxic Contaminants- Include pesticides as well as heavy metals such as copper, lead and zinc which are commonly found in old paint, tires, lawn chemicals and preservatives. They attach to sediments, resist breakdown, accumulate in organisms and represent threats to the food chain.
Debris- Consists of various items of trash, such as old tires, shopping carts and plastics. It comes from illegal dumping, street litter, and boating waste. It threatens aquatic life and detracts from recreational and aesthetic values.
Oil- Is one of the worst offenders. One gallon of oil dumped down a storm drain can create a slick up to 8 acres and may pollute up to 1 million gallons of water.
Thermal Stress- From elevated water temperatures reduces survival rates and disease resistance of valued native species and allows the spread of non-native (exotic) species. Water temperature rises because of increased pavement near streams, loss of vegetated stream buffers and stream channelization.
Source: Association of New Jersey Environmental Commissions (1998, Spring). ***ANJEC Report***

4.0 CURRENT CONDITONS

4.1 SETTING

Nestled in the steep slopes of the Navesink Highlands, the Borough of Atlantic Highlands offers commanding views of Sandy Hook Bay. Mount Mitchell, the highest point on the eastern seaboard is part of the Borough's striking topography. The Borough's orientation and topography are illustrated through Figure 1- USGS Quad Map. Atlantic Highlands is predominately residential, with a small commercial area on First Avenue that leads to the large, well-maintained municipal marina. Ferry service to New York City and easy access to the Garden State Parkway makes Atlantic Highlands attractive for commuters. Other environmental and topographic features are also part of the Borough's attraction. A designated "Tree City", Atlantic Highlands has trees lining its major thoroughfares as well as residential streets. It also has areas of dense mature woods, which are preserved by homeowners, public parks, and natural preserves.

Further, in regards to soils, The "Soil Survey of Monmouth County" which was compiled by the U.S Department of Agriculture's Soil Conservation Service has found ten different soil types in Atlantic Highlands. These soils have been illustrated within this report as Figure 2-Soils Map, and their characteristics are described in greater detail below.

The three most common soil series in the Borough are Tinton loamy sand-urban land complex, 0 to 5 percent slopes; Udorthents- urban land complex, 0 to 3 percent slopes; and Phalanx loamy sand, 10 to 25 percent slopes:

Tinton loamy sand soils are typically found in the uplands and terraces ranging from flat to 5 percent slopes and between streams and drainage basins on side slopes. This is true in Atlantic Highlands. Tinton soils cover most of the areas between Wagner Creek and Many Mind Creek on the west side of Atlantic Highlands, the areas which was historically the site of most of the farming that was done by the Borough's earliest European settlers. Tinton soils also make up the surface of the gentle slopes between First and Third Avenues and in the central southern section of town almost as far east as Sears Avenue. The urban land complex of Tinton soils consists of areas covered by impermeable surfaces such as dwellings, roads and streets, shopping centers, and industrial parks.

Udothents soils were brought into the Borough as fill to make up the entire surface in three areas: between the east bank of Many Mind Creek and First Avenue, from the Foodtown shopping center to the harbor; all along the harbor lands and beyond its eastern end; and for three or four blocks near both sides of the southernmost point of Atlantic Highlands. The filled areas are on floodplains, in tidal marshes, and on areas of moderately well drained, to very poorly drained soils The urban land complex of Udorthents soils consists of areas covered by impermeable surfaces, such as dwellings, roads, shopping centers, parking lots, and industrial complexes.

Phalanx soils make up the entire hills section of Atlantic Highlands, which exists roughly from along Ocean Boulevard and E. Highland Avenue from about Third Avenue to the

border with the Highlands, paralleling the bay. Typical of Phalanx soils, this area has slopes as steep as 25 percent and is almost entirely wooded. Common tree species on this type of soil are chestnut, oak, black oak, white oak, Virginia pine, and pitch pine. Land development on these soils is often not advisable as the main limitation towards using this soil for single-family homes or other types of land development are the cement pan sandstone layers, the caving of cutbacks for excavation, and slope. Runoff from rainfall is rapid to very rapid and as a result, erosion and thus soil stability is a serious hazard. Due to their unstable nature, the USGS has identified these steep slope areas as geological hazard areas.

"Due to the threat steep slopes pose on development patterns, the Borough of Atlantic Highlands adopted Land Development Ordinance contains a section on steep slopes (7.33) which regulates, in great detail the land uses and intensity of development that may take place on these slopes, as well as maintenance requirements. This ordinance provides strict provisions on slopes greater than 15 percent (USGS geological hazard areas) that are applicable to development applications, which propose:

- any "soil disturbance" over one cubic yard,
- "change in impervious ground cover" over 25 square feet,
- "removal or disturbance of vegetation" covering over 25 square feet

Also, these provisions severely limit the removal of trees both on and proximate to the steep slopes.

With regards to maintenance requirements and erosion control techniques, the following measures have been included within the Borough's Land Development Ordinance:

- Under the heading "Development Permit" on page 3-17, it is required that development permits be secured from the Zoning Officer prior to "the excavation, removal, or addition of soil or fill to or from any site exceeding 10 cubic yards" etc. (see 3.4.A.1.f.).
- Within that same sub-paragraph is equally concerned with "alteration of drainage patterns," "regrading," and "removal of ground cover."
- Under the heading "Soil Removal and Fill" at 7.28 (on page 7-30), the regulation reads "No fill in excess of ten (10) cubic yards shall be placed on any property within the Borough of Atlantic Highlands...without the prior approval of the Borough", which also has erosion control effects.

4.2 DEMOGRAPHICS

The Borough of Atlantic Highlands is a small, highly developed community located on Sandy Hook Bay in northeastern Monmouth County. The Borough has a land area of 1.2 square miles (3.1 km2), and contained 4,705 residents as of the 2000 census. Atlantic Highlands small size places it 35th in total land area among Monmouth County's 53 municipalities.

In the period of time between 1890 and 1970, Atlantic Highlands experienced rapid, virtually uninterrupted growth, with the only exception being between 1910 and 1920 when the Borough experienced a slight decrease in population. By the mid 1970's, the rapid development that occurred throughout the 20th century up to that point had rendered the Borough close to being effectively build-out. Since that time, most of the land development has been focused westward of Atlantic Highlands, towards areas with vast tracts of vacant land still available. While Monmouth County as a whole has become the fourth fastest growing county in the state of New Jersey, Atlantic Highlands population, after reaching its peak in 1972, has moderated and stabilized. However, the Borough still demonstrates a population density of 3,921 persons per square mile, a density that is three times that of Monmouth County as a whole, which had 1,323 persons per square mile in 2000.

As the Borough has been has been essentially built-out for sometime, Atlantic Highlands has maintained a fairly steady population. Although losing 6.5% of its population between 1980 and 1990, Atlantic Highlands witnessed a very steady, slow growth over the past 15 years.

Table 3:Atlantic Highlands Population Characteristics

Year	Population	% Change
1970	5,102	N/A
1980	4,950	-3.0%
1990	4,629	-6.5%
2000	4,705	1.7%
2004 (Projected)	4,710	0.1%

Source: Monmouth County Planning Board *At A Glance: Files and Data* accessed on January 12, 2005. http://www.monmouthplanning.com/AtAGlanceFiles/Atlantic%20Highlands.pdf

4.3 WATERWAYS

OVERVIEW

The Many Mind Creek and Wagner Creek are the main drainage channels for the Borough of Atlantic Highlands. They carry almost all of the surface water runoff from the Borough northward to the bay. Some runoff enters these creeks directly over the land, some is retained in creek side wetlands, and some runs in stormwater drainage pipes, which are embedded in the streets and empty into the creeks. In addition, a smaller amount of runoff from the Borough is carried by a number of gullies and ravines through the steep slopes above the bay shore between the eastern end of the harbor and near the border with the Highlands.

The total Bayshore Watershed territory, which drains into Raritan/ Sandy Hook Bay, extends 18 miles east to west along the bayshore. The watershed is comprised of a total of 13 creeks, which includes both Many Mind Creek and Wagner Creek. Both streams carry water northward from their sources between one and four miles inward before emptying directly into the bay. A comprehensive illustration of the waterways, HUC-14 watershed boundaries, and inventory of C1 designated streams in Atlantic Highlands is included within this report on Figure 3-Waterways Map. Further, a more in depth analysis of the chemical, physical and biological health of these waterways is available in Appendix B, Appendix C, and in Section 4.4 of this report

MANY MIND CREEK

The Many Mind Creek is a stream that flows from the Lenape Woods Nature Preserve through the Borough of Atlantic Highlands and eventually drains into Sandy Hook Bay. Upstream, the creek serves as Atlantic Highlands' southern border between the Navesink section of Middletown Township as it flows parallel to West Avenue and First Avenue. Within the Borough, four small tributaries join the creek. Moving upstream, the first being north of W. Highland Avenue next to West Avenue, a second south of Leonard Avenue near Fireman's Field, a third behind Dairy Queen on Highway 36, and the fourth is along Sears Avenue. At the last three locations, wetlands are associated with the stream intersections.

As illustrated in the Waterways Map, wetlands areas surround the Many Minds stream corridor. However, generally speaking, the banks of the Many Mind are bordered by intense development. Adjacent land uses include apartment complexes single-family homes, commercial facilities, and even light industrial use.

Due to the urban nature of its watershed, the health of the Many Mind Creek and its adjoining stream corridor has been severely damaged. Meanwhile, the incorporation of more stringent stormwater regulations is crucial to the vitality of this stream corridor as additional development continues to threaten both peak flow rates and flood levels. Although the majority of the Borough is built out, impervious cover has continued to expand, and this expansion is slated to continue through both approved and approved and

proposed projects along First and West Avenue, and Many Mind Creek. The resulting new stormwater flows to the creek have not been aggregated statistically, nor have they been subjected to the limitations of actual flow rate or volume based on calculations of the creeks capacity. However, as part of the Many Mind Creek Regional Stormwater Management Plan, a comprehensive hydrologic and hydraulic modeling analysis is in the process of being completed so that the current conditions can more accurately be understood. This analysis will also help the Borough to plan for the remediation and revitalization of the streams waters and corridor, which will be completed in the near future.

Generally, the Many Mind Creek water quality deteriorates moving downstream. Evidence of this deterioration from water quality testing results is associated with a decrease in benthic macroinvertebrate diversity, and an increase in habitat perturbations as the creek moves downstream. Further, habitat disturbance in the stream appears correlated with development and impervious cover in the watershed as well as a decrease in vegetated buffers and the resultant increase in stream bank erosion as the creek moves through the Borough. These preliminary water quality findings are based on water quality testing that was completed along the Creek throughout 2003 and 2004. However, as the Many Mind Creek Regional Stormwater Plan continues to move forward, a comprehensive water quality assessment will be conducted including benthic macroinvertebrate data, habitat assessments, coliform levels, which are discussed further in the Water Quality portion of this report.

Atlantic Highlands is taking proactive measures to reduce the threat caused by stormwater to the environment and to properties in the Borough through the development of a greenway and trail along the Many Mind Creek. In September 2002, the Atlantic Highlands Environmental Commission submitted a conceptual plan entitled *"Many Mind Creek Greenway & Trail: A Conceptual Plan"*, which proposed a coordinated greenway and trail network along the creek. It is anticipated that the greenway and trail may be linked into the Henry Hudson Trail which is part of the County's Park System The open space plan foresees a greenway that would follow the entire route of the Many Mind Creek along the border with Middletown up to Sears Avenue and East Washington Avenue. Currently, the following areas along the creeks route are devoted to open space:

1) Approximately 15 acres in the western section of Lenape Woods Nature Preserve, which contain the creeks headwaters, and freshwater wetlands.

2) A half-acre of open space near Many Mind Avenue playground, which also contains freshwater wetlands.

3) 6.8 acres of recreational lands on Fireman's Field, also bordered by freshwater wetlands.

4) Approximately half an acre of grasslands along West Avenue, between Bay and Mount Avenues, which contain saltwater wetlands.

These measures will indirectly improve the stormwater flows along the Many Mind. At present the creek is largely inaccessible to people, becomes a dumping ground for debris, and almost no one sees this and cleans it up. With a walking trail (plus water quality education and some periodic organized clean-up efforts), all is visible and should be better cared in terms of people pollution. In addition, a more direct effect will come from the Many Mind Creek Greenway and stream buffer that is planned for the east bank on the Giuliani property. This bank is being designed to serve as a
buffer against automotive pollution from the neighboring parking area.
Although the realization of the greenway concept would be a long-term project, its development holds the potential not only to significantly improve stormwater management and the water quality of stormwater flows through the Borough; it would also expand recreational opportunities for residents of Atlantic Highlands.

New Jersey Natural Gas (NJNG) is the owner of a former manufactured gas plant (MGP) site which is located within the Borough, off of Lincoln Avenue. Through time, as a by-product of MGP activities, the soils along the many Mind Creek as well as the surrounding area have become contaminated with MGP related constituents including polyaromatic hydrocarbons (PAHs) and benzene, toluene, ethylbenzene and xylenes (BTEX) compounds. On October 10, 1989, New Jersey Natural Gas entered into an Administrative Consent Order with the New Jersey Department of Environmental Protection to remediate the former Manufactured Gas Plant site. In August of 1998, NJNG submitted a final Remedial Action Work Plan in which strategies for remediation of the Atlantic Highlands site, as well as surrounding areas were presented. The impacted areas that will be remediated include the former MGP site, the nearby former municipal landfill, and adjacent properties, as well as the Many Mind Creek sediments, associated creek banks and adjacent properties.

With relation to improving stormwater quality and management of the Many Mind the following actions will be including in the Many Mind Creek restoration project:

- Restoration of the Many Mind Creek stream channel and adjacent wetlands and transition areas in the area between Route 36 and Sandy Hook Bay
- Restoration of the detention basin and additional wetlands and transitional areas located in close proximity to the facility
- Monitoring well installation/replacement/sealing and ground water monitoring
- Remediating groundwater that exceeds the groundwater quality standards using an aboveground pump and treat system in conjunction with barrier walls
- Installation of a free product recovery system upgradient of the stream to prevent recontamination of the stream and to allow for groundwater remediation (on-going)

NJNG is in the middle of a 5-year, multi-phase remediation project to remove the contaminated soil from the area, re-establish the creek bed and associated wetlands and construct the aforementioned greenway and trail. The on going remedial objectives are in general to remove and/or contain contaminated soils and implement engineering controls where necessary to minimize future MGP impacts in the surrounding area. In sum, this

on-going project seeks to provide equal or greater replacement value of those wetlands impacted during remedial activities of the Many Mind Creek. Tree species will be replaced with the same or a higher value tree species. Shrubs will be replaced with the same or higher value shrub species, and herbaceous areas will be maintained and replanted with herbaceous vegetation of similar of higher value. Through the NJNG remediation efforts, and the Borough's commitment to develop the greenway concept, the management of stormwater flowing through the Many Mind Creek stands to be significantly improved in the near future.

In addition, As of May 2007, the data gathering phase was completed for a project that will produce a regional stormwater management plan for the Many Mind Creek watershed, which is shared by Atlantic Highlands and Middletown. The project is funded by a grant from NJ Department of Environmental Protection under the program for pollution control and stormwater management (Section 319H). The project is managed by the Atlantic Highlands Environmental Commission with a technical subcontractor and a steering committee that includes representatives of Atlantic Highlands, Middletown, NJ-DEP, Monmouth County Planning Board, Freehold Soil Conservation Division, Monmouth University, Brookdale College field station, Surfrider Foundation, Clean Ocean Action, and others.

Work done so far has included sampling and laboratory analysis of water quality; identification of the presence, number and variety of benthic macroinvertebrates (pollution sensitive and pollution tolerant) in the stream; modeling the hydrology and hydraulics of the stream, including flooding issues; analysis of conditions of the creek channel and banks (e.g. erosion, sediment, vegetation, stream debris, etc.); assessment of fish and wildlife habitat; spotting illegal infill of wetlands and prompting action for its removal where possible; compilation and map-plotting of historical and current data on excedances of DEP water quality criteria, particularly those regarding fecal coliform; and initial suggestions for follow-up projects.

The data are being used to prepare a characterization and assessment of the watershed as a whole, including identification of main problems that need to be addressed in the regional plan. As this is the first regional (multi-town) exercise to be undertaken, the nature and contents of the final plan are being redefined by NJ-DEP over time within the overall objective of protecting and restoring the watershed and overcoming problems of water quality. The project is currently targeted for completion by September 2007, but a no-cost time extension may be necessary. The plan for the Many Mind Creek watershed that results from the project could, when formally adopted, affect the Borough's Stormwater Control Ordinance, which in that case would then be reviewed and revised accordingly.

WAGNER CREEK

Wagner Creek forms the Western border of the Borough, next to the Leonardo section of Middletown Township in its entirety, the creek flows for one half mile, from its source near Highway 36, to its mouth, at the Raritan Bay. At its mouth the western creek bank

in Leonardo is a commercial boatyard. The eastern creek bank in Atlantic Highlands is bordered by extensive wetlands next to Center Avenue Park.

The approximately 5-acre area of wetlands is comprised primarily of non-native phragmites. Permits to redevelop this area as coastal freshwater wetlands with native species have been issued by the NJDEP. The wetland mitigation is required as part of the construction of the extension of the Bayshore Trail along the bayfront in Atlantic Highlands. The construction of the trail itself requires filling in small portions of isolated wetlands. The wetland mitigation project proposes a 5:1 mitigation along the Wagner Creek. The reconstruction of the wetland area with native species will provide more storage and treatment of stormwater prior to flowing into the Sandy Hook Bay. This area is tidally influenced, which will also provide additional filtering and removal of debris and impurities from the tidal water.

The area between Center Avenue and the bay, on the east bank of Wagner Creek is protected as part of the Borough-owned Center Avenue Park, which also includes neighboring woodland, a sandy beach, a playing field and tot lot, and related gravel parking. This highly pervious, low-impact use provides a buffer along Wagner Creek and restricts any further development of this property which may degrade stormwater quality. The Atlantic Highlands Open Space Plan, adopted in 2001 proposes extending the protected area along Wagner Creek as far upstream as the Henry Hudson Trail next to Highway 36. Creekside land would be set aside to provide a buffer for flood control needs, preserve habitat, and create a greenway with public access and a connection to the trail.

The protected zone would be extended two ways:

- Eastward along the beach as far as Avenue D, in order to increase public recreational uses on the bayfront.

- Southward for blocks along Wagner Creek to provide a buffer and green way to serve flood control needs, preserve habitat, and provide a connection to the Henry Hudson Trail near Highway 36.

These acquisitions, which would likely be accomplished mainly through negotiating easements or outright purchases to establish a consistent 50-foot buffer along the stream corridor, would in turn ease erosion along the creek bed, improve groundwater recharge, reduce the threat of flooding for existing residents, and improve the quality of stormwater entering the bay. As the Borough has adopted the Open Space and Recreation Plan that originally proposed the Wagner Creek greenway concept, they are actively engaged in a five-year land acquisition plan to develop the greenway network along Wagner Creek's stream corridor.

OTHER SURFACE WATERS

Although Many Mind and Wagner Creeks are the most visible carriers of surface water, there are other less visible, less volumous flows in the Borough, mostly in the eastern hills section. These include:

- Small spring fed streams which have been channeled into underground pipes, such as from Oceans Boulevard to Grand Avenue, to the bay;
- Intermittent streams which flow only when it rains or at times of the year when soils are heavily saturated, (specific reference available)
- Open springs that maintain steady output, such as the Henry Hudson Springs off Bayshore Drive.
- Saturated wetlands where water is visible all year round, or nearly so (specific references available)

A comprehensive illustration of the waterways, which flow through the Borough, has been included within this MSWMP as Figure 3- Waterways Map. This map illustrates that a small portion of the Borough lies within the Navesink River Watershed, which has been designated as a Category One waterbody according to GIS data provided by the NJDEP. As depicted through the Groundwater Recharge Map, runoff from this area proceeds downhill by feeding an intermittent stream that flows through Middletown lands parallel to and then crossing Highway 36. As this stormwater flows into a tributary of a Category One waterbody, this small section of the Borough is subject to more rigid land development standards regarding buffering and impervious area pursuant N.J.A.C. 7:8.

To inform the public of the importance and functionality of the Borough's waterways and other environmental issues that are crucial to the vitality of Atlantic Highlands, the Environmental Commission has provided a number of public outreach initiatives designed to inform the public. Outreach programs have included:

- Non-point source pollution program to educate the public on its effect on groundwater springs and more volumous water bodies in the Borough.
- Painting fish symbols on the asphalt adjacent to the storm drains and the warning "No Dumping - Leads to Waterway." Spearheaded by the Environmental Commission and carried out by volunteers, this public outreach effort was completed in the Spring/Summer of 2001.
- The Environmental Commission has developed an educational pamphlet entitled *"Clean Water for our Boro"*. This pamphlet provides background information regarding the dynamic cycle of stormwater, explains the need and purpose of stormwater management, and enumerates actions that residents can take to reduce the volume of runoff generated on their properties and reduces the amount of pollution in stormwater runoff. The pamphlet is distributed annually by a Borough-wide mailing and will be available at Borough Hall and during Borough sponsored events.

THE MUNICIPAL HARBOR

The Borough of Atlantic Highlands owns and operates the municipal marina located at the end of First Avenue along the Sandy Hook Bay. The marina has fallen victim to several sources of pollution, such as illegal discharge of sewerage from boats, discarded fish carcasses from party boats and minor fuel spills. The NJDEP has required municipal marinas to develop stormwater management plans to address the sources of pollution and to develop best management practices and policies to control pollution and improve water quality. The goals, objectives and strategies contained within the marina's stormwater management plan will be incorporated into this plan by amendment upon its completion and approval.

Aquatic lifefound both in and around the marina includes blue-claw crabs, horseshoe crabs, spider crabs, sand shrimp, hard and soft shell clams, slipper shells, bay scallops, silversides, blue fish, black fish, fluke, and striped bass. One of the most popular fish to come along the bayfront is the snapper – a baby bluefish around 6 inches long that has strong jaws and sharp teeth. Abundant small fish, often caught for bait, swim in large schools and include silversides or spearing, mummichogs, and killifish. These small fish are important to the local marine's food web, because many game fish, such as striped bass, feed on them. Furthermore, due to their strong schooling behavior, killifish are commonly eaten by many fish-eating birds, such as herons and terns.

Some of the boat harbor structures actually encourage and support this aquatic life. Piers, pilings, and breakwater provide a solid foundation in the constantly shifting tides and sands of the bay and estuary for many coastal species to rest, feed, or reproduce.
To protect this fragile environment, the Environmental Commission has detailed proposals for saltmarsh enhancement, restoration of fish and wildlife habitat, dune protection, a walking trail, nature observation stations and other low-impact uses of. Proposed plans proximate to the harbor include fringe wetland enhancement, a vegetated buffer, and the final trail of the proposed Many Mind Creek Greenway linking to the Bayshore Trail behind the marina that would lead toward the Highlands. Per these initiatives, it should be noted that the New York-New Jersey Harbor Estuary Program (HEP), made up of federal, regional, state and local partners, has given the creek's saltmarsh and fringe wetland priority for acquisition and restoration (#RB-17). Also, ideas for marina parking areas to have more vegetation, reduce impervious cover, infiltrate stormwater, and enhanced parking lot aesthetics have been put forward by the Atlantic Highlands Environmental Commission.

In addition, the Borough will be passing ordinances to enable legal enforcement of the marina's policies. The marina has begun to implement some of the "Clean Marina Program" initiatives, which through guidelines and specific procedures enlists boaters and officials in better practices including but not limited to boat sanding, painting and washing, disposal of fish remains, and sewage pump-outs. These measures will be imposed to more effectively protect the ecology of the Harbor and it's surrounding environment. Currently, the Borough relies on the good faith and ethics of marina patrons

to keep the marina clean. However, with the ordinances that will be adopted, the Borough police and harbor security staff will have the authority to issue citations to violators.

4.4 WATER QUALITY

Water quality will remain a critical factor to maintain a high quality of life for residents of the Atlantic Highlands community. As stated within the objectives of the Atlantic Highlands Master Plan, additional stormwater management techniques are consistent with the intentions of the master plan, specifically: Objective #1 "To secure safety form fire, flood, panic, and other natural and manmade disasters, and also Objective #3 " To prevent the degradation of the environment through the improper use of land, streams and stream corridors, wetlands, the bay front, and woodlands, and through reduction of tree cover and vegetation on the land.

To further these public goals, the New Jersey Department of Environmental Protection (NJDEP) has established an Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways. Currently, there are over 800 AMNET sites within the state of New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. The data is used to generate a New Jersey Impairment Score (NJIS). According to these scores, the waterway is then classified as non-impaired, moderately impaired, or severely impaired. Currently, no sampling stations currently exist in Atlantic Highlands, therefore no streams have been deemed "impaired" through AMNET.

Although the Atlantic Highlands Environmental Commission has discontinued it's water sampling efforts since 2004, between 1998 and the spring of 2004 the Environmental Commission conducted bi-monthly sampling for the Many Mind Creek and less frequent sampling for Wagner Creek. These observations are illustrated through Figure 4- Water Sampling Map, and also within Appendix B, titled-Benthic Macroinvertebrate Sample Summary. Further, the waters turbidity, temperature, PH, dissolved oxygen; nitrates and phosphates have all been documented. In March of 2004, water samples were recorded at 6 locations along the Many Mind. Appendix B indicates that at site one, which lies farthest upstream, the waste quality qualified as "excellent". Further downstream the sampling sites indicated that water quality steadily deteriorated, but then began to rebound again at testing station number 6. Although location 6 proved to be an exception to the general rule, it should also be noted that Location 6 is located directly downstream of a small wetland that may provide a buffer from up stream runoff, pollution, and erosion, as well as habitat for benthic macroinvertebrates and fish. The results of these tests performed by the Atlantic Highlands Environmental Commission indicate that at certain times, certain portions of both the Many Mind Creek and Wagner Creek feature water contamination serious enough to warrant "impaired" status. For streams that have been classified as impaired, those that do not meet the federal Clean Water Act Guidelines, and state determined guidelines as stated in N.J.A.C. 7:9B-1.14(c) of the New Jersey Surface Water Quality Standards for FW2 waters, "Fecal coliform levels shall not exceed a geometric average of 200/100 ml nor should more than 10 percent of the total samples taken during any 30-day period exceed 400/100 ml.".

The results of these grassroots based testing efforts also helped to inspire the Atlantic Highlands Environmental Commission to undertake a concentrated Regional Stormwater Management Plan for the Many Mind Creek and its watershed so as to develop the objectives, standards, and guidelines that will improve the health of the watershed through the future. Further, the Environmental Commission has been active through both public outreach and in securing funding to continue a Regional Stormwater Management project for the Many Mind Creek. At the moment, the Many Mind is undergoing a comprehensive hydrologic and hydraulic analysis.

4.5 WATER QUANTITY

The Atlantic Highlands Water Department Plant, located on West Lincoln Avenue, provides the water supply for Atlantic Highlands. Water sources for the Borough are the Englishtown Aquifer and the Raritan-Magothy aquifer. Water from these two aquifers goes through several steps to remove odor and disease-causing organisms. Independent water-quality laboratories regularly test well water samples from all wells in the Borough. No samples exceeded the maximum contaminant levels (MCL's) that have been established by Federal and NJ State government agencies. Under federal law, all water users now receive an annual report on the quality of their drinking water, listing only the contaminants that are detected in the water. Water quality reports for Atlantic Highlands have been mailed to homeowners since February 2000.

However, the Borough is within a "critical area" for water supply from its underlying aquifers according to the New Jersey Department of Environmental Protection (NJDEP), which means that it is not possible to increase withdrawals from the Raritan-Magothy aquifer.

As an effectively built-out community, the Borough of Atlantic Highlands is not foreseen to require a large increase in demand of water quantity. However, as is the case with all water related issues, the scope of water quantity concerns must focus well beyond the municipal borders of Atlantic Highlands Borough. In the approaching years, continued land development demand, and the resulting growth will press the Monmouth County region to provide for an ever increasing demand for potable water throughout the region.

The Open Space and Recreation Plan for Atlantic Highlands envisages greenways to be implemented along both the Wagner and Many Mind Creeks. The Wagner Creek Greenway concept proposes to extend a protected natural greenway area all along Wagner Creek farther upstream to include the Henry Hudson trail. To provide a natural greenway, creekside land would be set aside to provide riparian stormwater management, preserve habitat, and offer an additional public connection to the trail.

The proposed Many Mind Greenway and Trail is even further along in its design. In September of 2003, the Atlantic Highlands Environmental Commission produced a conceptual plan for the greenway. The plan, which proposes to preserve and enhance the final stretch of the Many Mind Creek from its source 2 miles away in the Lenape Woods

Nature Preserve. With regard to water quantity the completion of the greenway concept is crucial to maintain and or even improve groundwater recharge levels through the Borough through the incorporation of additional pervious surfaces along the greenway and trail.

However, the continuous expansion of impervious surfaces in the Borough have decreased groundwater recharge, and in turn contributed to the stormwater management issues that exist in Atlantic Highlands. The average annual groundwater recharge rates are shown graphically in Figure 5-Ground Water Recharge Areas. New Jersey Geologic Survey (NJGS) estimates groundwater recharge using methodology from NJGS Report GSR-32 "A Method for Evaluation of Ground-Water-Recharge Areas in New Jersey". Land-use/land-cover, soil and municipality-based climatic data were combined and used to produce an estimate of ground-water recharge in inches/year. Recharge was then ranked by volume (billions of gallons/year) using natural breaks in the percentage of total volume. Wellhead protection areas, also required as part of the MSWMP, are illustrated in Figure 6-Wellhead Protection Areas. According to the NJDEP, "A Well Head Protection Area (WHPA) in New Jersey is a map area calculated around a Public Community Water Supply (PCWS) well that delineates the horizontal extent of ground water captured by a well pumping at a specific rate over a two, five, and twelve-year period of time for unconfined wells. ...The confined wells have a fifty foot radius delineated around each well serving as the well head protection area to be controlled by the water purveyor in accordance with Safe Drinking Water Regulations" (see NJAC 7:10-11.7(b) 1). Well Head Protection Area delineations are conducted in response to the Safe Drinking Water Act Amendments of 1986 and 1996 as part of the Source Water Area Protection Program (SWAP). The delineations are the first step in defining the sources of water to a public supply well. Within these areas, potential contamination will be assessed and appropriate monitoring will be undertaken as subsequent phases of the NJDEP SWAP program.

With respect to potable water supplies, the Bureau of Safe Drinking Waters Water Supply Administration within the New Jersey Department of Environmental Protection administers the Source Water Assessment Program (SWAP). According to the 2004 Source Water Assessment Report for Atlantic Highlands Borough, residents receive potable water from the Atlantic Highlands Water Department via 4 supply wells, which draw from both the Englishtown Aquifer and the Upper Potomac-Raritan-Magothy aquifer.

4.6 FLOODING AND FLOODPLAINS

To inform both public and private land use decision makers of areas that are subject to flooding, the Federal Emergency Management Agency has completed Flood Insurance Rate Maps for the Borough of Atlantic Highlands. Immediately along the banks of both the Many Mind Creek and the Wagner Creeks lie areas that have been designated as an A zone by the FIRM maps. The area contained within the A flood zone designation have been found to lie within the 100 year floodplain, but a specific base flood elevation has only been determined at a few selected points along each stream corridor; three of which

are along the Many Mind Creek, and two of which are along Wagner Creek. The FEMA floodplain boundaries within Atlantic Highlands have been included within this report within Figure 7-FEMA Flood Map, and the specific points, along with the base flood elevation are listed below in Table 5:

Table 5: Elevation Reference Marks within the Borough of Atlantic Highlands

Elevation in Feet	Location
13.0	PK nail in wood railing at upstream side of Center Avenue bridge over Wagner Creek
7.67	Chiseled square cut in upstream pipes under Highland Avenue bridge over Wagner Creek
7.29	PK nail set in wood guardrail at upstream side of Bay Avenue bridge over Many Mind Creek
9.72	Chiseled square cut in west end of upstream headwall of Highland Avenue Bridge over Many Mind Creek
11.88	Chiseled square cut in west end of upstream headwall of State Route 36 bridge over Many Mind Creek

Source: FEMA *Flood Insurance Rate Map (FIRM)—Borough of Atlantic Highlands New Jersey, Monmouth County, New Jersey Map* Revised July 5, 1984

Further, the immediate portion of the Borough's shore line along Sandy Hook Bay has been designated as a V zone, which means the area is within the 100-year floodplain, and faces additional velocity hazard due to the wave action produced by the bay. Within this area, one more base flood elevation reading has been determined. The elevation was recorded at 209.99 feet by a PK nail set at intersection of centerlines of Belvidere Road and Ocean Boulevard. Farther beyond the floodplain lies the B Flood zone. Land contained within the B Flood Zone Designation has been determined to fall beyond the 100-year floodplain, but within the 500-year flood plain.

The remaining portions of the Borough, which constitutes the vast majority of land has been designated as a C zone by FEMA, which means the lands falls outside the 500 year floodplain and have less than a 0.2% annual probability if flooding.

To help minimize the impact of stormwater to property and possessions, Atlantic Highlands is continuing its initiative to establish buffers along the stream corridors of both the Many Mind and Wagner Creeks. The Atlantic Highlands Open Space Plan, which was adopted in 2003, outlines the Borough's strategy to gradually acquire land to incorporate the greenway plans that are in their conceptual stage at the moment.

4.7 EXISTING AREAS OF FLOODING & SOLUTIONS

The Borough is continuously monitoring and correcting existing areas of flooding throughout the Borough. The Department of Public Works routinely vacuums inlets known prone to flooding and clears away fallen leaves during the autumn months. The Borough Engineer will work with the Director of Public Works to develop a list of locations prone to flooding. This list will be prioritized and solutions engineered for each.

The following is a preliminary list of areas of frequent flooding:

- The intersection of Seventh Avenue and State Highway Route 36. The State Department of Transportation has been contacted and repairs have been scheduled.
- The intersection of Navesink Avenue and State Highway Route 36. The State Department of Transportation has been contacted.
- Ocean Boulevard in the vicinity of 96, 98, 100 and 102 Ocean Boulevard. As Ocean Boulevard is a county Road, any improvement will be made under the purview of the Monmouth County Engineering Department
- West Highland Avenue at the bridge over Many Mind Creek. This area of flooding is in close proximity to the on-going remediation of Many Mind Creek by NJNG. Upon completion of the remediation, the bridge inlets and surface will be reconstructed.

5.0 STORMWATER MANAGEMENT

5.1 INFRASTRUCTURE

Atlantic Highlands Borough receives 44 inches of rain in an average year. To manage the public risk that flooding imposes on residents, a substantial stormwater management system has been developed. As illustrated earlier through Table 2, the pace, amount, and condition of the water that finds its way into local waterways is in large part determined by the amount of impervious cover the land contains. With less absorption of rainwater into the ground, the increased runoff moves faster and collects more pollutants from the surface, which promotes erosion, damages stream banks, and in turn dumps sediment into streambeds. As impervious cover in the western two-thirds of Atlantic Highlands is now close to 33 percent of the land, an extensive infrastructure has been installed to manage the public risk that flooding and degraded water quality poses to residents.

N.J.A.C. 7:8 spells out guidelines for how to manage stormwater more effectively and also how to incorporate best management practices into the planning stages of project design. These standards now require stormwater detention capacity to hold and slowly release the runoff from storms that have a likelihood of occurring once every two, ten and one hundred years. Some sites may be able to achieve these standards through vegetative swales, and buffers, and landscaping to control non-point source pollution. Other sites may require the building of a stormwater basin. In these cases, where the development of

structural stormwater facilities is necessary, the New Jersey Department of Environmental Protection's BMP guide should be consulted. This document includes strategies to incorporate non land-intensive Best Management Practices such as: Infiltration Basins, Manufactured Treatment Devices, Pervious Paving Systems, Rooftop Vegetated Cover, Sand Filters, and Vegetative Filters. The incorporation of such designs into the existing stormwater management infrastructure is strongly encouraged to enhance groundwater recharge, and reduce runoff that originates on site. (Sentence deleted per MCPB Request)

Also, Low Impact Development techniques, which coincide with the goals and functions of stormwater management BMP's include additional means to promote the goals stated within this Municipal Stormwater Management Plan. When practical, incorporating such techniques as maximizing the amount of pervious land to be preserved, utilizing native vegetation for replanting, adding curb cuts to detain and filter stormwater, and using vegetated buffers are also encouraged.

5.2 STORM DRAINS

The most widespread form of stormwater management utilized in Atlantic Highlands is through the use of storm drains which funnel stormwater to the creeks and on to the bay. Storm drains exist throughout the flatter portions of the Atlantic Highlands, and are continuing to be extended through the eastern portions of the Borough. This complex network of piping discharges water to almost 50 different outfall points in streams across the Borough. Of these outfall points, 25 discharges into the Many Mind Creek and 2 discharge into the Wagner Creek, which both flow directly into the bay. The exact percentages of gutter versus overland flow in the Borough are not readily available. However, the Borough's Director of Public Works estimates that roughly 85% of the Borough utilizes overland flow and 15% uses gutter flow. For new land development proposals, this particular method of stormwater management is discouraged as it concentrates flows, and minimizes infiltration. Alternative measures, which attempt to mimic the natural environment, are encouraged so as to not aggravate the current infrastructure.

The Borough of Atlantic Highlands operates an annual Capital Improvement Program through which infrastructure improvements are designed and constructed. The construction or reconstruction of drainage improvements within the Borough are included in this program. In addition, to encourage groundwater recharge, projects located outside of the steep slope area that involve drainage improvements will incorporate best management practices, such as the installation of perforated pipe and sump inlets to the stormwater management facilities that will be installed on site.

At the moment, no systematic schedule for the maintenance and replacement of these facilities has been established. However, in the summer of 2002 a major storm drain project along First Avenue was undertaken to install new storm drains in an area that had experienced flooding in the past. Also, the intersection of First Avenue and Washington Avenue was reconstructed in 2004 to further alleviate the potential of flooding in the

area. The sewer lines in the project area have also been plagued with stormwater infiltration during bouts of heavy precipitation. Not only did the project help to alleviate stormwater infiltration, thereby reducing sewage treatment costs, it also included the installation of a Stormceptor device. The Stormceptor is a stormwater interceptor that efficiently removes sediment and oil from stormwater run-off, and stores these pollutants for safe and easy removal. The Borough's Department of Public Works is responsible for the maintenance and periodic removal of debris. To this point the facility has successfully contained pollutants and debris that would have continued directly into the streams through a conventional storm drain. However, through the future, the Department of Public Works recognizes that retrofitting Storm Inlets with eco-drain Type N or J castings will serve to improve the quality of stormwater in the Borough".

5.3 STORMWATER BASINS

As most of the development in Atlantic Highlands occurred prior to the 1980's most of the stormwater management system relies on storm drains. However, there are two types of stormwater basins and both are present in Atlantic Highlands. First, "detention basins" are built strictly to detain the stormwater for a period of time, while releasing water at a slow and controlled rate. They are designed to be dry between storm events. Atlantic Highlands currently has two such basins, which were built in concert with the last two multiple dwelling developments to be built in town—Scenic Ridge and the single-family homes at Victorian Woods.

Secondly, Hoder Pond, which is located on West Highland Avenue is a retention basin facility that currently operates within the bounds of Atlantic Highlands. The facility, which was installed in the late 1990's, was designed to provide service to the entire West Side Storm Drain System from Leonard Avenue to South Avenue, and Avenue D to Many Mind Creek. The basin is designed to stay "wet" by retaining a permanent pool so as to mimic a natural pond or lake. During bouts of precipitation, if stormwater reaches a certain level, it is released at a controlled rate to the Many Mind Creek. The basin has also been installed with a backflow preventer to stop Many Mind Creek from flowing back into it during dry periods.

Periodically, the basin must be cleaned and dredged as silt and sediment that has settled out of stormwater flows must be removed to ensure that the basin continues to function properly. Although the basin is still functioning adequately, at this point, the Borough's department of public works has not completed sediment removal as part of its routine maintenance of the basin. However, as part of the many Mind remediation process, NJNG will be dredging the pond as part of its on-going contamination removal process.

Two options have been identified as to how to proceed with restoration efforts relating to the reshaping of Hoder Pond. One option would increase its role in flood management by redesigning it to receive tidal flows twice daily and to function as a tidal pond. In this configuration, it would also continue serving some of its water quality function. A final functional determination may be made by the DEP as part of the site remediation and

restoration review process. In any case, the pond will be redesigned to incorporate a more aesthetically pleasing, natural looking form.

5.4 WATERSHED

The Borough of Atlantic Highlands is largely contained within the Bayshore Watershed Area, which includes approximately fifteen separate creeks between Atlantic Highlands and South Amboy. However, a small portion of the Borough lies within the Navesink River Watershed, which has been designated as a Category One waterbody according to GIS data provided by the NJDEP. As depicted through the Groundwater Recharge Map, runoff from this area proceeds downhill by feeding an intermittent stream which flows through Middletown lands parallel to and then crossing Highway 36. As this stormwater flows into a tributary of a Category One waterbody, this small section of the Borough is subject to more rigid land development standards regarding buffering and impervious area pursuant N.J.A.C. 7:8.

6.0 DESIGN AND PERFORMANCE STANDARDS

To minimize the adverse impact of stormwater runoff on water quality, water quantity and the loss of groundwater recharge in receiving water bodies, the Borough will adopt design and performance standards that comply with the stormwater management measures as presented in N.J.A.C. 7:8. The design and performance standards include amended language for the inclusion of maintenance requirements, and safety standards consistent with N.J.A.C. 7:8-6. The ordinances will be submitted to the county for review and approval within 24 months of the effective date of the Stormwater Management Rules.

Further, by amending their current Land Use Regulations, it is the intention of Borough of Atlantic Highlands to incorporate both structural and nonstructural stormwater management strategies as presented in N.J.A.C. 7:8-5 to the maximum extent practicable. So as to minimize the adverse impact on water quality which is imposed by stormwater runoff, the proposed amendments to the Borough's current development regulations include the incorporation of stricter stormwater management guidelines relating to water quantity, water quality, and groundwater recharge as identified in the design and performance standards as presented in N.J.A.C. 7:8-5. Prior to adoption, these ordinances will all be submitted to the Monmouth County Planning Board for review and approval.

The second set of rules are the Phase II New Jersey Pollutant Discharge Elimination System Stormwater Regulation Program Rules (N.J.A.C. 7:14A). These Rules are intended to address and reduce pollutants associated with existing stormwater runoff. The Rules establish a regulatory program for existing stormwater discharges as required under the Federal Clean Water Act. These rules govern the issuance of permits to entities that own or operate small municipal separate storm sewer systems, known as MS4s. Under this program permits must be secured by municipalities, certain public complexes

such as universities and hospitals, and State, interstate and Federal agencies that operate or maintain highways. The permit program establishes the Statewide Basic Requirements that must be implemented to reduce nonpoint source pollutant loads from these sources. The Statewide Basic Requirements include measures such as: the adoption of ordinances (litter control, pet waste, wildlife feeding, proper waste disposal, etc.); the development of a municipal stormwater management plan and implementing ordinance(s); requiring certain maintenance activities (such as street sweeping and catch basin cleaning); locating discharge points and stenciling catch basins; and a public education component

Owners or operators of small MS4s would be required to develop and implement a storm water management program designed to reduce the discharge of pollutants to the maximum extent practicable and protect water quality. Control measures are expected to include, at a minimum, the following components:

- Public education and outreach
- Public involvement and participation
- Illicit discharge detection and elimination
- Construction site storm water runoff control
- Post-construction storm water management in new development and redevelopment
- Pollution prevention/good housekeeping for municipal operations.

6.1 IMPLEMENTING NON-STRUCTURAL STORMWATER MANAGEMENT

The implementation of non-structural Best Management Practices are strongly encouraged to be added to the Borough's existing development regulations and applied to all new site design proposals. Whenever possible, the following nine strategies should be incorporated into site design:

- Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
- Minimize impervious surfaces and break up or disconnect the flow of runoff over
- impervious surfaces;
- Maximize the protection of natural drainage features and vegetation;
- Minimize the decrease in the "time of concentration" from pre-construction to postconstruction. "Time of Concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the drainage area to the point of interest within a watershed;
- Minimize land disturbance including clearing and grading;
- Minimize soil compaction;
- Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
- Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas; and

- Provide other source controls to prevent or minimize the use or exposure of pollutants at the site in order to prevent or minimize the release of those pollutants into stormwater runoff. These source controls include, but are not limited to:

  i. Site design features that help to prevent accumulation of trash and debris in drainage systems;

  ii. Site design features that help to prevent discharge of trash and debris from drainage systems;

  iii. Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and

  iv. When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act N.J.S.A. 4:24-39 et seq., and implementing rules.

6.2 IMPLEMENTING STRUCTURAL STORMWATER MANAGEMENT STRATEGIES

As mentioned earlier, the NJDEP has implemented more rigid regulations regarding the volume, rate, and quality of stormwater originating on a new development site. Some sites may be able to achieve these standards through vegetative swales, and buffers, and landscaping to control non-point source pollution. Other sites may require the building of a stormwater basin. In these cases, where the development of structural stormwater facilities is necessary, the New Jersey Department of Environmental Protection's BMP guide should be consulted. This document includes strategies to incorporate such best management practices as, bioretention systems, Infiltration Basins, Pervious Paving Systems, Rooftop Vegetated Cover, Sand Filters, Vegetative Filters, and Wet Ponds. The incorporation of non-land intensive Best Management Practices that are not into the existing stormwater management infrastructure is strongly encouraged to improve both groundwater recharge and the quality of stormwater runoff that originates in the Borough.

As mentioned earlier, the NJDEP has implemented more rigid regulations regarding the volume, rate, and quality of stormwater originating on a new development site. Some sites may be able to achieve these standards through vegetative swales, and buffers, and landscaping to control non-point source pollution. Other sites may require the building of a stormwater basin. In these cases, where the development of structural stormwater facilities is necessary, the New Jersey Department of Environmental Protection's BMP guide should be consulted. The structural BMP's utilized in low impact development concentrate on the following practices to be utilized in site development in conjunction with the non-structural methods described above:

- Bio-retention Systems – A bioretention system consists of a soil bed planted with native vegetation located above and underdrained sand layer. It can be configured either as a basin or a swale.
- Constructed Stormwater Wetlands – Constructed wetlands are wetlands systems designed to maximize the removal of pollutants from stormwater runoff through settling and both uptake and filtering by the vegetation.
- Dry Wells - A dry well is a subsurface storage facility that receives and temporarily stores stormwater runoff from roofs and structures. Discharge of the accumulated stormwater from a dry well occurs through infiltration into the surrounding soils.
- Extended Detention Basins - An extended detention basin is a facility constructed through excavation or embankments that provides temporary storage of stormwater runoff. It has an outlet structure that detains runoff inflow and allows for controlled outflow to aid in mitigating stormwater flows from development. Usually this type of structure is utilized to provide both water quantity and water quality mitigation.
- Infiltrative Basins – Infiltration Basins are similar to detention basins in that they both temporarily store stormwater runoff generated from development project. The principal outlet to this type of basin is not a constructed outlet structure, but rather the highly permeable soils allowing for infiltration into the surrounding subsoils.
- Manufactured Treatment Devices – A manufactured treatment device is a pre-fabricated stormwater treatment structure utilizing settling, filtration, absorptive materials, vortex separation, vegetative components, and/or other appropriate technology to remove pollutants from stormwater runoff.
- Pervious Paving Systems – Pervious pavement utilizes paving material which allows for stormwater to infiltrate through the pavement rather than accumulate as is the case with standard paving material. Pervious pavement utilizes void areas within the paving material to provide for this permeable feature.
- Sand Filters – A sand filter consists of a forebay and an underdrained sand bed. Runoff entering the sand filter is conveyed first through the forebay, which removes trash, debris and coarse sediments, and then infiltrates through the sand bed to an outlet pipe at the bottom of said filter.
- Vegetative Filters – A vegetative filter is an area designed to remove suspended solids and other pollutants from stormwater runoff flowing through a length of vegetation, called a vegetative filter strip. The vegetation in a filter strip can range from turf grass to woody vegetation.
- Wet Ponds - A wet pond is a facility constructed through excavation or embankments that provides both permanent and temporary storage of stormwater runoff. It has an outlet structure that creates a permanent pool and detains and attenuates runoff inflows promoting the settlement of pollutants.

Further, all structural stormwater management measures (structural BMP's) shall be designed according to the following conditions:

- They should to take into account the existing site conditions, including, for example, environmentally critical areas, wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone).
- They should be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure as appropriate, and shall be parallel bars with one-inch (1") spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than one-third (1/3) the width of the diameter of the orifice or one-third (1/3) the width of the weir, with a minimum spacing between bars of one-inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of N.J.A.C. 7:8-7.D.
- They should be designed, constructed, and installed to be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvements Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement.
- At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half inches in diameter.
- Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Section N.J.A.C. 7:8-7.
- Stormwater management measure guidelines are available in the New Jersey Stormwater Best Management Practices Manual. Other stormwater management measures may be utilized provided the design engineer demonstrates that the proposed measure and its design will accomplish the required water quantity, groundwater recharge and water quality design and performance standards established by this subchapter.
- Manufactured treatment devices may be used to meet the requirements of this subchapter, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.
- In order to ensure adequate long term operation as well as preventative and corrective maintenance of stormwater management measures and structural BMP's, the designers of such facilities should submit to the municipality a *Maintenance Plan* indicating specific maintenance tasks and schedules as indicated in N.J.A.C. 7:8-5.8 "Maintenance Requirements". This maintenance plan will require the ultimate user of said structural BMP's to provide an annual certification that the stormwater management measures approved are functioning as designed and that the proper maintenance and inspection of said measures have been performed. Random spot inspections by the municipality will be conducted to ensure compliance along with appropriate enforcement actions such as fines to be levied should non-compliance result.

By adhering to the State's newly adopted design standards, the BMP's engineered for each proposed development project will serve to improve stormwater quality, enhance

groundwater recharge, and reduce stormwater runoff. Combined, these methods will serve to improve the environment and protect the public interest by minimizing the risk of flooding and maintain the Borough's water supply through the future.

However, unlike areas farther north, steep slopes in the Coastal Plain area of New Jersey both in and around Atlantic Highlands are underlain by unconsolidated sediment. Not only are these slope areas poorly suited to handle development; indirectly the incorporation of additional groundwater recharge through structural and non-structural BMP methods threatens the stability of these soils and in turn the development that has taken place on and around them. Unless the Atlantic Highlands Planning Board specifically states otherwise, those areas of the Borough that contain steep slopes, as defined in 7.33A of the existing Atlantic Highlands Land Use Development Regulations shall be exempted from the strict application of groundwater recharge measures, structural BMP's and non-structural BMP standards, as their application may cause further instability and slumping of soils contained on these slopes.

6.3 PLAN CONSISTENCY

Currently, no land within Atlantic Highlands are contained within the bounds of an adopted Regional Stormwater Management Plan (RSWMP) and no Total Daily Maximum Loads (TDML's) have been developed for waters within the Borough. Therefore, at this time, it is not necessary for the amendments proposed in this plan to adhere to standards developed through the adoption of a Regional Stormwater Management Plan. However, it should be noted that through a NJDEP Section 319H NPS Pollution Control and Management Implementation Grant as well as a NJDEP Environmental Services Program grant matched by Borough funds, the Atlantic Highlands Environmental Commission was able to initiate the first steps toward developing a RSWMP for the Many Mind Creek and its watershed. To date, going efforts to development and adopt a RSWMP for the Many Mind Creek are continuing. If more stringent design standards do become effective for the Borough either through the adoption of a RSWMP for the Many Mind, or if a TMDL becomes effective upstream or within the Borough, then this plan and the Borough's Stormwater Control Ordinance will be reviewed and revised accordingly.

As of May 2007, the data gathering phase was completed for a project that will produce a regional stormwater management plan for the Many Mind Creek watershed, which is shared by Atlantic Highlands and Middletown. The project is funded by a grant from NJ Department of Environmental Protection under the program for pollution control and stormwater management (Section 319H). The project is managed by the Atlantic Highlands Environmental Commission with a technical subcontractor and a steering committee that includes representatives of Atlantic Highlands, Middletown, NJ-DEP, Monmouth County Planning Board, Freehold Soil Conservation Division, Monmouth University, Brookdale College field station, Surfrider Foundation, Clean Ocean Action, and others.

Work done so far has included sampling and laboratory analysis of water quality; identification of the presence, number and variety of benthic macroinvertebrates (pollution sensitive and pollution tolerant) in the stream; modeling the hydrology and hydraulics of the stream, including flooding issues; analysis of conditions of the creek channel and banks (e.g. erosion, sediment, vegetation, stream debris, etc.); assessment of fish and wildlife habitat; spotting illegal infill of wetlands and prompting action for its removal where possible; compilation and map-plotting of historical and current data on excedances of DEP water quality criteria, particularly those regarding fecal coliform; and initial suggestions for follow-up projects.

The data are being used to prepare a characterization and assessment of the watershed as a whole, including identification of main problems that need to be addressed in the regional plan. As this is the first regional (multi-town) exercise to be undertaken, the nature and contents of the final plan are being redefined by NJ-DEP over time within the overall objective of protecting and restoring the watershed and overcoming problems of water quality. The project is currently targeted for completion by September 2007, but a no-cost time extension may be necessary. The plan for the Many Mind Creek watershed that results from the project could, when formally adopted, affect the Borough's Stormwater Control Ordinance, which in that case would then be reviewed and revised accordingly.

Also, the Borough's current ordinance reinforces the principles and design standards that have already been adopted in the State of New Jersey's Residential Site Improvement Standards (RSIS). As the State of New Jersey's Stormwater Management Rules have already been adopted into the RSIS, this municipal stormwater management plan is consistent with the RSIS (N.J.A.C. 5:21), and the Borough will utilize the most current update of the RSIS in the stormwater management review of residential areas. Further, major development must meet the established design and performance standards set forth in the Soil Erosions and Sediment Control Act as all new development and redevelopment plans must comply with New Jersey's Soil Erosion and Sediment Control standards. Also, during construction activities, municipal inspectors will observe land disturbance as well as on-site soil erosion and sediment control measures and will report any inconsistency to the Freehold Soil Conservation District.

With regard to land use, the ecologically sensitive measures that are being pursued through this plan and other Borough initiatives are consistent with the State Plan. As the entire Borough of Atlantic Highlands has been designated as a (PA1) Metropolitan Planning Area, the goals and objectives outlined within this plan will serve to encourage compact redevelopment of an appropriate scale where land is suited for development to integrate environmentally sensitive stormwater management techniques into the site design of a land development project, which in turn, will protect environmentally sensitive lands from development.

Further, after review, it has been found that stormwater management methods that are discussed within this Municipal Stormwater Management Plan are consistent with and

incorporate the objectives and polices of the Monmouth County Growth Management Guide, which was adopted by the Monmouth County Planning Board in December 1995.

6.4 MITIGATION PLANS

OVERVIEW

A municipal mitigation plan is an element of the Municipal Stormwater Management Plan that allows municipalities to grant variances or exemptions to the design and performance standards for stormwater runoff quality, stormwater runoff quantity, and groundwater recharge established in N.J.A.C. 7:8-5, and adopted into the municipal stormwater control ordinance. The existence of a mitigation plan does not preclude the requirement that an applicant meet the design and performance standards for any one of the three key stormwater requirements, namely maintaining pre-development recharge, stormwater runoff quantity reduction and stormwater runoff quality. Instead, the mitigation plan allows the Atlantic Highlands Borough, in limited circumstances to waive the strict compliance of one or more of the performance standards, where full compliance cannot be reasonably accommodated on site, provided that a mitigation plan has been approved by the county review agency under the requirements of N.J.A.C. 7:8-4. In addition, approval of a waiver or exemption from one of the three criteria outlined above provides no guarantee that, if requested, an exemption or waiver will be granted for either or both of the remaining criteria. However, under no circumstances shall Atlantic Highlands Borough waive the Special Resources Protection Area (SRPA) established under the stormwater management rules at N.J.A.C. 7:8-5.5 (h).

Supporting evidence for an exemption or waiver shall be prepared in the form of a "stormwater management report" which will be signed and sealed by a New Jersey licensed professional engineer. The report shall include at a minimum:

- Detailed hydrologic and hydraulic calculations identifying the sizing criteria for each BMP and the stormwater collection system based upon the anticipated peak flow and/or volume.

- A map of the planned project showing existing conditions with drainage boundaries and land features, including delineated wetlands, proposed improvements, including all BMPs, grading, utilities, impervious features, and landscaping.

- Construction details for each BMP with appropriate contact information.

When applying for a waiver, the applicants professional engineer must first demonstrate that on-site compliance is either a) not possible, or b) possible but would result in tangible negative environmental or structural impacts. Such impacts may include:

- If the strict application of the regulations would result in a reduction of open space and/or undisturbed buffer areas. It is important to note that in this situation,

the applicant must demonstrate that such reductions are caused by compliance with State and local regulations and not an attempt to maximize buildable area.

- The degradation of groundwater quality due to the infiltration of poor quality runoff. For example, if runoff from a shopping plaza with heavy traffic volume will be directed to a protected water supply aquifer to achieve compliance, alternative recharge locations may be more practical and environmentally sound.

- The modification to the elevation of the groundwater table due to rapid infiltration of stormwater will have demonstrable negative impacts on local structures and/or local groundwater quality. For example, rapid infiltration in a highly pervious soil near a basement may cause flooding and settlement; and also

- Flooding due to changes in the time of peak for a storm attenuated in compliance with *N.J.A.C. 7:8* and the *New Jersey Stormwater Best Management Practices Manual.* Despite the requirement for peak reductions to be applied to the 2-year, 10-year and 100-year events, peak runoff from a sub-basin of a HUC-14 may actually experience increases due to changes to peak timing.

An applicant may also propose a mitigation project on a site that has not been identified in this mitigation plan. However, in each circumstance the selection of a mitigation project must incorporate the following requirements:

- The project must be within the same area that would contribute to the receptor impacted by that project. If there are no specific sensitive receptors that would be impacted as the result of the granting of the waiver/exemption, then the location of the mitigation project can be located anywhere within the municipality, and should be selected to provide the most benefit relative to an existing stormwater problem in the same category (quality, quantity, or recharge).

- Legal authorization must be obtained to construct the project at the location selected. This includes the maintenance and any access needs for the project through throughout its operation.

- The mitigation project should be located close to the original development project. If possible, the mitigation project should be located at a similar distance from the identified sensitive receptor. This distance should not be based on actual location, but on a similar hydraulic distance to the sensitive receptor. For example, if a project for which a waiver is obtained discharges to a tributary, but the closest location discharges to the main branch of a waterway, it may be more beneficial to identify a location discharging to the same tributary.

- It is preferable to have one location that addresses any and all of the performance standards waived, rather than one location for each performance standard.

- The project location must demonstrate no adverse impacts to other properties.

- For projects addressing the groundwater recharge performance standard, a mitigation project site upstream of the location of the actual project site is preferable to a downstream location.

- Mitigation projects that address stormwater runoff quantity can choose to provide storage for proposed increases in runoff volume, as opposed to a direct peak flow reduction.

- Mitigation projects that address stormwater runoff quality can choose to address another pollutant other than TSS, which has been demonstrated to be of particular concern, such as streams that have been listed as an impaired waterbody for other pollutants. However, care must be taken to ensure that waivers that are granted for the TSS requirements do not result in the impairment of an existing unimpaired area.

All mitigation plans and reviews should consider the location of the mitigation project in relation to the property where the projected damage will occur. For example, if a project were unable to achieve the stormwater quantity performance standards upstream of an inadequate culvert, a mitigation project downstream of that culvert would not offer similar protection. Or, if the groundwater recharge is the major contributor to a wetlands area, the new project should continue to provide recharge to the wetlands area.

Also, in environmentally critical areas, the quality of stormwater that is being directed to infiltration facilities should be assessed. If the quality of stormwater that would be infiltrated following development poses a threat to groundwater supplies, off-site mitigation should be considered. Off-site mitigation should also be undertaken when on-site recharge is precluded by site conditions, or when stormwater quality assessments indicate that on-site stormwater infiltration will degrade ambient groundwater quality in environmentally sensitive areas. Environmentally critical areas include locations where groundwater is classified by the State as holding either special ecological significance, wellhead protection areas, areas of known groundwater contamination, or areas of on-going groundwater remediation. Groundwater recharge is of particular concern in areas discharging to Category 1 (C1) groundwater or in wellhead protection areas. Options for off-site groundwater recharge include:

- Retrofitting an existing stormwater basin
- Reducing the amount of impervious cover on site by adding vegetation or incorporating pervious paving materials
- Splitting flows to isolate high quality runoff and constructing infiltration basins to receive only the high quality runoff
- Acquiring upland recharge areas

SENSITIVE RECEPTORS

Within the Waterways and Wetlands Map, Atlantic Highlands has taken care to illustrate the sensitive receptor areas within the Borough that are especially susceptible to stormwater changes. As evidenced through this Map, the Borough has not identified any sensitive receptor areas beyond it's waterways, and wetlands areas.

As many of the mitigation measures that will be employed to these, or possibly other, not yet identified sensitive receptor areas are in the planning and preliminary design stage, when appropriate, Atlantic Highlands will allow developers to fund studies to plan and engineer the most suitable mitigation measure for each project site, and each performance standard. An applicant may also provide compensatory mitigation through the contribution of funds when, due to the small amount of the waiver given for the performance standard, it is not practical to provide a full mitigation project. In these circumstances, the receipt of financial contributions shall be considered the completion of mandatory mitigation for that project. However, in these instances, the Borough will be responsible to ensure that mitigation occurs based on the collection of these funds. If such a situation were to arise, a detailed description of the circumstances, funding amount and performance standard that was mitigated will be provided in Atlantic Highlands annual NJPDES report.

MITIGATION CRITERIA

The mitigation requirements listed below offer a hierarchy of options that are intended to offset the effect on groundwater recharge, stormwater quantity control, and/or stormwater quality control to an equal or greater extent than was created by the granting of a waiver or exemption from the stormwater management requirements.

The mitigation criteria are listed below in order of preference:

1) **Identify, design, and implement a compensating measure to mitigate impacts-** The preferred option is to identify and develop a compensating mitigation project in the same drainage area as the proposed development. In these cases, the applicant will address the same issue within the design and performance standards for which the variance or exemption is being sought, and demonstrate that the proposed mitigating measures provide equal or greater compensation to offset the non-complying aspect of the stormwater management system on site. The developer must also ensure the long-term maintenance of the project as outlined in Chapters 8 and 9 of the NJDEP Stormwater BMP Manual. If the Borough agrees to control a new stormwater management facility, arrangement in the form of an escrow account will be made to stipulate the payment amount, schedule, and long term responsibilities of the facility to ensure that it functions to capacity.

2) **Complete a project identified by the municipality as equivalent to the environmental impact created by the exemption or variance-** If a suitable site

cannot be located in the same drainage area as the proposed development, as discussed in option 1, the mitigation project may provide measures that are not directly equivalent to the impacts for which the variance or exemption is being sought, but that addresses the same issue to an equal or greater extent.

Atlantic Highlands may consider granting a waiver from their adopted stormwater management design and performance If an applicant is able to identify and propose to complete a mitigation project that will improve water quality, water quantity, or groundwater recharge to an equal or greater extent than which the applicant is seeking a waiver for.

As such, an appropriate mitigation measure may take place within the larger confines of the HUC-14 subwatershed area, or another portion of the Borough, rather than the contributing area within which the proposed project is located, if the Atlantic Highlands Borough Planning Board finds that the mitigation will equally protect public health, safety and welfare, the environment, and public and private property.

3) **Provide funding for municipal projects that would address existing stormwater impacts-** The third and least preferable stormwater mitigation option is for the applicant to provide funding or partial funding for an environmental enhancement project that has been identified in this Municipal Stormwater Management Plan, or towards the development of a Regional Stormwater Management Plan. The contributed funds must be equal or greater than the cost to implement the required on-site stormwater measure for which relief is requested including the cost of land, easements, engineering design, and long-term maintenance. However, with this option Atlantic Highlands Borough, not the applicant is ultimately responsible for the design, property acquisition, construction, construction management, maintenance (short-term and long-term) and follow-up study, unless that project and its prospective costs have been outlined within this Mitigation Plan.

REQUIREMENTS FOR MITIGATION PROJECTS

Whether the applicant is proposing the mitigation project, or Atlantic Highlands has identified the project within this Mitigation Plan, the following requirements for mitigation must be included in the project submission.

- **Impact from noncompliance-** The applicant must provide a table to show the required values, and the values provided in the project, and include an alternatives analysis that demonstrates that on-site compliance was maximized to the greatest extent practicable.

- **Narrative and Supporting Information Regarding the Need for the Waiver-** The waiver cannot be granted for a condition that was created by the applicant. If the applicant can provide compliance with the stormwater rules through a

reduction in the scope of the project, the applicant has created the condition and a waiver cannot be issued. The applicant must provide a discussion and supporting information of the site conditions that would not allow the construction of a stormwater management facility to provide compliance with these requirements, and/or if the denial of the application would impose an extraordinary hardship on the applicant brought about by circumstances peculiar to the subject property. The site conditions to be considered are soil type, the presence of karst geology, acid soils, a high groundwater table, unique conditions that would create an unsafe design, as well as conditions that may provide a detrimental impact to public health, welfare, and safety.

- **Sensitive Receptor**- Identify the sensitive receptor related to the performance standard for which a waiver is sought. Demonstrate that the mitigation site contributes to the same sensitive receptor.

- **Design of the Mitigation Project**- Provide the design details of the mitigation project. This includes, but is not limited to, drawings, calculations, and other information needed to evaluate the mitigation project.

- **Responsible Party**- The mitigation project submission must list the party or parties responsible for the construction or maintenance of the mitigation project. Documentation must be provided to demonstrate that the responsible party is aware of, has authority to perform, and accepts the responsibility for the construction and the maintenance of the mitigation project. Under no circumstances shall the responsible party be an individual single-family homeowner.

- **Maintenance**- The applicant must include a maintenance plan that addresses the maintenance criteria at N.J.A.C. 7:8-5 as part of a mitigation plan. In addition, if the maintenance responsibility is being transferred to Atlantic Highlands Borough, or another entity, the entity responsible for the cost of the maintenance must be identified. Atlantic Highlands provides applicants with the option of conveying the mitigation project to the Borough, provided that the applicant funds the cost of maintenance of the facility in perpetuity.

- **Permits**- The applicant is solely responsible to obtain any and all necessary local, State, or other applicable permits for the identified mitigation project or measure. The applicable permits must be obtained prior to the municipal approval of the project for which the mitigation is being sought.

- **Construction**- The applicant must demonstrate that the construction of the mitigation project coincides with the construction of the proposed project. A certificate of occupancy or final approval by the municipality for the application permit cannot be issued until the mitigation project or measure receives final approval. Any mitigation projects proposed by the municipality to offset the stormwater impacts of the Borough's own projects must be completed within six

months of the completion of the municipal project, in order to remain in compliance with Spring Lake Heights's NJPDES General Permit.

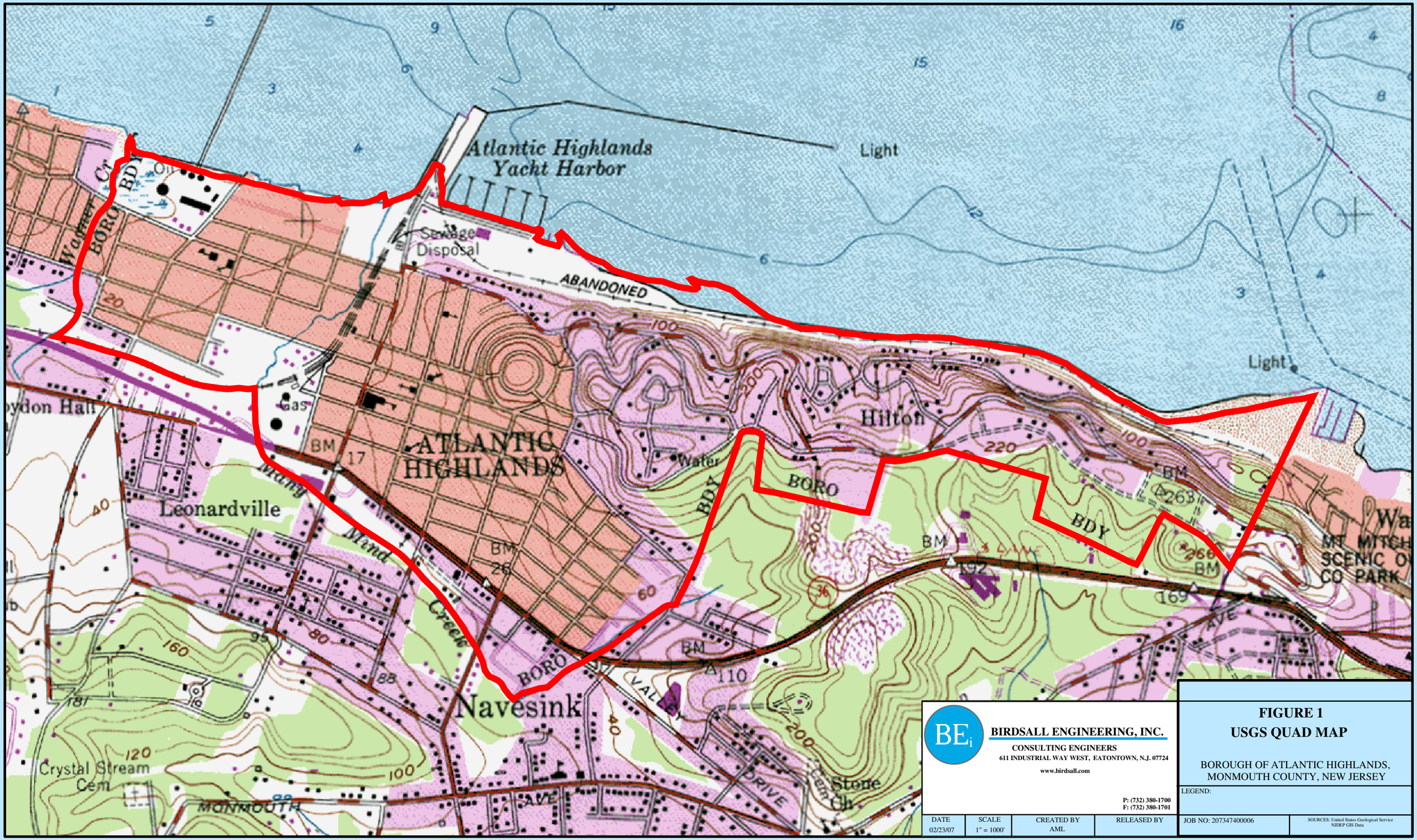
Through this Mitigation Plan, developers would be required to contribute to or complete a mitigating alternative to clearly offset the effect on groundwater recharge, stormwater quantity control, and/or stormwater quality control that was created by granting the variance or exemption. The Borough is also encouraged to identify and rank possible projects to include within the mitigation project criteria. To devise such a list, it is important for the municipality to have sufficient information on each project, including the projects size, permit requirements, land ownership, and estimated project costs (i.e., permitting fees, engineering costs, construction costs, and maintenance costs).

The Borough has developed a preliminary list identifying mitigating projects that are already underway. Potential mitigating projects to alleviate flooding within the Borough include the following areas:

- The intersection of Seventh Avenue and State Highway Route 36. The State Department of Transportation has been contacted and repairs have been scheduled.
- The intersection of Navesink Avenue and State Highway Route 36. The State Department of Transportation has been contacted.

Also, the implementation of both the Many Mind Creek and Wagner Creek greenway concepts are a very high priority for the Borough. As the concepts have been adopted into the current Master Plan, a five-year time frame has been set to develop these greenway initiatives. All potential funding sources will be pursued, however, the adoption of a mitigation plan would create yet another potential funding source to advance the projects the Borough has identified as prioritized to alleviate stormwater management problems in the Borough.

FIGURES



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DATE	SCALE	CREATED BY	RELEASED BY
02/23/07	1" = 1000'	AML	

FIGURE 1
USGS QUAD MAP

BOROUGH OF ATLANTIC HIGHLANDS,
MONMOUTH COUNTY, NEW JERSEY

LEGEND:

JOB NO: 207347400006

SOURCES: United States Geological Service
NJDEP GIS Data

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FIGURE 2
SOILS MAP

ATLANTIC HIGHLANDS BOROUGH,
MONMOUTH COUNTY, NEW JERSEY

NOTES:

JOB NO:

SOURCES: N.J. D.E.P. 2002 AERIALS
USDA SOILS
N.J.G.I.S. DATA

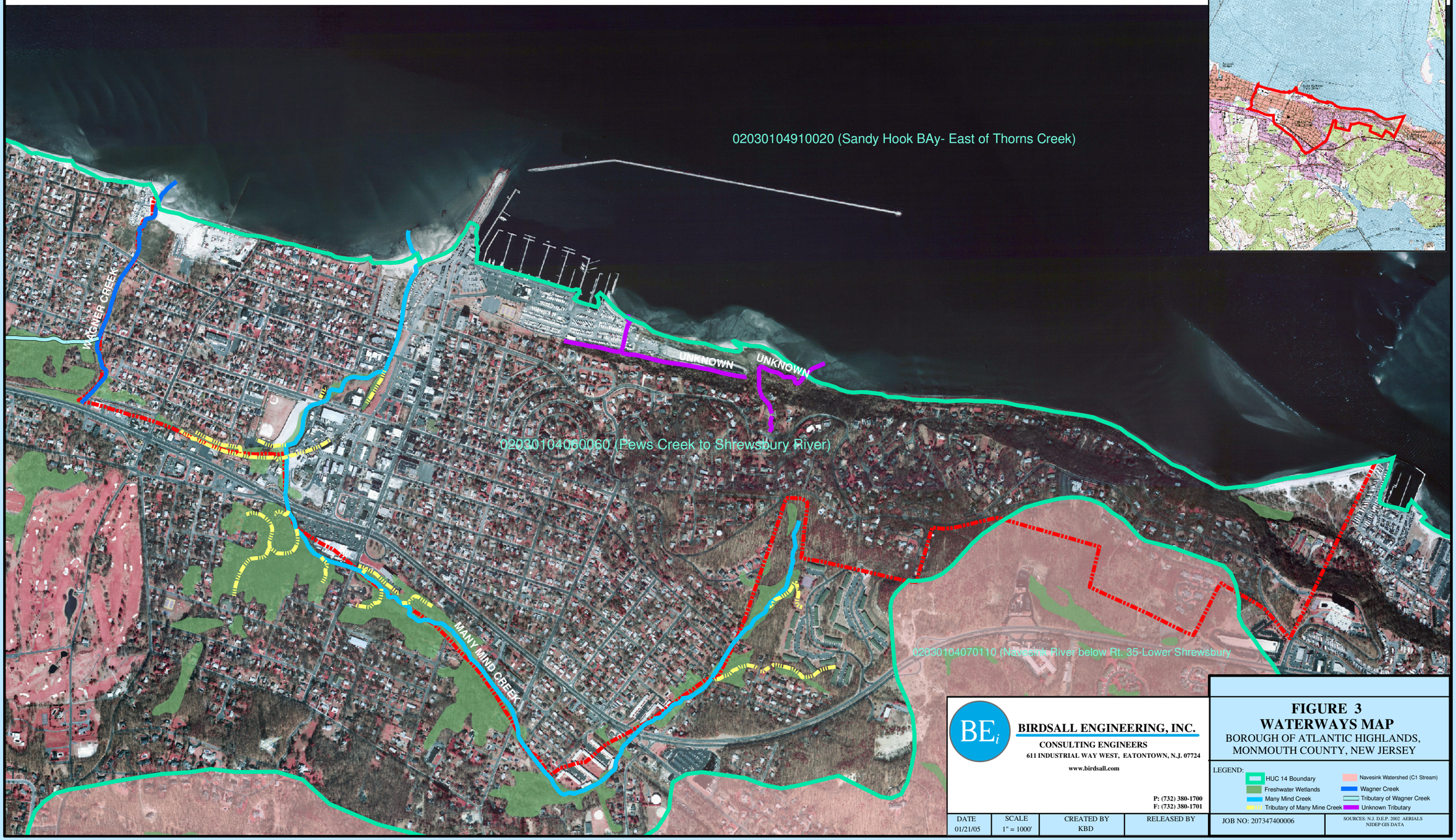

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FIGURE 3
WATERWAYS MAP
BOROUGH OF ATLANTIC HIGHLANDS,
MONMOUTH COUNTY, NEW JERSEY

LEGEND:
- HUC 14 Boundary
- Freshwater Wetlands
- Many Mind Creek
- Tributary of Many Mine Creek
- Navesink Watershed (C1 Stream)
- Wagner Creek
- Tributary of Wagner Creek
- Unknown Tributary

DATE	SCALE	CREATED BY	RELEASED BY
01/21/05	1" = 1000'	KBD	

JOB NO: 207347400006

SOURCES: N.J. D.E.P. 2002 AERIALS
NJDEP GIS DATA

NOTE: POINTS WHERE CREATED IN APPROXIMATE LOCATIONS USING DESCRIPTIONS FROM REPORT ONLY, THEY ARE NOT THE ORIGINAL POINTS LOCATED BY BCC. POINTS NEED TO BE VERIFIED FOR CORRECT LOCATIONS.

BE*i*

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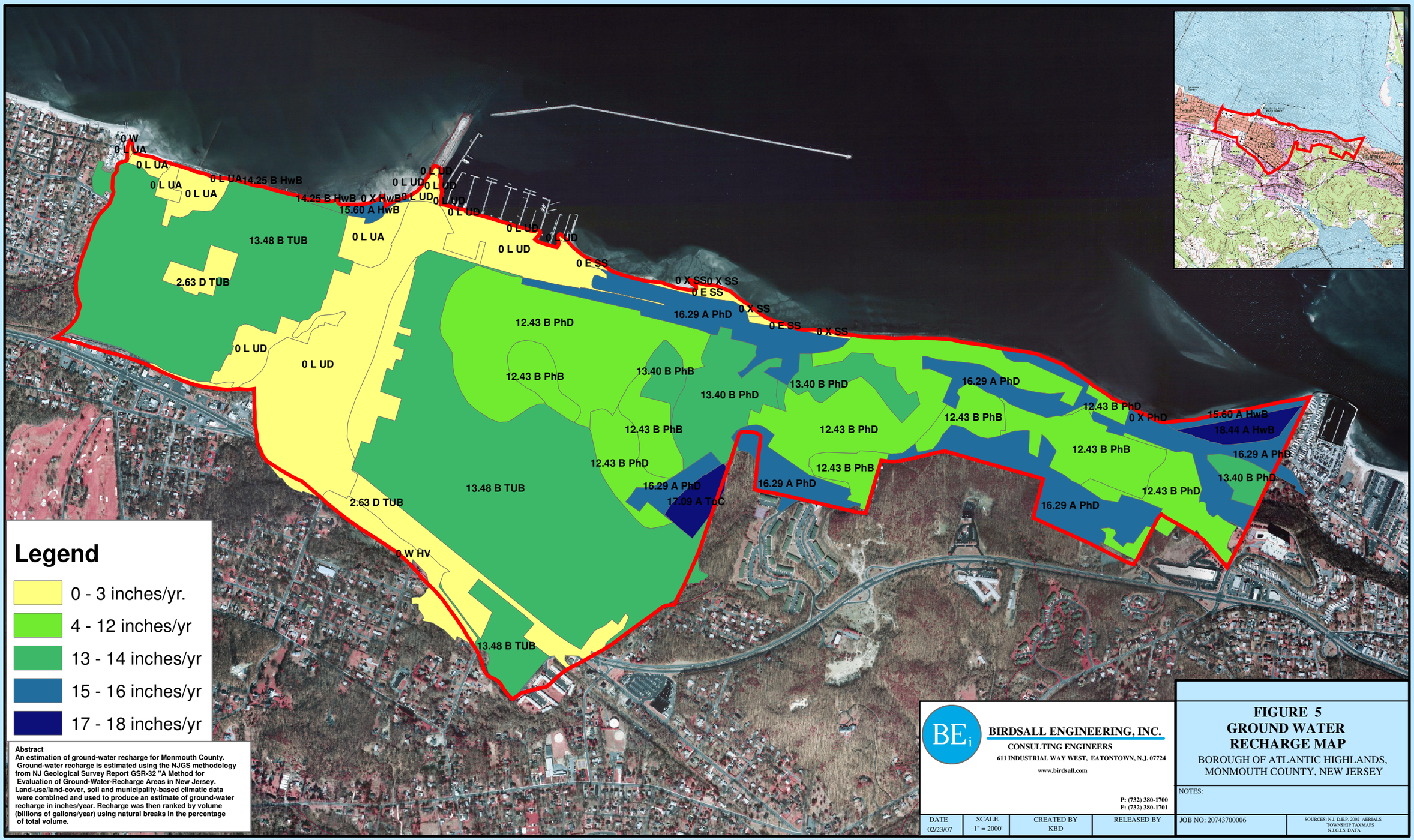
FIGURE 4
WATER SAMPLING MAP

BOROUGH OF ATLANTIC HIGHLANDS,
MONMOUTH COUNTY, NEW JERSEY

LEGEND:
- ATLANTIC HIGHLANDS BOROUGH
- WATER SAMPLE LOCATIONS
- 1 POINT ID
- 7 WATER QUALITY RATING (27= EXCELLENT/7 = POOR)

JOB NO: 20734740006

SOURCES: N.J. D.E.P. 2002 AERIALS
N.J.D.E.P. GIS DATA



Legend

- 0 - 3 inches/yr.
- 4 - 12 inches/yr
- 13 - 14 inches/yr
- 15 - 16 inches/yr
- 17 - 18 inches/yr

Abstract
An estimation of ground-water recharge for Monmouth County. Ground-water recharge is estimated using the NJGS methodology from NJ Geological Survey Report GSR-32 "A Method for Evaluation of Ground-Water-Recharge Areas in New Jersey. Land-use/land-cover, soil and municipality-based climatic data were combined and used to produce an estimate of ground-water recharge in inches/year. Recharge was then ranked by volume (billions of gallons/year) using natural breaks in the percentage of total volume.

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FIGURE 5
GROUND WATER RECHARGE MAP

BOROUGH OF ATLANTIC HIGHLANDS,
MONMOUTH COUNTY, NEW JERSEY

NOTES:

JOB NO: 20743700006

SOURCES: N.J. D.E.P. 2002 AERIALS
TOWNSHIP TAXMAPS
N.J.G.I.S. DATA

A Well Head Protection Area (WHPA) in New Jersey is a map area calculated around a Public Community Water Supply (PCWS) well in New Jersey that delineates the horizontal extent of ground water captured by a well pumping at a specific rate over a two-, five-, and twelve-year period of time for confined wells. The area of capture over two-, five-, and twelve-years is defined using line boundaries and polygon areas generated with the ARC/INFO Geographic Information System (GIS).

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FIGURE 6
WELLHEAD PROTECTION AREAS MAP

BOROUGH OF ATLANTIC HIGHLANDS,
MONMOUTH COUNTY, NEW JERSEY

LEGEND:
- WELLHEAD LOCATIONS TIER 1 - 2 YEAR
- PUBLIC SUPPLY WELLS

JOB NO: 207347400006

SOURCES: N.J. D.E.P. 2002 AERIALS
ATL HIGHLANDS TAX MAPS
N.J.G.I.S. DATA

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FIGURE 7
F.E.M.A. FLOOD ZONE MAP

BOROUGH OF ATLANTIC HIGHLANDS,
MONMOUTH COUNTY, NEW JERSEY

NOTES:

JOB NO: 207347400006

SOURCES: N.J. D.E.P. 2002 AERIALS
NJDEP GIS DATA

APPENDIX A

ATLANTIC HIGHLANDS STORMWATER CONTROL ORDINANCE (23-2007)

ORDINANCE 23-2007

AN ORDINANCE TO AMEND THE CODE OF THE BOROUGH OF ATLANTIC HIGHLANDS BY ADDING CHAPTER XXVII STORMWATER MANAGEMENT AND CONTROL

BE IT ORDAINED by the Mayor and Council of the Borough of Atlantic Highlands, in the County of Monmouth and State of New Jersey, as follows:

That Chapter XXVII, Stormwater Management and Control is added as follows:

Section 1: Purpose

A. Policy Statement.

Flood control, groundwater recharge and pollutant reduction through nonstructural or low impact techniques shall be explored before relying on structural Best Management Practice (BMP)s. Structural BMPs should be integrated with nonstructural stormwater management measures and proper maintenance plans. Nonstructural measures include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site or from being exposed to stormwater. Source control plans should be developed based upon physical site conditions and the origin, nature, and the anticipated loading of potential pollutants. Multiple stormwater BMP methods may be necessary to achieve the established performance standards for water quality, quantity and groundwater recharge.

B. Purpose

It is the purpose of this ordinance to establish minimum stormwater management requirements and controls for major development as defined in Section 13.

C. Applicability

This ordinance shall be applicable to any site plan or subdivision that requires preliminary or final site plan review, and to all major developments undertaken by Atlantic Highlands. No variances, waivers or special exceptions shall be granted without the express approval of the New Jersey Department of Environmental Protection (Department).

D. Compatibility with other permit and ordinance requirements.

Development approvals issued pursuant to this ordinance are to be considered an integral part of development approvals under the subdivision and site plan review process and do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act or ordinance. In their interpretation and application, the provisions of this ordinance shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare. This ordinance is not intended to interfere with, abrogate, or annul any other ordinances, rule or regulation, statute, or other provision of law except that, where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.

Section 2: General Standards

A. Design and Performance Standards for Stormwater Management Measures

1. Stormwater management measures for major development shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards in this ordinance unless such development or other measures are otherwise not permitted under the Steep Slopes section of Atlantic Highlands Borough Development Regulations.[1] To the maximum extent feasible, these standards shall be met by incorporating nonstructural stormwater management strategies into the design. If these strategies alone are not sufficient to meet these standards, structural stormwater management measures necessary to meet these standards shall be incorporated into the design.

2. The standards in this ordinance apply only to new major development and are intended to minimize the impact of stormwater runoff on water quality and water quantity in receiving water bodies and maintain groundwater recharge. The standards do not apply to new major development to the extent that alternative design and performance standards are applicable under a regional stormwater management plan or Water Quality Management Plan adopted in accordance with Department rules. Such alternative standards shall provide at least as much protection from stormwater–related loss of groundwater recharge,

[1] The Borough Steep Slope Ordinance 943-89 as amended was upheld by the New Jersey Supreme Court in Rumson Estates Inc. (Ferraro Builders) v. Borough of Fair Haven (Atlantic Highlands), 176 N.J. 250 (2003). The areas protected by the Steep Slope Ordinance have been identified by the United States Geologic Survey as a geologic hazard area. See Geological Survey Professional Paper 898, U.S. Government Printing Office, Washington, D.C. 1974.

stormwater quantity and water quality impacts of major development projects as would be provided under the standards in this subchapter.

3. For site improvements regulated under the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21, the RSIS shall apply in addition to this Ordinance except to the extent the RSIS are superseded by this Ordinance or alternative standards applicable under a regional stormwater management plan or Water Quality Management Plan adopted in accordance with Department rules.

Section 3. Stormwater Management Requirements For Major Development

A. The development shall incorporate a maintenance plan and designate a responsible party for the stormwater management measures incorporated into the design of a major development.

B. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department's Landscape Project or Natural Heritage Database established under N.J.S.A. 13:1B-15.147 through 15.150, particularly *Helonias bullata* (swamp pink) and/or *Clemmys muhlnebergi* (bog turtle).

C. The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Sections 3.F and 3.G:

1. The construction of an underground utility line provided that the disturbed areas are revegetated upon completion.

2. The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable.

3. The construction of a public pedestrian access, such as a sidewalk or trail with a maximum width of 10 feet, provided that the access is made of permeable material.

D. A waiver from strict compliance from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Sections 3.F and 3.G may be obtained for the enlargement of an existing public roadway or railroad; or the construction or enlargement of a public pedestrian access, provided that the following conditions are met:

1. The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;

2. The applicant demonstrates through an alternatives analysis, that through the use of nonstructural and structural stormwater management strategies and measures, the option selected complies with the requirements of Sections 3.F and 3.G to the maximum extent practicable;

3. The applicant demonstrates that, in order to meet the requirements of Sections 3.F and 3.G, existing structures currently in use, such as homes and buildings would need to be condemned; and

4. The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under 3.D above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate for requirements of Sections 3.F and 3.G that were not achievable on-site.

E. Nonstructural stormwater management measures

1. To the maximum extent practicable, the standards in Sections 3.F and 3.G shall be met by incorporating nonstructural stormwater strategies set forth at Section 3.E into the design. The applicant shall identify the nonstructural measures incorporated into the design of the project. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management measures identified in paragraph 2 below into the design of a particular project, the applicant shall identify the measures considered and provide a basis for the contention.

   The applicant shall be aware that areas defined as Steep Slopes and protected by the Steep Slope Section of the Atlantic Highlands Borough Development Regulations have been identified by the United States Geologic Survey as a geologic hazard area (Geological Survey Professional Paper 898, US Government Printing Office, Washington, 1974). See Footnote 1. Increasing groundwater recharge and/or infiltration in the Steep Slopes Section increases the geologic hazard to the detriment of the public interest and welfare and is not permitted.

2. Nonstructural stormwater management measures incorporated into site design shall:

   a. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;

b. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;

c. Maximize the protection of natural drainage features and vegetation;

d. Minimize the decrease in the "time of concentration" from pre-construction to post-construction. "Time of concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the watershed to the point of interest within a watershed;

e. Minimize land disturbance including clearing and grading;

f. Minimize soil compaction;

g. Provide low-maintenance native plant landscaping that maximizes retention of existing native vegetation and planting of native vegetation and minimizes the use of lawns and need for fertilizers and pesticides;

h. Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas;

i. Provide other source controls to prevent or minimize the use or exposure of pollutants at the site in order to prevent or minimize the release of those pollutants into stormwater runoff. These source controls include, but are not limited to:

(1) Site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Section 3.E. 3. below;

(2) Site design features that help to prevent discharge of trash and debris from drainage systems;

(3) Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and

(4) When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules.

3. Site design features identified under Section 3.E.2.i.(2) above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see Section 3.E.3.c. below.

a. Design engineers shall use either of the following grates whenever they sue a grate in pavement or another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:

(1) The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or

(2) A different grate, if each individual clear space in that grate has an area of no more than seven (7.0) square inches, or is no greater than 0.5 inches across the smallest dimension.

Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of space bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater basin floors.

b. Whenever design engineers use a curb-opening inlet, the clear space in that curb opening (or each individual clear space, if the curb opening has two or more clear spaces) shall have an area of no more than seven (7.0) square inches, or be no greater than two (2.0) inches across the smallest dimension.

c. This standard does not apply:

(1) Where the review agency determines that this standard would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets that meet these standards;

(2) Where flows from the water quality design storm as specified in Section 3.G.1 are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designated, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:

(a) A rectangular space four and five-eighths inches long and one and one-half inches wide (this option does not apply for outfall netting facilities); or

(b) A bar screen having a bar spacing of 0.5 inches.

(3) Where flows are conveyed through a trash rack that has parallel bars with one-inch (1") spacing between the bars, to the elevation of the water quality design storm as specified in Section 4.G.1; or

(4) Where the New Jersey Department of Environmental Protection determines, pursuant to the New Jersey Register of Historic Places rules at N.J.A.C. 7:4-7.2(c), that action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property.

4. Any land area used as a non-structural stormwater management measure to meet the performance standards in Sections 3.F and 3.G shall be dedicated through deed to a government agency, subjected to a conservation deed restriction filed with the appropriate County Clerk's office, or subject to an approved equivalent restriction that ensures the maintenance of that measure in perpetuity.

5. Guidance for nonstructural stormwater management measures is available in the New Jersey Stormwater Best Management Practices Manual. The manual is available on the Department's web page at http://www.njstormwater.org or www.njnonpointsource.org.

F. Erosion control, groundwater recharge and runoff quantity standards

1. This section contains minimum design and performance standards to control erosion, encourage and control infiltration and groundwater recharge, and control stormwater runoff quantity impacts of major development.

   a. The minimum design and performance standards for erosion control are those established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq. and implementing rules.

   b. The minimum design and performance standards for groundwater recharge are as follows:

      (1) Except if (2), (3) or (4) apply, the design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations of Section 4, either:

(a) Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100% of the average annual preconstruction groundwater recharge volume for the site; or

(b) Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the 2-year storm is infiltrated.

(2) This groundwater recharge requirement does not apply to projects that qualify as "urban redevelopment".

(3) The following types of stormwater shall not be recharged;

(a) Stormwater from areas of high pollutant loading. High pollutant loading areas are areas in industrial and commercial developments where solvents and/or petroleum products are loaded/unloaded, stored, or applied, areas where pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than 'reportable quantities' as defined by the United States Environmental Protection Agency (EPA) at 40 CFR 302.4; areas where recharge would be inconsistent with a Department approved remedial action work plan or landfill closure plan and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities; and

(b) Industrial stormwater exposed to "source material". "Source material" means any material(s) or machinery, located at an industrial facility that is directly or indirectly related to process, manufacturing or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to, raw materials; intermediate products; final products; waste materials; by-products; industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.

(4) Where it's a hazard and not permitted as outlined in the Steep Slopes section of Atlantic Highlands Borough as defined in (the AH Steep Slopes Ordinance #943-89 as

amended #14-96), upheld by the NJ Supreme Court (Ferraro Builders, LLC and Rand Associates, a New Jersey Partnership v. Borough of Atlantic Highlands Planning Board and Borough of Atlantic Highlands DECIDED August 5, 2003), has been identified by the United States Geologic Survey as a geologic hazard area (Geological Survey Professional Paper 898, US Government Printing Office, Washington, 1974).

(5) The design engineer shall assess the hydraulic impact on the groundwater table and design the site so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonally high water table so as to cause surficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems and other subsurface structures in the vicinity or downgradient of the groundwater recharge area.

c. In order to control stormwater runoff quantity impacts, the design engineer shall, use the assumptions and factors for stormwater runoff calculations of Section 4, complete one of the following:

(1) Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the 2, 10, and 100 year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;

(2) Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the 2, 10, and 100 year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area; or

(3) Design stormwater management measures so that the post-construction peak runoff rates for the 2, 10 and 100 year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed. The percentages shall not be applied to post-construction stormwater runoff

into tidal flood hazard areas if the increased volume of stormwater runoff will not increase flood damages below the point of discharge;

(4) In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with (1), (2) and (3) above shall only be applied if the increased volume of stormwater runoff could increase flood damages below the point of discharge.

2. Any application for a new agricultural development that meets the definition of major development at Section 12 shall be submitted to the appropriate Soil Conservation District for review and approval in accordance with the requirements of this section and any applicable Soil Conservation District guidelines for stormwater runoff quantity and erosion control.

G. Stormwater runoff quality standards

1. Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff by 80 percent of the anticipated load from the developed site, expressed as an annual average. Stormwater management measures shall only be required for water quality control if an additional 1/4 acre of impervious surface is being proposed on a development site. The requirement to reduce TSS does not apply to any stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the New Jersey Pollution discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A, or in a discharge specifically exempt under a NJPDES permit from this requirement. The water quality design storm is 1.25 inches of rainfall in two hours. Water quality calculations shall take into account the distribution of rain from the water quality design storm, as reflected in Table1. The calculation of the volume of runoff may take into account the implementation of non-structural and structural stormwater management measures.

Table 1: Water Quality Design Storm Distribution

Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
0	0.0000	65	0.8917
5	0.0083	70	0.9917
10	0.0166	75	1.0500
15	0.0250	80	1.0840

20	0.0500	85	1.1170
25	0.0750	90	1.1500
30	0.1000	95	1.1750
35	0.1330	100	1.2000
40	0.1660	105	1.2250
45	0.2000	110	1.2334
50	0.2583	115	1.2417
55	0.3583	120	1.2500
60	0.6250		

2. For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Section 6. TSS reduction shall be calculated based on the removal rates for the BMPs in Table 2 below. Alternative removal rates and methods of calculating removal rates may be used if the design engineer provides documentation demonstrating the capability of these alternative rates and methods to the review agency. A copy of any approved alternative rate or method of calculating the removal rate shall be provided to the Department at the following address: Division of Watershed Management, New Jersey Department of Environmental Protection, P.O. Box 418, Trenton, New Jersey, 08625-0418.

3. If more than one BMP in series is necessary to achieve the required 80% TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:

$$R = A + B - (AxB)/100$$

Where
R = total TSS load removal from application of both BMPs, and
A = the TSS removal rate applicable to the first BMP
B = the TSS removal rate applicable to the second BMP

Table 2: TSS Removal Rates for BMPs

Best Management Practice	**TSS %Removal Rate**
Bioretention Systems	90
Constructed Stormwater Wetland	90
Forested Buffers 70	
Extended Detention Basin	40-60
Infiltration Structure	80

Manufactured Treatment Device		See N.J.A.C. 7:8-5.7(c)
Sand Filter	80	
Vegetative Filter Strip	50	
Wet Pond	50-90	

4. If there is more than one onsite drainage area, the 80% TSS removal rate shall apply to each drainage area, unless the runoff from the sub-areas converge on site in which case the removal rate can be demonstrated through a calculation using a weighted average.

5. Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load from the developed site in stormwater runoff generated from the water quality design storm. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include nonstructural strategies and structural measures that optimize nutrient removal while still achieving the performance standards in Sections 3.F and 3.G.

6. Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Section 6.

7. In accordance with the definition of FW1 at N.J.A.C. 7:9B-1.4, stormwater management measures shall be designed to prevent any increase of stormwater to waters classified as FW1.

8. Special water resource protection areas shall be established along all waters designated Category One of N.J.A.C. 7:9B and perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the USGS Quadrangle Maps or in the County Soil Surveys, within the associated HUC 14 drainage. These areas shall be established for the protection of water quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:

    a. The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:

        (1) A 300-foot special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the top of the bank of the waterway or centerline of the waterway where the bank is undefined, consisting of existing vegetation or vegetation allowed to follow natural succession is provided.

(2) Encroachment within the designated special water resource protection area under subsection G.8.a(1) above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or maintained lawn area). The encroachment shall only be allowed where applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable. In no case shall the remaining special water resource protection area be reduced to less than 150 feet as measured perpendicular to the top of the bank of the waterway or centerline of the waterway where the bank is undefined. All encroachments proposed under this subparagraph shall be subject to review and approval by the Department.

b. All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the Standard For Off-Site Stability in the "Standards for Soil Erosion and Sediment Control in New Jersey", established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq.

c. If stormwater discharged outside of and flowing through the special water resource protection area cannot comply with the Standard For Off-Site Stability in the "Standards for Soil Erosion and Sediment Control in New Jersey", established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., then the stabilization measures in accordance with the requirements of the above standards may be placed within the special water resource protection area, provided that:

(1) Stabilization measures shall not be placed within 150 feet of the Category One waterway;

(2) Stormwater associated with discharges allowed by this section shall achieve a 95% TSS post construction removal rate;

(3) Temperature shall be addressed to ensure no impact on receiving waterway;

(4) The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable;

(5) A conceptual project design meeting shall be held with the appropriate Department staff and Soil Conservation District staff to identify necessary stabilization measures; and

(6) All encroachments proposed under this section shall be subject to review and approval by the Department.

d. A stream corridor protection plan may be developed by a regional stormwater management planning committee as an element of a regional stormwater management plan, or by a municipality through an adopted municipal stormwater management plan. If a stream corridor protection plan for a waterway subject to Sec 3.G.8. has been approved by the Department of Environmental Protection, then the provisions of the plan shall be the applicable special water resource protection area requirements for that waterway. A stream corridor protection plan for a waterway subject to G.8 shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in G.8.a(1) above. In no case shall a stream corridor protection plan allow the reduction of the Special Water Resource Protection Area to less than 150 feet as measured perpendicular to the waterway subject to this subsection.

e. This subsection does not apply to the construction of one individual single family dwelling that is not part of a larger development on a lot receiving preliminary or final subdivision approval on or before February 2, 2004, provided that the construction begins on or before February 2, 2009.

Section 4: Calculation of Stormwater Runoff and Groundwater Recharge

A. Stormwater runoff shall be calculated in accordance with the following:

1. The design engineer shall calculate runoff using one of the following methods:

   a. The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook Section 4 – Hydrology and Technical Release 55 – Urban Hydrology for Small Watersheds; or

   b. The Rational Method for peak flow and the Modified Rational Method for hydrograph computations.

2. For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the preconstruction condition of a

site or portion thereof is a wooded land use with good hydrologic condition. The term "runoff coefficient" applies to both the NRCS methodology at Section 5.A.1.a. and the Rational and Modified Rational Methods at Section 5.A.1b. A runoff coefficient or a groundwater recharge land cover for an existing condition may be used on all or a portion of the site if the design engineer verifies that the hydrologic condition has existed on the site or portion of the site for at least five years without interruption prior to the time of calculation. If more than one land cover have existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations. In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is pasture, lawn, or park), with good cover (if the land use type is woods), or with good condition and conservation treatment (if the land use type is cultivation.)

3. In computing pre-construction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts that may reduce pre-construction stormwater runoff rates and volumes.

4. In computing stormwater runoff from a design storm, the design engineer shall consider the relative stormwater runoff rates and/or volumes of pervious and impervious surfaces separately to accurately compute the rates and volume of stormwater runoff from the site. To calculate runoff from unconnected impervious cover, urban impervious area modifications as described in the NRCS Technical Release-55, Urban Hydrology for Small Watersheds may be employed.

5. If the invert of the outlet structure of a stormwater management measure is below the flood hazard design flood elevation as defined at N.J.A.C. 7:13, the design engineer shall take into account the effects of tailwater in the design of structural stormwater management measures.

B. Groundwater Recharge may be calculated in accordance with the following:

1. The New Jersey Geological Survey Report GSR-32 A Method for Evaluating Ground-Water Recharge Areas in New Jersey, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual: at http://www.state.nj.us/dep/njgs/; or at New Jersey Geological Survey, 29 Arctic Parkway, P.O. Box 427, Trenton, New Jersey 08625-0427; (609) 984-6587.

Section 5: Standards for Structural Stormwater Management Measures

A. Standards for structural stormwater management measures are as follows:

1. Structural stormwater management measures shall be designed to take into account the existing site conditions, including, for example, environmentally critical areas; wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone). The Steep Slopes section of Atlantic Highlands Borough as defined in (the AH Steep Slopes Ordinance #943-89 as amended #14-96), upheld by the NJ Supreme Court (Ferraro Builders, LLC and Rand Associates, a New Jersey Partnership v. Borough of Atlantic Highlands Planning Board and Borough of Atlantic Highlands DECIDED August 5, 2003), has been identified by the United States Geologic Survey as a geologic hazard area (Geological Survey Professional Paper 898, US Government Printing Office, Washington, 1974). Increasing groundwater recharge and/or infiltration in the Steep Slopes Section increases the geologic hazard to the detriment of the public interest and welfare and is not permitted.

2. Structural stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure as appropriate, and shall have parallel bars with one-inch (1") spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than one-third (1/3) the width of the diameter of the orifice or one-third (1/3) the width of the weir, with a minimum spacing between bars of one inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of Section 7.D.

3. Structural stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement.

4. At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half inches in diameter.

5. Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins of Section 7.

6. Stormwater management measures shall be designed to drain rapidly to prevent their becoming breeding or reservoir areas for disease vectors.

B. Stormwater management measure guidelines are available in the New Jersey Stormwater Best Management Practices Manual. Other stormwater management measures may be utilized provided the design engineer demonstrates that the proposed measure and its design will accomplish the required water quantity, groundwater recharge and water quality design and performance standards in Section 7.D.1, 7.D.2 and 7.D.3 for trash racks, overflow gates, and escape as established by this subchapter. .

C. Manufactured treatment devices may be used to meet the requirements of this subchapter, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.

Section 6: Sources for Technical Guidance

A. Technical guidance for stormwater management measures can be found in the documents listed at 1 and 2 below, which are available from Maps and Publications, Department of Environmental Protection, 428 East State Street, P.O. Box 420, Trenton, New Jersey, 08625; telephone (609) 777-1038.

1. Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended. Information is provided on stormwater management measures such as: bioretention systems, constructed stormwater wetlands, dry wells, forested buffers, extended detention basins, infiltration structures, manufactured treatment devices, pervious paving, sand filters, vegetative filter strips, and wet ponds.

2. The New Jersey Department of Environmental Protection Stormwater Management Facilities Maintenance Manual, as amended.

B. Additional technical guidance for stormwater management measures can be obtained from the following:

1. The "Standards for Soil Erosion and Sediment Control in New Jersey" promulgated by the State Soil Conservation Committee and incorporated into N.J.A.C. 2:90. Copies of these standards may be obtained by contacting the State Soil Conservation Committee or any of the Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a) 4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey 08625; 609-292-5540;

2. The Rutgers Cooperative Extension Service, 732-932-9306; and

3. The Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a) 4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey, 08625, 609-292-5540.

Section 7: Safety Standards for Stormwater Management Basins

A. This section sets forth requirements to protect public safety through the proper design and operation of stormwater management basins. This subchapter applies to any new stormwater management basin.

B. The provisions of this section are not intended to preempt municipal or county safety requirements for new or existing stormwater management basins. Municipal and county stormwater management plans and ordinances may, pursuant to their authority, require existing stormwater management basins to be retrofitted to meet one or more of the safety standards in Section 7.D.1, 7.D.2 and 7.D.3 for trash racks, overflow grates, and escape provisions at outlet structures.

C. Operative date and compliance schedule

1. For purposes of this subchapter, a stormwater management basin is "existing" if construction of such basin commenced prior to (one year from the effective date of this ordinance), or if such basin was identified in a subdivision or site plan application that received final approval pursuant to the Municipal Land Use Law (N.J.S.A. 40:55D-1 et seq.) as of (one year from the effective date of this ordinance). Any other stormwater management basin is a "new" basin.

2. As of (one year from the effective date of this ordinance), the construction, installation, or operation of any new stormwater management basin that does not conform to the requirements of this subchapter is prohibited.

3. If an existing stormwater management basin does not conform to a municipal or county stormwater control ordinance adopted pursuant to N.J.A.C. 7:8-6.1(c), the person responsible for the stormwater management basin under such ordinance shall, within the time period specified in the ordinance, modify the basin to comply with the ordinance.

D. Requirements for trash racks, overflow grates and escape provisions

1. A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures. Trash racks shall be installed at the

intake to the outlet from the stormwater management basin to ensure proper functioning of the basin outlets in accordance with the following:

a. The trash rack shall have parallel bars, with no greater than six inch spacing between the bars.

b. The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure.

c. The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack.

d. The trash rack shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs/ft sq.

2. An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:

a. The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.

b. The overflow grate spacing shall be no less than two inches across the smallest dimension.

c. The overflow grate shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs/ft sq.

3. For purposes of this subsection, escape provisions means the permanent installation of ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management basins. Stormwater management basins shall include escape provisions as follows:

a. If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Section 7.E., a free-standing outlet structure may be exempted from this requirement.

b. Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half feet. Such safety ledges shall be comprised of two steps. Each step shall be four to six feet in

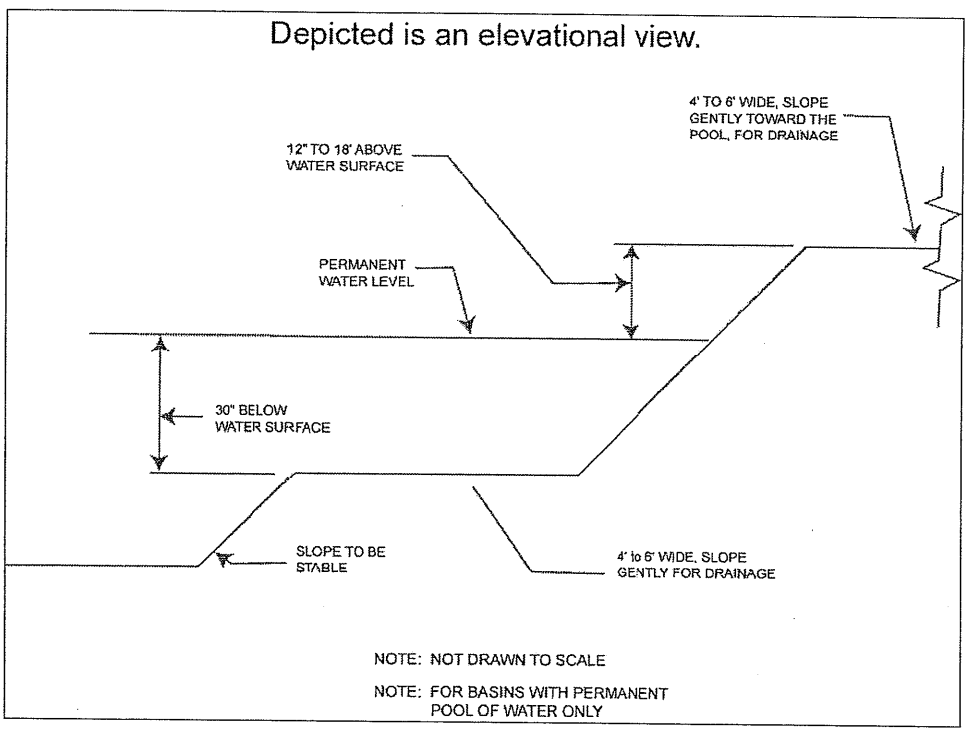
width. One step shall be located approximately two and one-half feet below the permanent water surface, and the second step shall be located one to one and one-half feet above the permanent water surface. See Section 7.F for an illustration of safety ledges in a stormwater management basin.

c. In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than 3 horizontal to 1 vertical.

E. Variance or exemption from safety standards

1. A variance or exemption from the safety standards for stormwater management basins may be granted only upon a written finding by the appropriate reviewing agency (municipality, county or Department) that the variance or exemption will not constitute a threat to public safety.

F. Illustration of safety ledges in a new stormwater management basin.



Section 8: Requirements for a Site Development Stormwater Plan

A. Submission of Site Development Stormwater Plan

1. Whenever an applicant seeks municipal approval of a development subject to this ordinance, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan

at 8.C below as part of the submission of the applicant's application for subdivision or site plan approval.

2. The applicant shall demonstrate that the project meets the standards set forth in this ordinance.

3. The applicant shall submit 18 copies of the materials listed in the checklist for site development stormwater plans in accordance with subsection 8.C of this ordinance.

B. Site Development Stormwater Plan Approval

The applicant's Site Development project shall be reviewed as a part of the subdivision or site plan review process by the municipal board or official from which municipal approval is sought. That municipal board or official shall consult the engineer retained by the Planning and/or Zoning Board (as appropriate) to determine if all the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this ordinance.

C. Checklist Requirements

The following information shall be required:

1. Topographic Base Map

The reviewing engineer may require upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of 200 feet beyond the limits of the proposed development, at a scale of 1"=200' or greater, showing 2-foot contour intervals. The map as appropriate may indicate the following: existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category 1 waters, wetlands and flood plains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces, existing man-made structures, roads, bearing and distances of property lines, and significant natural and manmade features not otherwise shown.

2. Environmental Site Analysis

A written and graphic description of the natural and man-made features of the site and its environs. This description should include a discussion of soil conditions, slopes, wetlands, waterways and vegetation on the site. Particular attention should be given to unique, unusual, or environmentally sensitive features and to those that provide particular opportunities or constraints for development.

3. Project Description and Site Plan(s)

A map (or maps) at the scale of the topographical base map indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural facilities for stormwater management and sediment control, and other permanent structures. The map(s) shall also clearly show areas where alterations occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high ground water elevations. A written description of the site plan and justification of proposed changes in natural conditions may also be provided.

4. Land Use Planning and Source Control Plan

This plan shall provide a demonstration of how the goals and standards of Sections 2 through 5 are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater recharge, stormwater quality and stormwater quantity problems at the source by land management and source controls whenever possible.

5. Stormwater Management Facilities Map

The following information, illustrated on a map of the same scale as the topographic base map, shall be included:

a. Total area to be paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.

b. Details of all stormwater management facility designs, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention and emergency spillway provisions with maximum discharge capacity of each spillway.

6. Calculations

a. Comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in Section 3 of this ordinance.

b. When the proposed stormwater management control measures (e.g. infiltration basins) depends on the hydrologic properties of soils, then a soils report shall be submitted. The soils report shall be based on onsite boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and

distribution of soil types present at the location of the control measure.

7. Maintenance and Repair Plan

   The design and planning of the stormwater management facility shall meet the maintenance requirements of Section 9.

8. Waiver from Submission Requirements

   The municipal official or board reviewing an application under this ordinance may, in consultation with the municipal engineer, waive submission of any of the requirements Sections 8.C.1 through 8.C.6 of this ordinance when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

Section 9: Maintenance and Repair

A. General Maintenance

1. The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.

2. The maintenance plan shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual. If the maintenance plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's agreement to assume this responsibility, or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.

3. Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.

4. If the person responsible for maintenance identified under Section A.2 above is not a public agency, the maintenance plan and any future

revisions based on Section A.7 below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.

5. Preventative and corrective maintenance shall be performed as needed, including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of nonvegetated linings.

6. The person responsible for maintenance identified under Section A.2 above shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.

7. The person responsible for maintenance identified under Section A.2 above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.

8. The person responsible for maintenance identified under Section A.2 above shall retain and make available, upon request by a public entity, the maintenance plan and the documentation required by Sections A.2, A.6, and A.7 above.

9. The requirements of Sections A.3 and A.4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.

10. In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have fourteen (14) days to effect maintenance and repair of the facility in a manner that is approved by the municipal engineer or his designee. If the responsible person fails or refuses to perform such maintenance and repair, the municipality or County may immediately proceed to do so and shall bill the cost thereof to the responsible person.

B. Nothing in this section shall preclude the municipality in which the major development is located from requiring the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53.

Section 10: Penalties

Except as otherwise provided, each and every day, in which a violation of any provision of this Ordinance exists, shall constitute a separate violation. Any

responsible person who violates any portion or section of this ordinance shall be subject to fines up to $5,000.00 per violation. In addition the judge may impose any other penalty as provided for under the Revised General Ordinances of the Borough of Atlantic Highlands, Chapter 1 section 1-5 titled "General Penalties".

Section 11: Effective Date

This ordinance shall take effect immediately upon approval by the county review agency, or sixty (60) days from receipt of the ordinance by the county review agency if the county review agency should fail to act.

Section 12: Severability

If the provisions of any article, section, subsection, paragraph, subdivision or clause of this ordinance shall be judged invalid by a court of competent jurisdiction, such order of judgment shall not affect or invalidate the remainder of any article, section, subsection, paragraph, subdivision or clause of this ordinance.

Section 13: Definitions

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application. The definitions below are the same as or based on the corresponding definitions in the Stormwater Management Rules at N.J.A.C. 7:8-1.2.

"Agricultural development" means land uses normally associated with the production of food, fiber and livestock for sale. Such uses do not include the development of land for the processing or sale of food and the manufacture of agriculturally related products.

"CAFRA Centers, Cores or Nodes" means those areas within boundaries accepted by the Department pursuant to N.J.A.C. 7:8E-5B.

"CAFRA Planning Map" means the geographic depiction of the boundaries for the Coastal Planning Areas, CAFRA Centers, CAFRA Cores and CAFRA Nodes pursuant to N.J.A.C. 7:7E-5B.3.

"Compaction" means the increase in soil bulk density.

"Core" means a pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

"County review agency" means an agency designated by the County Board of Chosen Freeholders to review municipal stormwater management plans and implementing ordinance(s). The county review agency may either be:

- A county planning agency; or
- A county water resource association created under N.J.S.A 58:16A-55.5, if the ordinance or resolution delegates authority to approve, conditionally approve, or disapprove municipal stormwater management plans and implementing ordinances.

"Department" means the New Jersey Department of Environmental Protection.

"Designated Center" means a State Development and Redevelopment Plan Center as designated by the State Planning Commission such as urban, regional, town, village, or hamlet.

"Design engineer" means a person professionally qualified and duly licensed in New Jersey to perform engineering services that may include, but necessarily be limited to, development of project requirements, creation and development of project design and preparation of drawings and specifications.

"Development" means the division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, for which permission is required under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq. In the case of development of agricultural lands, development means: any activity that requires a State permit; any activity reviewed by the County Agricultural Board (CAB) and the State Agricultural Development Committee (SADC), and municipal review of any activity not exempt by the Right to Farm Act, N.J.S.A. 4:1C-1 et seq.

"Drainage area" means a geographic area within which water, sediments, and dissolved materials drain to a particular receiving waterbody or to a particular point along a receiving waterbody.

"Environmentally critical areas" means an area or feature which is of significant environmental value, including but not limited to: stream corridors; natural heritage priority sites; habitat of endangered or threatened species; large areas of continuous open space or upland forest; steep slopes; and well head protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the Department's Landscape Project as approved by the Departments Endangered and Nongame Species Program.

"Empowerment Neighborhood" means a neighborhood designated by the urban Coordinating Council in consultation and conjunction with the New Jersey Redevelopment Authority pursuant to N.J.S.A. 55:19-69.

"Erosion" means the detachment and movement of soil or rock fragments by water, wind, ice or gravity.

"Impervious surface" means a surface that has been covered with a layer of material so that it is highly resistant to infiltration by water.

"Infiltration" is the process by which water that seeps into the soil from precipitation.

"Major development" means any "development" shown in any site plan or subdivision plan that has not received preliminary or final approval by [insert the effective date of this ordinance] that provides for ultimately disturbing one or more acres of land or increasing impervious surface by one-quarter acre or more. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation. Projects undertaken by any government agency which otherwise meet the definition of "major development" but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq. are also considered "major development."

"Municipality" means the Borough of Atlantic Highlands.

"Node" means an area designated by the State Planning Commission concentrating facilities and activities which are not organized in a Compact form.

"Nutrient" means a chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

"Person" means any individual, corporation, company, partnership, firm, association, political subdivision of this State and any state, interstate or federal agency.

"Pollutant" means any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff or other residue discharged directly or indirectly to the land, ground waters or surface waters of the State, or to a domestic treatment works. "Pollutant" includes both hazardous and nonhazardous pollutants.

"Recharge" means the amount of water from precipitation that infiltrates into the ground and is not evapotranspired.

"Sediment" means solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

"Site" means the lot or lots upon which a major development is to occur or has occurred.

"Soil" means all unconsolidated mineral and organic material of any origin.

"State Development and Redevelopment Plan Metropolitan Planning Area (PA1)" means an area delineated on the State Plan Policy Map and adopted by the State Planning Commission that is intended to be the focus for much of the state's future redevelopment and revitalization efforts.

"State Plan Policy Map" is defined as the geographic application of the State Development and Redevelopment Plan's goals and statewide policies, and the official map of these goals and policies.

"Stormwater" means water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, or is captured by separate storm sewers or other sewage or drainage facilities.

"Stormwater runoff" means water flow on the surface of the ground or in storm sewers, resulting from precipitation.

"Stormwater management basin" means an excavation or embankment and related areas designed to retain stormwater runoff. A stormwater management basin may either be normally dry (that is, a detention basin or infiltration basin), retain water in a permanent pool (a retention basin), or be planted mainly with wetland vegetation (most constructed stormwater wetlands).

"Stormwater management measure" means any structural or nonstructural strategy, practice, technology, process, program, or other method intended to control or reduce stormwater runoff and associated pollutants, or to induce or control the infiltration or groundwater recharge of stormwater or to eliminate illicit or illegal nonstormwater discharges into stormwater conveyances.

"Tidal Flood Hazard Area" means a flood hazard area, which may be influenced by stormwater runoff from inland areas, but which is primarily caused by the Atlantic Ocean.

"Urban Coordinating Council Empowerment Neighborhood" means a neighborhood given priority access to state resources through the New Jersey Redevelopment Authority.

"Urban Enterprise Zones" means a zone designated by the New Jersey Enterprise Zone Authority pursuant to the New Jersey Urban Enterprise Zones Act, N.J.S.A. 52:27H-60 et. seq.

"Urban Redevelopment Area" is defined as previously developed portions of areas:

(1) Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1), Designated Centers, Cores or Nodes;
(2) Designated as CAFRA Centers, Cores or Nodes,
(3) Designated as Urban Enterprise Zones; and
(4) Designated as Urban Coordinating Council Empowerment Neighborhoods.

"Waters of the State" means the ocean and its estuaries, all springs, streams, wetlands, and bodies of surface or ground water, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

"Wetlands" or "wetland" means an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

SECTION 14
Section 21-58, Plat and plan details is hereby amended as follows
21-58 Plat and Plan Details

A. *No Change*

B. *No Change*

1-20. *No Change*

21. Stormwater Management and sanitary sewer reports, including proposed storm drainage and sanitary disposal facilities; specifically, the location, type and size of all existing and proposed catch basins, storm drainage facilities, utilities, plus all required design data supporting the adequacy of file existing or proposed facilities to handle future storm flows as required by the Borough or, if applicable, as required by the Stormwater Management and Control Chapter of this ordinance.

C – D. *No Change*

E. *No Change*

1-9. *No Change*

10. Stormwater Management and sanitary sewer reports, including proposed storm drainage and sanitary disposal facilities; specifically, the location, type and size of all existing and

proposed catch basins, storm drainage facilities, utilities, plus all required design data supporting the adequacy of file existing or proposed facilities to handle future storm flows as required by the Borough or, if applicable, as required by the Stormwater Management and Control Chapter of this ordinance.

SECTION 15

Section 21-59, On-tract and on-site improvements is hereby amended as follows:

21-59 On-tract and on-site improvements.

A. *No Change*

1-2. *No Change*

3. Storm drains and culverts. All streets shall be provided with sufficient catch basins, storm sewers, culverts, water detention basins and other drainage appurtenances for the proper drainage of the area, with respect to existing and future conditions, and if applicable, in accordance with the Borough's Stormwater Management and Control chapter of this ordinance. All such facilities shall be constructed in accordance with this chapter, the Stormwater Management and Control chapter, if applicable, or such other accepted engineering design practices as may be required by the Borough Engineer where special circumstances so require.

B. *No Change*

C. *No Change*

1. *No Change*

2. Drainage. All sites shall be drained and graded so as to control surface runoff efficiently. Storm drainage shall be connected to existing facilities whenever possible. Detention facilities may be required by the Borough in cases where existing systems lack capacity or where needed to protect downstream properties. Drainage design shall be as set forth in 21-65.V of this chapter or the Borough's Stormwater Management and Control chapter, if applicable.

SECTION 16

Section 21-65, Design Specifications is hereby amended as follows :

21-65 Design Specifications.

A-U. *No Change*

V. Stormwater Drainage

General Requirements

A. All streets shall be provided with manholes, catch basins and pipes where the same may be necessary for proper surface drainage. On-site facilities may be permitted. Additionally, all work shall be in accordance with the established design standards of the Borough, including the Stormwater Management and Control chapter, if applicable.

Council member Dellosso introduced this Ordinance and, after First Reading, moved for its approval. It was seconded by Council member Archibald and approved by the following vote.

AYES: Council members Archibald, Dellosso, Doyle, Fligor Spatola and Sutton
NAYS: NONE
ABSTAIN: NONE
ABSENT: NONE

The Second Reading, Public Hearing and possible adoption is scheduled for October 24, 2007.

I, Dwayne M. Harris, Municipal Clerk of the Borough of Atlantic Highlands, in the County of Monmouth, State of New Jersey, hereby certify this to be a true copy of the action of the Governing Body at its meeting held September 26, 2007. WITNESS my hand and the Seal of the Borough of Atlantic Highlands this 27th day of September 2007.

Dwayne M. Harris, RMC

After a Public Hearing and Second Reading, Council member Fligor moved for Final Adoption of this Ordinance. It was seconded by Council member Spatola and adopted by the following vote:

AYES: Council members Archibald, Doyle, Fligor, Spatola and Sutton
NAYS:
ABSTAIN:
ABSENT: Council Member Dellosso

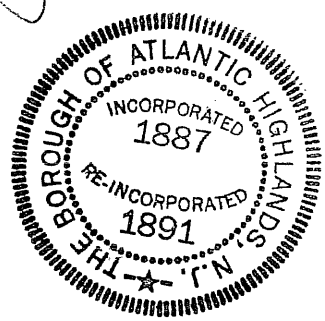
I, Dwayne M. Harris, Municipal Clerk of the Borough of Atlantic Highlands, in the County of Monmouth, State of New Jersey, hereby certify this to be a true copy of the action of the Governing Body at its meeting October 24, 2007.

WITNESS my hand and the Seal of the Borough of Atlantic Highlands this 25th day of October 2007.

Dwayne M. Harris, RMC

DATE OF MAYORS APPROVAL: October 25, 2007

Peter E. Donoghue, Mayor



APPENDIX B
BENTHIC MACROINVERTEBRATE SAMPLE SUMMARY: MANY MIND CREEK

On October 22,2003 two fish traps were also deployed at sites 1 and 2. There were no samples collected from the fish traps and they were not used again. In the two seine samples all organisms were combined. The following list of organisms is the total of the two seines.

- Grass Shrimp > 2000
- Killifish 64
- Silversides 25
- Hermit Crab 9
- Mullet 3
- Ribbed Mussel 3

3.1 Overall Water Quality Ratings for Sites 1-6

Site #1 Aquatic Macroinvertebrate Sample 10/24/03					
Pollution Sensitive		**Somewhat Sensitive**		**Pollution Tolerant**	
Caddisfly Larvae Mayfly Larvae Riffle Beetle Stonefly Larvae		Beetle Larvae Freshwater Clams Atherix Alderfly Larvae Fishfly Larvae Cranefly Larvae		Aquatic Worms Blackfly Larvae Leeches	
Total	**Index Value**	**Total**	**Index Value**	**Total**	**Index Value**
4	12	6	12	3	3
Overall water quality rating: 27 Excellent					

Site #2 Aquatic Macroinvertebrate Sample 11/5/03					
Pollution Sensitive		**Somewhat Sensitive**		**Pollution Tolerant**	
Caddisfly Larvae		Beetle Larvae Freshwater Clams Atherix Dragon Fly Nymph Fishfly Larvae Cranefly Larvae		Aquatic Worms Midge Fly Larvae	
Total	**Index Value**	**Total**	**Index Value**	**Total**	**Index Value**
1	3	6	12	2	2
Overall water quality rating: 17 Good					

Site #3 Aquatic Macroinvertebrate Sample 11/13/03					
Pollution Sensitive		**Somewhat Sensitive**		**Pollution Tolerant**	
Caddisfly Larvae		Freshwater Clams Atherix Cranefly Larvae Suds		Aquatic Worms Midge Fly Larvae Pouch Snails	
Total	**Index Value**	**Total**	**Index Value**	**Total**	**Index Value**
1	3	4	8	3	3
Overall water quality rating: 14 Fair					

Site #4 Aquatic Macroinvertebrate Sample 10/24/03					
Pollution Sensitive		**Somewhat Sensitive**		**Pollution Tolerant**	
No species were collected		Beetle Larvae Fishfly Larvae Cranefly Larvae Suds		Aquatic Worms Leeches	
Total	**Index Value**	**Total**	**Index Value**	**Total**	**Index Value**
0	0	4	8	2	2
Overall water quality rating: 10 poor					

Site #5 Aquatic Macroinvertebrate Sample 11/11/03					
Pollution Sensitive		**Somewhat Sensitive**		**Pollution Tolerant**	
No species were collected		Beetle Larvae Cranefly Larvae Suds		Aquatic Worms	
Total	**Index Value**	**Total**	**Index Value**	**Total**	**Index Value**
0	0	3	6	1	1
Overall water quality rating: 7 poor					

Site #6 Aquatic Macroinvertebrate Sample 10/23/03					
Pollution Sensitive		**Somewhat Sensitive**		**Pollution Tolerant**	
Caddisfly Larvae		Freshwater Clams Sowbugs Cranefly Larvae Suds		Aquatic Worms Midge Fly Larvae Pouch Snails Leeches	
Total	**Index Value**	**Total**	**Index Value**	**Total**	**Index Value**
1	3	4	8	4	4
Overall water quality rating: 15 Fair					

TABLE 1
BENTHIC MACROINVERTEBRATE SAMPLE SUMMARY
MANY MIND CREEK
ATLANTIC HIGHLANDS, NEW JERSEY
MARCH 2004

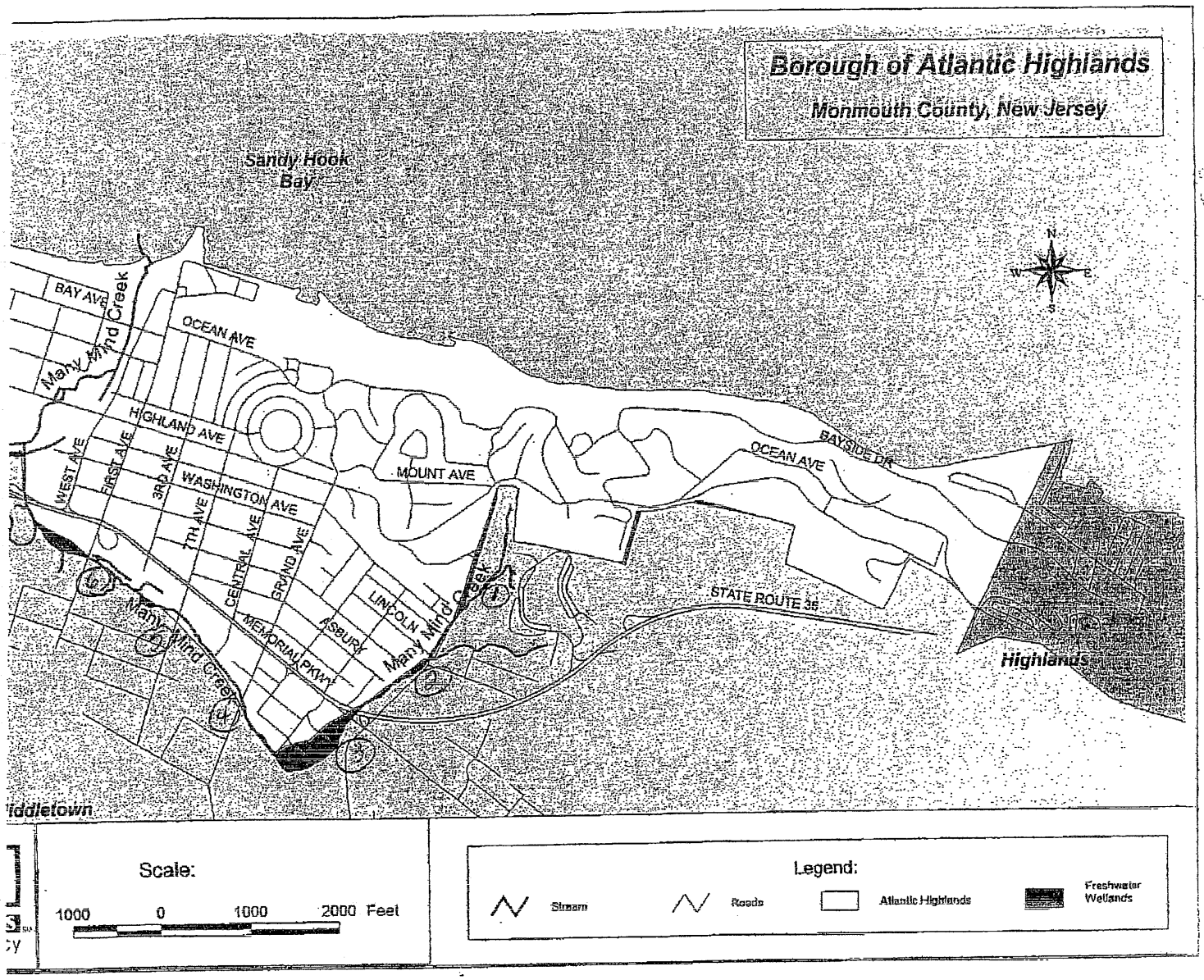
Location	Upstream			Downstream		
	1	2	3	4	5	6
Sensitive Species						
Caddisfly Larvaes	A	A	A			A
Hellgrammites						
Mayfly Nymphs	A					
Gilled Snails						
Riffle Beetles - Adult	A					
Stonefly Nymphs	A					
Waterpenny Larvae						
Index Value	12	3	3	0	0	3
Moderately Sensitve Species						
Beetle Larvae	B			A	A	
Clams	A	A	A			B
Crane Fly Larvae	B	A	A	A	A	A
Crayfish						
Damselfly Nymphs						
Dragonfly Nymphs		A				
Scuds		C	C	B	C	C
Sowbugs						A
Fishfly Larvae	B	A		A		
Alderfly Larvae	B					
Atherix	B	A	A			
Index Value	12	12	8	8	6	8
Tolerant Species						
Aquatic Worms	A	C	C	B	B	C
Blackfly Larvae	A					
Leeches	A			A		B
Midge Larvae		A	A			A
Pouch (and other) Snails			A			B
Index Value	3	2	3	2	1	4
Total Number of Groups Represented	13	9	8	6	4	9
Water Quality Rating	27	17	14	10	7	15

Index Value is calculated as follows: Letter codes A, B, or C are used to record the numbers of organisms found in a 3 foot by 3 foot area. (A= 1-9, B=10-99, C=100 or more) The number of letters in each column are added up and multiplied to yield the index value. (Sensitive Species Multiplier = 3, Moderately Sensitive Species Multiplier = 2, Tolerant Species Multiplier = 1). The Index Values are then added to yield the Water Quality Rating.

Water Quality Rating is measured as follows: >22 = Excellent, (17-22) = Good, (11-16) = Fair, <11 = Poor

Sampling procedures based on the Izaak Walton League Save Our Streams Program, April 1994

6 SAMPLING LOCATIONS 2003-04



APPENDIX C
WAGNER CREEK WATER QUALITY TESTING RESULTS

Site # 4 - Wagner Creek — W. Highland Ave, (just past Bowne Ave) downstream side of street

Date	Sampler	time	water temp	air temp	depth	free Cl	pH	alkalinity	JTU turbidity	ppm oxygen	ppm nitrates	ppm phosphates	comments
20-Feb-02	Justin Noll	9:45 PM	47.8	54		0.0	6.2	0	3	7.7	4.5	0.15	water clear, running well
9-Mar-02	Berrien/Noll/Kociela	1:00 PM	54.1	64		0.0	6.2	0	3	7.9	2.0	0.00	High iron, good flow, water striders present
24-Mar-02	Peter Berrien	8:25 AM	41.4	43		0.3	6.6	0	2	7.8	5.5	0.15	clearer water than #2 and #3 on Many Mind
6-Apr-02	Donna & Ken Kociela	11:20 AM	49.5	45		0.5	6.2	0	3	8.6	6.0	0.15	
26-Apr-02	Al Crocker	10:55 AM	51.6	50	6	0.0	6.2	0	4	8.2	6.5	0.15	
5-May-02	Justin & Kelsey Noll	5:35 PM	58.6	68		0.3	6.2	10	2	6.7	5.0	0.20	water clear and flowing well.
19-May-02	Peter Berrien	8:20 AM	52.0	48	NA	0.5	6.6	10	3	6.2	5.0	0.20	looks and smells clean; house sparrow. No fish or insects noticed in stream
1-Jun-02	Donna & Ken Kociela	1:40PM	62.0	83		0.2	6.2	10					good flow of water
28-Jul-02	onna/Ken + Doreen Silakows	1:50PM	69.3	78		0.5	6.2	0		4.2			Black sediment in center of creek, DO tested with Palm Pilot unit
25-Aug-02	Peter Berrien	8:00 AM	68.7	68		0.4	6.8	30	12	3.8	5.0	0.20	water cloudy, **slightly greenish cast, smells mildly soapy at first,** racoon tracks on bank
22-Sep-02	Justin Noll	4:30PM	70.0			0.0	6.8	0	5	3.6	5.5	0.10	water flowing well, reddish tinge, slightly cloudy
14-Oct-02	Al Crocker	8:30 AM	57.7	53	6	0.0	6.2	0	3	6.8	5.0	0.15	Water flowing fast
21-Oct-02	Peter Berrien	12:15 PM	55.9	56		0.3	6.8	0	5	4.8	6.5	0.00	good flow, slightly cloudy , again, high tide backing it up. 6 mallards
2-Nov-02	Donna & Ken Kociela	2:45 PM	46.0	42		0.3	6.4	0	7	6.9	6.5	0.15	good flow, racoon tracks on bank
17-Nov-02	Justin Noll	1:55PM	57.6			0.0	6.2	0	5	7.5	5.0	0.10	
12/22/2002	Donna & Ken Kociela	1:30 PM	42.0	48		0.1	6.4	0	5	9.7	6.5	0.20	good water flow
4/14/2003	Peter Berrien	9:35 AM	46.8	52		0.2	6.4	0	2	9.8	5.0	0.00	clear (clearer than site #3); lots of water flowing; ducks downstream (blacks/mallards?)
4/27/2003	Donna & Ken Kociela	4:05 PM	58.0	67		0.5	6.2	0	5	7.8	4.0	0.00	good flow; mallard downstream
5/25/2003	Peter Berrien	7:57 AM	55.0	58		0.5	6.2	10	3	8.2	4.5	0.00	fast flow (even some from drain on west side
6/19/2003	Justin Noll	9:00 PM	61.4	69		0.5	6.2	40	5	6.1	4.5	0.10	water flow very fast
6/26/2003	Peter Berrien	10:30 AM	65.3	84		0.0	6.8	0	11	4.5	4.5	0.20	good flow; cloudy water
7/11/2003	Al Crocker	2:50 PM	65.2	83		0.0	6.6	0	10	5.0	4.0	0.10	moving water; level high
8/3/2003	Donna & Ken Kociela	4:58 PM	68.0	80		0.2	6.4	20	7	4.8	3.0	0.10	
10/7/2003	Peter Berrien	10:30 AM	54.5	54		0.5	6.8	0	11	7.4	4.5	0.05	mallards in creek; rusty bottom deposits; water slightly cloudy
11/26/2003	Al Crocker	11:10 AM	52.5	52		0.0	6.8	0	10	7.8	5.0	0.00	water cloudy and moving well
12/14/2003	Ken Kociela	4:00 PM	38.0	38		0.0	6.2	20	60	14.3	5.5	0.55	water high and discolored; strong flow
1/12/2004	Peter Berrien	10:15 AM	38.1	31		0.5	6.8	0	12	11.3	6.5	0.10	slightly cloudy; rusty precipitate
4/3/2004	Donna & Ken Kociela	3:50 PM	44.0	46		0.0	6.2	20	10	8.4	4.0	0.10	brisk water flow

BOROUGH OF ATLANTIC HIGHLANDS PLANNING BOARD

RESOLUTION ADOPTING STORM WATER MANAGEMENT PLAN MASTER PLAN ELEMENT

WHEREAS, the Planning Board is a duly constituted approving authority created pursuant to the provisions of NJSA 40:55D-23 of the Municipal Land Use Law; and

WHEREAS, pursuant to NJSA 40:55D-28, the Planning Board may prepare and after public hearing, may amend a Master Plan or component parts thereof to guide the use of lands within the municipality in a manner which protects public health and safety and promotes the general welfare; and

WHEREAS, pursuant to NJAC 7:8-4.3(a), a municipality shall adopt a Municipal Storm Water Management Plan as an integral part of its Master Plan; and

WHEREAS, pursuant to NJAC 7:8-1.1 et. seq., the Planning Board has prepared a Storm Water Management Plan Master Plan Element in order to comply with the requirements set forth in the New Jersey Administrative Code for Municipal Storm Water Management Planning; and

WHEREAS, pursuant to the requirements of the Municipal Land Use Law NJSA 40:55D-1 et. seq. and specifically NJSA 40:55D-28 and NJSA 40:55D-13, the Planning Board conducted a public hearing on the 12th day of July, 2007, due notice of said meetings having been given in accordance with New Jersey Statutes, the Open Public Meetings Act and the Municipal Land Use Law and a quorum of the Planning Board being present, the Planning Board reviewed and considered the proposed Storm Water Management Plan Master Plan Element along with any public comment thereon and the Planning Board having determined that the Storm Water Management Plan Master Plan Element is in compliance with the requirements of the Municipal Land Use Law and the requirements for Storm Water Management pursuant to the applicable sections of the New Jersey Administrative Code.

NOW THEREFORE BE IT RESOLVED, by the Planning Board of the Borough of Atlantic Highlands on this 12th day of July 2007 that the Storm Water Management Plan Master Plan Element prepared by LGA Engineering, Inc., dated June 2007 be and is hereby adopted.

OFFERED BY: MAYOR DONOGHUE

SECONDED BY: COUNCILMAN FLIGOR

ROLL CALL:

YES: MAYOR DONOGHUE, COUNCILMAN FLIGOR, MRS. CAFFREY, MR. HOWE, MR. LOLLOS, MR. MARCOLUS, MR. ACKERSON, MR. GRECO, MR. KELLEY

NO: NONE

ABSTAIN: NONE

ABSENT: CHAIRMAN CHILES, MRS. RAST

Chairman, Planning Board
Borough of Atlantic Highlands

I certify that the above is a true and exact copy of the Resolution adopted by the Planning Board of the Borough of Atlantic Highlands at its meeting held on July 12, 2007.

Michelle Clark
Secretary, Planning Board
Borough of Atlantic Highlands