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MUNICIPAL STORMWATER MANAGEMENT PLAN


SPRING LAKE HEIGHTS BOROUGH MONMOUTH COUNTY, NEW JERSEY

SPRING LAKE HEIGHTS PLANNING BOARD

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**STORMWATER MANAGEMENT PLAN
BOROUGH OF SPRING LAKE HEIGHTS**

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1.0 INTRODUCTION

The Borough of Spring Lake Heights has consulted with Birdsall Engineering, Inc. (BEI) to devise a Municipal Stormwater Management Plan (MSWMP) for the Borough. This MSWMP outlines a strategy for Spring Lake Heights to alleviate the Borough's stormwater management problems through the incorporation of more stringent stormwater policies within their Land Use Regulations. The creation of this MSWMP is required by N.J.A.C. 7:14A-25, the Municipal Stormwater Regulations, which were proposed in the New Jersey Registrar on January 6, 2003, and made effective on February 2, 2004. This plan also includes a Stormwater Control Ordinance (Appendix A) which would incorporate both the goals of this plan and the new stormwater management standards into the Borough's existing regulations by applying the newly adopted design standards to "Major Development", which includes development or redevelopment projects that either disturb one or more acres of land, or propose to add ¼ acre or more of impervious surface.

This plan will incorporate 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 (N.J.A.C. 7:8-2.2). Further, the plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating the newly adopted 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, to reduce the discharge of pollutants to the maximum extent practicable and protect water quality, the plan incorporates the six control measures outlined within the Phase II New Jersey Pollutant Discharge Elimination System Stormwater Regulation Program Rules (N.J.A.C. 7:14A).

To accomplish these ends, Birdsall Engineering has completed a review of the Borough's existing ordinances, the Spring Lake Heights Master Plan, and other planning documents to ensure that nonstructural stormwater management techniques have been integrated into these documents to the maximum extent practicable. In addition, a Mitigation Plan (Section 6.4) that allows Spring Lake Heights Borough, in limited circumstances, to waive the strict compliance of one or more of the stormwater design and performance standards where full compliance cannot be reasonably accommodated on site has also been included in this MSWMP. Also, as the Borough of Spring Lake Heights contains less than one mile of vacant or agricultural land, a build-out analysis pursuant to N.J.A.C. 7:8 4-2 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 Spring Lake Heights, the incorporation of more stringent stormwater management techniques have been identified as a priority by both state and local level government agencies. The new stormwater management requirements and best management practices will advance the goals and objectives of both the New Jersey Department of Environmental Protection, and the Borough of Spring Lake Heights itself. The Borough's most recent Master Plan has included to "protect and preserve the remaining existing and environmentally sensitive areas in the Borough, including lands which are subject to flooding, and those which are identified as wetlands" within its goals and objectives. As the incorporation of more stringent stormwater management regulations are designed to reduce the risk of flooding and help protect environmentally sensitive areas, the goals of this plan are consistent with those of the Borough.

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 Objectives that have been established for municipalities within Watershed Management Area 12 (WMA 12) which 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.

Source: Monmouth Coastal Watershed Partnerships website:

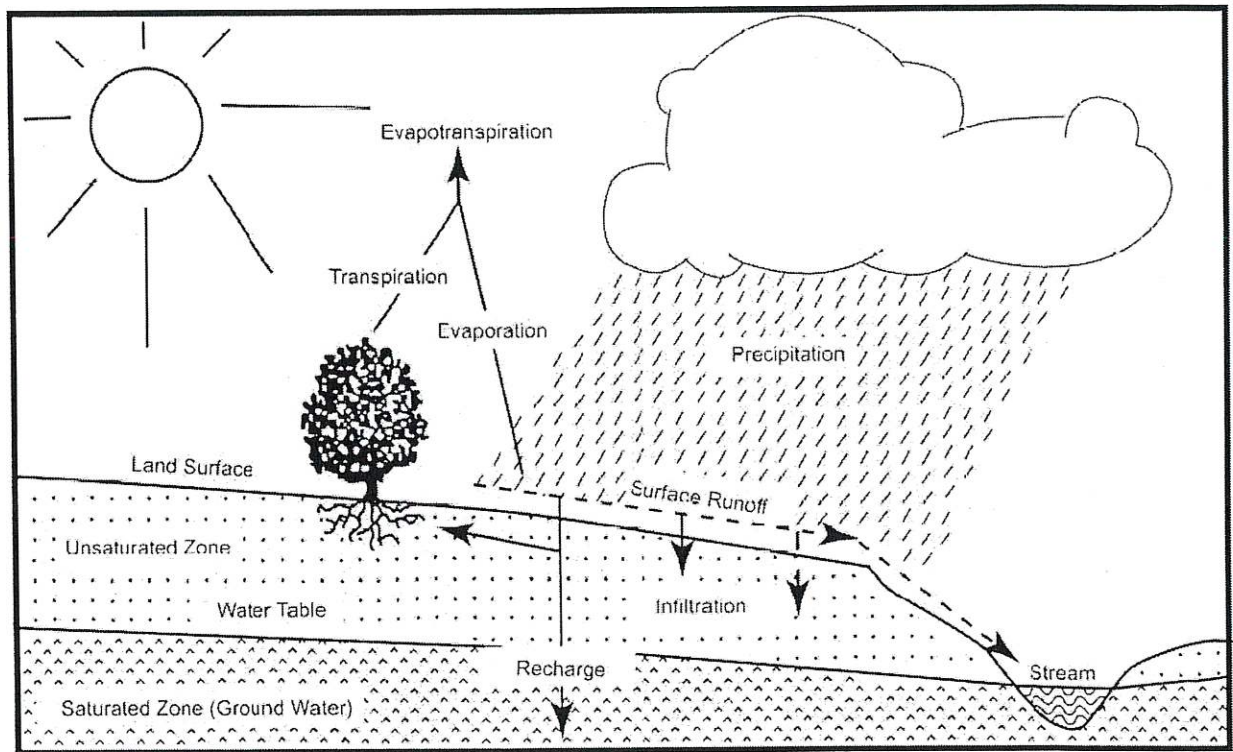
<http://www.shore.co.monmouth.nj.us/area12/>, Accessed March 8, 2005.

To achieve these goals, this plan examines the most pressing stormwater related issues facing Spring Lake Heights, and in turn proposes possible amendments to the Borough's design and performance standards to incorporate a more comprehensive code for managing stormwater. Further, in accordance with NJAC 7:8-5.6, preventative and corrective maintenance strategies are included in the plan to ensure the long-term effectiveness of stormwater management facilities, and the plan also outlines safety standards for stormwater infrastructure that will be implemented to protect public safety. 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 assure that preventative and corrective maintenance strategies have been formulated to maintain the long-term efficacy of stormwater management facilities.

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.

GROUNDWATER RECHARGE IN THE HYDROLOGIC CYCLE



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%	75-100%

Source: NJDEP *Planning for Clean Water: The Municipal Guide* Trenton, NJ 2000.

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

As illustrated through Figure 1-USGS Quad Map, the Borough of Spring Lake Heights is located along the southern coastal portion of Monmouth County and has a total land area of 1.3 square miles, or 832 acres. Spring Lake Heights is located adjacent to State Highways 71 and 35, which allow easy access to the Garden State Parkway via Allaire Road. The Borough shares common boundaries with three municipalities. To the west, south, and north, the Borough is bounded by Wall Township, to the east by Spring Lake Borough and to the southeast by Sea Girt Borough. Spring Lake Heights was established as a working class community with a variety of housing types including single-family homes, two family homes, and some seasonal units. A retail/commercial area has developed along Route 71 to serve the needs of local residents as well as the multitude of seasonal tourists who flock to the Borough and other New Jersey shore communities every summer. In addition, Spring Lake Heights continues to be a popular place to live because of its close proximity to the beach and its easy access to the Garden State Parkway and to public transportation provided by New Jersey Transit. Land uses in the Brough are illustrated through Figure 2- Land Use Map

4.2 DEMOGRAPHICS

The Borough of Spring Lake Heights is a small, highly developed community located in the south coast region of Monmouth County. The Borough has a land area of 1.3 square miles and contained 5,227 residents as of the 2000 census. Since growing rapidly in the post World War II years, Spring Lake Heights has maintained a relatively stable population base.

The Borough has grown significantly over the years, from 1200 residents in 1927 to 5,227 residents in 2000. Population trends within Spring Lake Heights have been very stable in the last few years, due largely to the highly developed character of the area and the fact that open land available for development in Spring Lake Heights is minimal at best. From 1980 to 2000 the Borough experienced a slow but steady loss of residents, resulting in a loss of about 3.65% of its total population.

Year	Population	% Change
1980	5,424	N/A
1990	5,341	-1.5%
2000	5,227	-2.1%
2004 (Projected)	5,215	-.23%

Source: Monmouth County Planning Board *At A Glance: Files and Data* accessed on February 24, 2005.
<http://www.monmouthplanning.com/AtAGlanceFiles/SpringLake%20Heights.pdf>

4.3 WATERWAYS

The most significant waterbody that flows through the Borough of Spring Lake Heights is the Wreck Pond Brook. Wreck Pond Brook begins in Wall Township and flows southeast between Sea Girt and Spring Lake. Within the Borough, the brook flows along the southern border of the Borough, separating it from Wall Township and Sea Girt Borough. Also, the north branch of the Wreck Pond Brook, which originates north of Allaire Road, and flows southeast through the Spring Lake Heights Golf Course, before emptying into the main branch of Wreck Pond Brook in the Borough of Spring Lake. Wreck Pond Brook's subwatershed is contained within the larger framework of Watershed Management Area 12, known as the Monmouth Watersheds.

In addition, Polly Pod Brook, which flows through Wall Township, transects a small portion of the northeastern corner of Spring Lake Heights near Snyder Avenue, before emptying into Lake Como. A comprehensive illustration of the waterways in Spring Lake Heights has been included in the plan on Figure 3- Waterways Map.

To inform the public of the importance and functionality of these waterways and other environmental issues that are crucial to the vitality of the Borough, the Spring Lake Heights has provided a number of public outreach initiatives designed to inform the public on environmental issues. These initiatives have included the implementation of "The Turtle Project", which has set out to label all of the storm drain inlets that are located in the Borough. Local Boy Scouts, Girl Scouts, and other volunteers will be applying the storm drain labels using a stencil and durable paint.

4.4 WATER QUALITY

Water quality will remain a critical factor to maintain a high quality of life for residents of the Spring Lake Heights community. To further the public goal of improving water quality, 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, a studied waterway is then classified as "non-impaired", "moderately impaired", or "severely impaired". These designations are determined by the following criteria:

Table 4: New Jersey Department of Environmental Protection AMNET Program Waterway Classification Criteria	
Non-Impaired	Benthic community comparable to other undisturbed streams within the region. A community characterized by a maximum taxa richness, balanced taxa groups and good representation of intolerant individuals.
Moderately Impaired	Macroinvertebrate richness is reduced, in particular EPT taxa. Taxa composition changes result in reduced community balance and intolerant taxa become absent.
Severely Impaired	A dramatic change in the benthic community has occurred. Macroinvertebrates are dominated by a few taxa that are very abundant. Tolerant taxa are the only individuals present.
Source: New Jersey Department of Environmental Protection Bureau of Freshwater and Biological Monitoring (NJDEP/BFBM): http://www.state.nj.us/dep/wmm/bfbm/. Accessed March 30, 2005.	

Currently, no AMNET testing sites exist within the borders of Spring Lake Heights. However, AMNET testing of Wreck Pond Brook has been conducted upstream of Spring Lake Heights in Wall Township. The water quality testing analysis, which was first completed in 1994, qualified the Wreck Pond Brook at Old Mill Road in Wall Township as being “moderately impaired”. However, more recent testing that took place in August of 1999 qualified the Brook as “severely impaired”. Additional information pertaining to the water quality testing results along Wreck Pond Brook are included within Appendix E of this report. Water Quality testing through the AMNET program has not taken place for the north branch of Wreck Pond Brook or Polly Pod Brook; therefore these waterways have not been deemed “impaired” according to AMNET criteria.

In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on the streams in the state. The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d) (Integrated List) is required by the federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. The integrated list is divided into five different sublists. The following table illustrates how those sublists were determined:

Table 5: New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d) Integrated List) Sublist Criteria	
Sublist 1	Attaining a water quality standard and no use is threatened.
Sublist 2	Attaining some of the designated uses; no use is threatened; and insufficient or no data and information is available to determine if the remaining uses are attained or threatened.
Sublist 3	Insufficient or no data and information to determine if any designated use is attained.
Sublist 4	Impaired or threatened for one or more designated uses but does not require the development of a TMDL. There are three categories: 1. TMDL has been completed.. 2. Other enforceable pollution control requirements are reasonably expected to result in the attainment of the water quality standard in the near future. 3. Impairment is not caused by a pollutant.
Sublist 5	The water quality standard is not attained. The waterbody is impaired or threatened for one or more designated uses by a pollutant(s), and requires a TMDL.
Source: New Jersey Department of Environmental Protection: http://www.state.nj.us/dep/wmm/sgwqt/wat/integratedlist/integratedlist2004.html . Accessed March 30, 2005	

Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDL's are needed. A Total Maximum Daily Load (TMDL) is the amount of a pollutant that can be accepted by a waterbody without causing an exceedance of water quality standards or interfering with the ability to use a waterbody for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant such as stormwater and wastewater discharges, which require an NJPDES permit to discharge, and non-point sources, which interfere with stormwater runoff from agricultural areas and residential areas, along with a margin of safety. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan is developed to identify how the various sources will be reduced to the designated allocations. Implementation strategies may include improved stormwater treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems and other BMP's.

The New Jersey 2004 Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(b)) was issued in June of 2004. The data shows that Wreck Pond Brook failed to obtain water quality standards for the following pollutants: pH, Total Suspended Solids, Fecal Coliform and Benthic Macroinvertebrates. Also, the United States Environmental Protection Agency has established a TMDL for Fecal Coliform along the Wreck Pond Brook at Allenwood Road in Wall Township. The TMDL, which was established on September 23, 2003 states that fecal coliform levels shall not exceed a geometric average of 200 cfu/100 ml nor should more than ten percent of the total samples taken during any thirty day period exceed 400 cfu/100 ml. Additional information on this topic can be found on the USEPA's website at: http://oaspub.epa.gov/pls/tmdl/waters_list.tmdl_report/p_tmdl_id=11011.

Also, Groundwater contamination is an issue both in and around the Borough. Recently, an auto shop on Route 71, which is proximate to Spring Lake Heights was found to be causing groundwater contamination to soils in both Wall Township and Lake Como Borough. Although Spring Lake Heights public supply wells are deep enough to avoid the contamination threat. In the future, private well owners in Spring Lake Heights are encouraged to check wells periodically for contamination.

WRECK POND

Clearly, one of the primary concerns for the Borough of Spring Lake Height's stormwater management program relates to Wreck Pond. The pond is located at the Southeastern corner of the Borough's municipal border, and both Polly Pod Brook, and Wreck Pond Brook drain into the pond. In addition to the tributary streams, Wreck Pond receives direct stormwater flows through outfall structures from surrounding areas within its watershed.

Tidal floodgates permit flow out of Wreck Pond and into the Atlantic Ocean, but prevent the regular flow of saltwater into the pond. As per the 1996 South Coast Environmental Planning Regional Ecological Resource Inventory, prepared by the Monmouth County Planning Board and Monmouth County Environmental Council, Wreck Pond Brook was designated as a unique area in the County due to its vegetative and environmental resources.

However, the pond, due to its size and the urban nature of its watershed contains an array of characteristics and impairments. Yearly, pH levels in the pond range from a low of 7.0 to a high of 9.0. The nitrate levels are high in the spring, when the most runoff occurs. Further, the highest nitrate levels are found in the inlet areas of the lake. Runoff and warmer temperatures during the spring and summer also causes excessive Coliform levels. Further Wreck Pond Brook and Wreck Pond are included on Sublist 5 of the NJDEP's 2004 "Integrated List of Impaired Waterbodies". As such, the Brook has been qualified as an impaired waterway for benthic macroinvertebrates, while the pond itself is listed as impaired due to phosphorous.

According to published findings, 50 of the 59 ocean swimming bans in the State of New Jersey in 2004 and 58 of the 80 closings in 2003 were caused by overflow from Wreck Pond. Potential sources of contamination include stormwater flow into the pond, waterfowl use, pet waste and

residential fertilizer use. These closings also negatively impacted the private and public beach economy as conservative.

To address the pond's water quality and flooding issues, several governmental initiatives are taking place simultaneously. First, the NJDEP has recently completed a project that extends the Wreck Pond's outfall an additional 300 out into the water of the Atlantic Ocean. However, in regards to water quality it is still unclear as to whether or not the longer pipe will result in an improvement in water quality at the beach. To determine the effect of the outfall extension, a government official will be conducting extra water sampling during storm events to observe the effect of the outfall extension

Simultaneously, the New Jersey Department of Environmental Protection (NJDEP) has proposed a dredging of the pond to improve water quality and reduce the impacts of overflows on ocean water quality. But as governmental funds to complete this project have yet to be allocated, it is unclear when a large Wreck Pond dredging project will be undertaken and whether or to what degree the outfall extension will improve water quality at the beaches.

On a larger scale, the Monmouth County Planning Board (MCPB) has initiated a committee to develop a Regional Stormwater Management Plan for the Wreck Pond watershed. The Borough is also an active participant in the preparation of the Wreck Pond Watershed Regional Stormwater Management Plan (RSWMP). The Committee, which is organized and is currently pursuing this effort is comprised of representatives from Spring Lake Heights and a number of surrounding communities and governmental bodies. This project, under the leadership of the MCPB is a working group, which endeavors to develop a Regional Stormwater Management Plan and more stringent design standards and apply them to the entire watershed so as to improve water quality and reduce beach closings. The RSWMP's activities include, but are not limited to, the design of plans to reduce flood damage, minimize runoff from new development, reduce soil erosion, assure the adequacy of existing and proposed culverts and bridges, maintain the integrity of stream channels for biological functions, and minimize pollutants in stormwater to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters contained in the watershed.

The RSWMP is expected to characterize the watershed, calculate groundwater recharge volume, determine the hydrologic and hydraulic relationships at work in the watershed, determine existing and potential sources of pollution, develop new and utilize existing computer model techniques that can be used as stormwater management tools, develop drainage area specific water quality and quantity management targets, and establish design and performance standards for Best Management Practices (BMP's) that might be installed in the watershed., a hydrologic model for the entire Wreck Ponds watershed. Once the Pond's Regional Stormwater Management Plan is complete, this Municipal Stormwater Management Plan and the Borough's Stormwater Control Ordinance may be amended to incorporate the goals, objectives, and design standards that are specified in the plan. Therefore, once the Wreck Pond RSWMP is completed, this MSWMP will be reviewed and amended as necessary to ensure consistency between the two reports.

4.5 WATER QUANTITY

Spring Lake Heights has exhibited water quantity problems including flooding, stream bank erosion, and many of the culverts associated with road crossings in the Borough are undersized. Spring Lake Heights' most pressing stormwater quantity management issues are discussed in greater detail below in Section 4.6 *Flooding & Proposed Solutions*.

The high imperviousness of the Borough has significantly decreased groundwater recharge, and in turn contributed to the stormwater management issues that exist in Spring Lake Heights. The average annual groundwater recharge rates are shown graphically in Figure 4- 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. It should also be noted that a comprehensive map of the soil types that can be found in the Borough has been included within this plan as Figure 5-Soils Map.

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.

In regards to potable water supplies, the Borough of Spring Lake Heights is the potable public water supplier for residents within the Borough. The public water system serves residents through four wells, and one purchased groundwater source that tap both the Englishtown aquifer system, and the Mount Laurel-Wenonah aquifer. The Borough also purchases water from neighboring municipalities including Wall Township, and Spring Lake Borough.

In July of 1990, growing concern about drinking water supplies in the Borough of Spring Lake Heights and neighboring communities led to the construction and operation of the 770 acre Manasquan Reservoir System. The reservoir is replenished by pumping water from the Manasquan River during periods of high river flow at an intake facility in Wall Township and supplemented by rain events in the 3.2 square mile drainage area surrounding the facility. The reservoir has the capacity to store 4.7 billion gallons of water and can supply a safe yield of 30 million gallons per day even during drought conditions. The Manasquan Water Treatment Plant

now provides 60% of the potable water consumed by the communities of Brielle, Sea Girt, Spring Lake, Spring Lake Heights, and Wall Township.

Additionally, the 2005 Water Quality Report, available now, has been prepared to meet the USEPA and NJDEP Consumer Confidence Report Regulations. This report summarizes the results of water analyses performed on the potable water delivered by the Manasquan Water Treatment Plant from January 1, 2004 through December 31, 2004. The results of these water tests show no contaminants present that contain maximum contaminants levels (MCL's), as 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.

4.6 FLOODING & PROPOSED SOLUTIONS

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 (FIRM) for the Borough of Spring Lake Heights. Areas located immediately along the banks of Wreck Pond Brook have been designated as an "A3 Zone" by the FIRM maps. The areas contained within the "A3" flood zone designation have been found to lie within the 100-year floodplain. Further, lands adjacent to Polly Pod Brook, and Wreck Pond Brook have been delineated as falling within the "B Flood Zone". These lands have been determined as areas that are either between the limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths of less than one (1) foot.

In the Borough, the majority of both Wreck Pond Brook and Polly Pod Brook feature well-defined channels. Urbanization and the resulting increase of impervious cover within both streams drainage areas has increased runoff into the streams and in turn increased the risk of flooding. In addition, flooding is aggravated by the accumulation of debris at bridges and culverts. Although the FIRM maps delineate floodplain boundary designations for the entire Borough, specific base flood elevations have only been determined at a few selected points. The specific points, along with their base flood elevation are listed on the next page in Table 6. In addition, Figure 7-FEMA Flood Zone Map reproduces the FEMA flood zone delineations for the entire Borough of Spring Lake Heights.

Table 6: Elevation Reference Marks Within the Borough of Spring Lake Heights	
Elevation	Location
10.546 ft.	Rivet set in top of sidewall at northwest corner of CONRAIL bridge over Wreck Pond Brook.
16.652 ft.	Chiseled square cut in Northeast corner concrete rail of State Route 71 bridge over Wreck Pond Brook.
15.062 ft.	Top of bolt at northeast corner of wood curb of Old Mill Road bridge over Wreck Pond Brook.
Source: FEMA Flood Insurance Rate Map (FIRM) Spring Lake Heights Borough, Monmouth County, New Jersey. Effective Date: December 15, 1981.	

Spring Lake Heights is continuously monitoring and correcting existing areas of flooding throughout the Borough. The Borough actively addresses drainage and flooding issues as they arise and are reported by residents. In addition Spring Lake Heights includes drainage improvements as part of these Capital Improvement Program. As a result, most of the flooding and drainage issues that in the Borough have been improved.

These improvements as evidenced through the underground recharge basins that have been implemented in to alleviate flooding and drainage issues along properties, which are proximate to Polly Pod Book. Within its Mitigation Plan, which is included in this Plan as section 6.4, the Borough has indicated that applicants proposing projects which are unable to meet the stormwater management design and performance standards for water quality on site due to hardship may examine the feasibility of constructing and implementing an underground recharge basin as mitigation.

5.0 STORMWATER MANAGEMENT

5.1 INFRASTRUCTURE

The Borough of Spring Lake Heights 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 stormwater 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 collects more pollutants from the surface, which promotes erosion, damages stream banks, and in turn dumps sediment into streambeds.

To control stormwater runoff quantity impacts (N.J.A.C. 7:8-5.4 3.), a major development must meet one of three design standards: (1) demonstrate at no point in time that the post-construction runoff hydrograph exceed the pre-construction runoff hydrograph, (2) demonstrate 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, 100-year storm event and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site, and (3) demonstrate the postconstruction peak runoff rates for the 2, 10 and 100-year storm events are 50, 75 and 80 percent, respectively, of the pre-construction runoff rates. However, for stormwater runoff quantity requirement (3), stream encroachment standards (N.J.A.C. 7:13-2.8) will require for the 100-year storm event 75 percent of the pre-construction peak runoff rates.

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, buffers, and other landscaping measures 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 as it outlines alternatives and strategies to incorporate Best Management Practices into a projects site design. The potential alternatives include surface structures such as Bioretention Basins, Sand Filters, constructed wetlands, and Pervious Paving Systems. Generally, the utilization of surficial BMP's is preferred by the DEP due to the difficulties associated with maintaining and repairing subsurface structures. However, guidance on which BMP would be most suited for a particular site can be not only be found within the DEP's BMP Manual, but also on-line as the DEP has prepared a draft document entitled "Matching the BMP to Site and Watershed Conditions" at:

http://72.14.203.104/search?q=cache:IU5IILBHCZkJ:www.state.nj.us/dep/watershedmgt/DOCS/BMP_DOCS/chapter4.PDF

The incorporation of such designs into the Borough's existing stormwater management infrastructure is strongly encouraged to enhance groundwater recharge and reduce the amount of runoff that originates on site; thus improving both the quality and quantity of stormwater in Spring Lake Heights.

5.2 STORM DRAINS

The Borough of Spring Lake Heights has an annual Capital Improvement Program through which infrastructure improvements are designed and constructed. The construction or reconstruction of drainage best management practices, and stormwater management improvements are included in this program.

Further, to inform the public of the presence of storm drains, Spring Lake Heights has initiated a storm drain labeling program, called "The Turtle Project". Through this project, all storm drain inlets that are along municipal streets with sidewalks, and all storm drain inlets within plazas, parking areas, or maintenance yards that are operated by the Borough will be labeled. Volunteers including Boy Scouts and Girl Scouts are applying the labels using a stencil and durable paint. The Borough of Spring Lake Heights will label a minimum of 50% of the storm drain inlets by April of 2007, and label all of the remaining storm drain inlets by April of 2009. During the annual catch basin cleaning program, the Borough will be checking to ensure that the labels are still visible.

Spring Lake Heights has also initiated programs to more effectively maintain and manage its existing stormwater infrastructure. In accordance with the Sewage Infrastructure Improvement Act (SIAA) regulations, maps showing the location of the end of all MS4 outfall pipes that are operated by the Borough, and also those that discharge within the Borough's jurisdiction to a surface water body have been prepared by Birdsall Engineering, Inc., a consultant of the Borough. The maps show both the location and name of each outfall pipe, and have also been given an alphanumeric identifier that is noted on the map. In accordance with N.J.A.C. 7:22A-4.3, the scale of the maps is 1:1200 (one inch=100 ft.) These maps satisfy the minimum standard specified in Statewide Basic Requirement 6.a.i. Through the future, as new development and/or redevelopment changes the current storm sewer system through the creation of new outfalls, these maps will be updated accordingly.

Spring Lake Heights Borough will also investigate the storm drains for illicit connections and will check outfall pipes for signs of scouring. The Borough will begin performing the initial inspection of outfall pipes within 18 months of the EDPA (by October 1, 2005) and will complete the initial physical inspection of all outfall pipes within 60 months of the EDPA (April 2009). The Borough will use the NJ Department of Environmental Protection (NJDEP) Illicit Connection Inspection Report Form to conduct these inspections, and each of these forms will be kept within the SPPP records. Outfall pipes that are found to have dry weather flow or evidence of an intermittent non-stormwater flow will be investigated to locate the illicit connection. If the Borough is able to locate the illicit connection (and the connection is located within Spring Lake Heights), the responsible party will be cited, and the connection will be eliminated immediately.

If an illicit connection is found to originate from another public entity, the Borough of Spring Lake Heights will report the illicit connection to the NJDEP.

As part of its illicit connection elimination program, the Borough is also checking outfall points for signs of scouring. All sites where scouring is observed is will be placed on a prioritized list and repairs will be made in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey. Those repairs that do not need NJDEP permits for implementation may be done first. Each repair will be followed up to ensure that scouring has not resumed. This program will be implemented in conjunction with the illicit connection elimination program by October 1, 2005 (within 18 months of the EDPA).

Further, through an annual catch basin cleaning program, Spring Lake Heights will implement a stormwater facility maintenance program to insure that all stormwater facilities operated by the Borough are functioning properly. Through this program, all catch basins will be inspected once a year. If at the time of inspection, no sediment, trash, or debris is observed in the basin, then that catch basin will not be cleaned. All catch basins within Spring Lake Heights will be inspected annually, even if the had been found to be "clean" the previous year. At the time of cleaning, the catch basins will also be inspected for proper function, and maintenance will be performed on those facilities that are not operating to capacity. The catch basin cleaning and maintenance will be recorded through the " Stormwater Facility Inspection and Maintenance Log", which will be submitted to the NJDEP annually. Currently, the Borough operates two drainage swales at Wreck Pond. Additional information relating to the Borough's long term stormwater basins maintenance plan can be found in Spring Lake Heights Stormwater Pollution Prevention Plan (SPPP), which was completed on February 26, 2005.

5.3 STORMWATER BASINS

As most of the development in Spring Lake Heights occurred prior to the 1970's, the Borough's stormwater management system relies primarily on catch basins. However, there are two types of stormwater basins and both are present in Spring Lake Heights. The first are "detention basins", which are designed to stay dry between storm events, detain stormwater for a period of time, while releasing water at a slow and controlled rate. A second type of basin that is designed to manage stormwater flows is a "retention basin". These basins are designed to stay wet by retaining a permanent pool so as to mimic a natural pond or lake.

A number of the existing stormwater basins in Spring Lake Heights are suited to be retrofitted to accommodate more volume, or to improve the quality of stormwater that is dispensed into the basin. In addition, Spring Lake Heights has identified the implementation of additional underground recharge basins as a method to reduce the threat of flooding and improve stormwater quality in the Polly Pod Brook watershed. Through mapping, maintenance, and retrofitting of the Borough's existing stormwater infrastructure, Spring Lake Heights will continue to alleviate the threat of flooding, protect potable water supplies, and improve the quality of stormwater that enters local waterways.

As flooding and/or drainage issues arise in the Borough, due to their ability to improve water quality, maintain water quantity, and provide groundwater recharge, the retrofitting of stormwater basins may be initiated by the Borough itself, or included within an adopted Mitigation Plan which would allow applicants who are not able to meet the stormwater design standards on site, to provide mitigation by means of retrofitting a proximate stormwater basin. Through mapping, maintenance, and retrofitting, these coordinated stormwater basin operation and maintenance programs will enable the Borough to improve the way stormwater is managed in Spring Lake Heights.

5.4 WATERSHED

The Borough of Spring Lake Heights is contained within the South Coast region subwatershed of NJDEP's Watershed Management Area 12, which is comprised of approximately 39 square miles of land within 14 municipalities. The Shark River and its tributaries dominate this region. However, Wreck Pond Brook, which flows through the Borough of Spring Lake Heights is also a significant waterway within the South Coast region. The South Coast Subwatershed is an area of recreational importance as it offers numerous oceanfront beaches and boating on the Shark River.

On an even smaller watershed scale, the majority of Spring Lake Heights lies within the Wreck Pond subwatershed. Lands delineated in this subwatershed either drain to Wreck Pond, or directly into the Ocean in a narrow band of land with close proximity to the beach. The Wreck Pond subwatershed is a mix of wooded areas, agricultural land, and low to medium density residential and mix use areas. The dominant feeder streams are Hurley's Pond Brook and Hannabrand Brook. There are many ponds in this subwatershed including Hurley's Pond, Albert Pond, Osborne Pond, Old Mill Pond and Wreck Pond. Most of the ponds are freshwater, although Wreck Pond is brackish. In addition, a smaller percentage of Spring Lake Heights is contained within the Lake Como subwatershed. Stormwater flows drain into the lake via Polly Pod Brook, which flows along the northern border of the Borough.

The term "HUC-14" is from the hydrologic unit code system for delineating and identifying drainage areas. The system starts with the largest possible drainage area (basin) and progressively breaks it down into smaller subdivisions (subbasins, watersheds and subwatersheds respectively). These subdivisions are delineated and numbered in a nested fashion. A drainage area with a 14 numbered address, or HUC-14, is a subwatershed of a larger watershed with 11 digits, or a HUC-11. There are 921 HUC-14 subwatersheds in New Jersey that average 8.5 square miles. There are 150 HUC-11 watersheds in New Jersey with an average size of 51.9 square miles. A statewide graphic depiction of the breakdown of these watershed areas is available at: <http://www.nj.gov/dep/watershedmgt/hucmap.htm> (Source: NJDEP – Division of Watershed Management).

Spring Lake Heights is located within the bounds of two different HUC-14 subwatersheds. These subwatersheds have been identified as HUC-14 unit codes 02030104090080 (Wreck Pond Brook

(below Route 35), which contains the vast majority of the Borough. However, the extreme northwestern part of the Borough lies within HUC-14 subwatershed 02030104090070 (Wreck Pond Brook (above Route 35). These subwatershed areas are all illustrated on Figure 3-Waterways Map.

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.

Further, by amending their current Land Use Regulations, it is the intention of the Borough of Spring Lake Heights 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.

The second set of rules is 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 STRATEGIES

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 post construction. "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.

Also, Chapter 22 "Municipal Land Use Regulations" of the Borough Code was reviewed to evaluate the extent to which non-structural stormwater management techniques have been implemented into the site design of a proposed development. This review included, but was not limited to existing provisions for Curbs and Gutters, Driveways and Accessways, Off-Street

Parking and Loading, Streets, and Sidewalks. A summary of the of the pertinent provisions is presented below:

Chapter 22, Section 5-11 (Environmental Impact Report) This section requires applicants to use either the Borough's Natural Resource Inventory, its Master Plan or the Soil Conservation Service maps to present an overview of the natural development constraints that are present on-site. These maps will aid in locating soil types, topography, slopes, surface waters, aquifers, depth to water table, floodplains, vegetation, foundation limitations, erosion potential and septic suitability. The Borough anticipates that major areas of concern can be identified and agreed upon by use of this generalized data at an early stage in order to avoid development designs that will encroach upon environmentally sensitive areas.

Chapter 22, Section 608 (Residential Cluster Development) Those developments within the R-1 zoning designation that seek to utilize the residential clustering provision are required to set aside open space. The ordinance states that the minimum percent of the total tract to be set aside for open space, common property or public areas, excluding street rights-of-way, shall be twenty (20%) percent of the proposed developments total area.

Chapter 22, Section 511.3 (Preservation of Existing Natural Resources or Man Made Assets) This section of the ordinance stipulates that each subdivision or site plan shall preserve existing critical areas on site. Critical Areas are defined as woodlands or large tree masses, stream corridors, soils having a depth to the seasonal high water of one (1') foot or less, marshy soils or wetlands, wildlife corridors, open space or high ecological value, drainage ridge lines, scenic views, historic sites, and other community assets and landmarks. Efforts should be made to minimize reduction in the recharge capability of the site to the maximum extent that is reasonably attainable. In addition, the use of stormwater infiltration basins should be encouraged at these locations.

This section also states that a conscious effort shall be made to preserve all trees and shrubs which provide shading, protection from wind, noise or visual screening or habitat for important wildlife species on the site. Except where alternative construction practices are unfeasible, filling around trees shall not be permitted. The removal of all trees having a diameter at breast height of a foot (1') or more will be compensated for by the planting of trees or shrubbery that is likely to provide equivalent or nearly equivalent benefits at maturity. By adhering to these provisions developers are minimizing the area of disturbance and the area of impervious surface that will be incorporated into the site design of a proposed development.

Chapter 22, Section 520.9 (Landscaping) Landscaping in parking and loading areas shall be shown on the natural resources portion of the site plan. Trees shall be staggered and/or spaced so as not to interfere with driver vision. Also they shall have branches no lower than six (6) feet above grade and be placed at the rate of at least one (1) tree for every ten (10) parking spaces. All areas between the parking area and the building shall be landscaped with trees, shrubs and ground cover. Any plantings which do not live shall be replaced within one (1) year or one (1) season. A majority of the parking areas for more than fifty (50) cars shall be obscured from

streets by buildings, landscaped berms, natural ground elevation or plantings, either singly or in combination.

Chapter 22, Section 607.3 (Quasi-Public Buildings and Recreation Areas) This section requires that a vegetated buffer be used to screen adjacent properties. The design of any structures erected in connection with such a use should be consistent with the general character of the residential area, and sufficient landscaping, including trees, shrubs and lawn shall be provided to serve as a buffer between said use and adjoining residential properties, and to insure an attractive appearance for the use. Quasi-public buildings and recreation areas, including clubhouses, parks, playgrounds, swimming pools, tennis courts and other such activities operated by non-profit membership organizations may be permitted in any residential zone district and the B-2 zone district. These vegetated buffers are for aesthetic purposes. The section of the ordinance may be reviewed to determine if additional provisions may be made that provide developers with incentives to incorporate these areas as stormwater management facilities.

Chapter 22, Section 513 (Floodplain Regulations) This section outlines provisions for development applications that fall either partially or entirely within the 100-year floodplain. The ordinance states that the applicant shall submit maps, reports and other appropriate documents permitting the approving authority to evaluate whether the proposal has an inherent low flood damage potential; does not obstruct flood flows or increase flood heights and/or velocities, does not affect adversely the water-carrying capacity of any delineated floodway or channel, does not increase local runoff and erosion; does not unduly stress the natural environment of the floodplain or degrade the quality of surface water or the quality and quantity of groundwaters, does not require channel modification or relocation, does not require fill or erection of structures, and does not include the storage of equipment and materials. Also, the uses permitted in the one hundred (100) year floodplain shall be limited to general farming, overflow parking and loading areas or areas of service peak parking and loading demands, lawns, gardens, detention basins and ponds meeting other state regulations, and open space/recreation uses not requiring structures, provided that none of these uses adversely affect the hydraulic capacity of the one hundred (100) year floodplain and that water surface elevation of the one hundred (100) year floodplain is not increased. Also, no septic systems shall be constructed within the 100-year floodplain.

Chapter 22, Section 510 (Easements for Conservation) This provision limits site disturbance for proposed developments. The erection of fences, walls, swimming pools and/or other structures and the removal of trees and ground cover shall be prohibited in a conservation easement or floodplain. The removal of dead or diseased trees, limited thinning of trees and growth to encourage the most desirable growth; and the removal of trees to allow for structures designed to impound water or in areas to be flooded in the creation of ponds or lakes, shall be permitted, if approved by the Planning Board.

Chapter 22, Section 528 (Stormwater Runoff) These design provisions require that all development shall incorporate on-site stormwater facilities that will encourage the recharging of underground aquifers and/or the reduction of the rate of surface water runoff from the project site. Further, where the rate or volume of stormwater runoff from the proposed development is sufficient to warrant detention of the peak flow, one (1) or more detention basins shall be

included in the project work. Each detention basin shall have sufficient capacity to accept surface water from a six (6") inch rainfall in twenty four (24) hours. All water stored in the basin shall be drained from the basin within thirty-six (36) hours after the peak runoff from the storm. Detention basins proposed to be located on or adjacent to any stream or watercourse, or within any floodway or floodplain, shall be subject to the approval of the New Jersey Department of Environmental Protection. Although these regulations include some language that is consistent with the new stormwater regulations, further provisions pertaining to water quality may be added to fully conform with the standards set forth in N.J.A.C. 7:8

Chapter 22, Section 508 (Drainage) This section outlines the drainage requirements that the Borough imposes on land development applications. The provisions within Section 508 state that where any development is traversed by a watercourse, a surface or an underground drainage way or drainage system, channel or stream, a drainage right-of-way easement shall be provided and dedicated to the Borough, which will conform substantially with the lines of such watercourse, with such further width as will be adequate to accommodate expected stormwater runoff in the future based upon reasonable growth potential in the Borough. A minimum of fifteen (15') feet beyond the bank top on at least one (1) side shall be provided for access to the drainage right-of-way. In any event, the easement shall meet the minimum widths and locations shown on any adopted Official map or Master Plan as required under Section 22-509, "Easements".

Chapter 22 Section 520 (Off-Street Parking and Loading). Within Spring Lake Heights, off-street parking spaces shall be either nine (9') or ten (10') feet wide, except that spaces serving retail uses shall be a minimum of ten (10') feet wide. Parking spaces shall be a minimum of twenty (20') feet in length in accordance with the following schedule. In parking lots containing more than ten (10) spaces, a minimum of one (1) space shall be a minimum of twelve (12') feet wide; and for parking lots with more than twenty (20) spaces, five (5%) percent of all spaces, but no more than three (3) spaces, shall be twelve (12') feet wide. These wider spaces shall be located in areas conveniently related to major entrances and designated as parking for the handicapped. They shall be located so that access does not require wheeling or walking behind parked cars.

All parking and loading areas shall have drainage facilities installed in accordance with good engineering practice as approved by the Municipal Engineer, and in accordance with the drainage provisions in Section 508 (Drainage). Where subgrade conditions are wet, springy or of such nature that surfacing would be inadvisable without first treating the subgrade, these areas shall be excavated to a depth of at least six (6") to twelve (12") inches below the proposed subgrade and filled with a suitable subbase material as determined by the Municipal Engineer. Where required by the Engineer, a system of porous concrete pipe subsurface drains shall be constructed beneath the surface of the paving and connected to a suitable drain.

In an effort to reduce paving costs and reduce the amount of impervious area, the approving authority may approve parking plans for a nonresidential use for designated compact car parking areas, provided that such space shall be limited to employee parking and that each area for compact cars shall have at least thirty (30) spaces. The compact car spaces shall be eight by sixteen (8' x 16') feet with aisles reduced to ninety (90%) percent of the dimensions shown in subsection 22-520.5, Dimensions. The number of parking spaces that may be approved for

compact cars shall be a determination of the approving authority based upon documentation by the applicant and any data submitted by others.

Chapter 22, Section 520.4 (Curbing and Wheel Blocks) Off-street parking areas containing six (6) or more spaces and all off-street loading areas shall be designed in conjunction with a drainage plan. In lieu of concrete curbing in residential projects having off-street parking lots with six (6) or more spaces, the Borough's approving authority may accept equivalent methods of defining the edge of paving, preventing vehicles from encroaching upon nonpaved areas, controlling drainage, and guiding traffic circulation. Concrete wheel blocks may be located within designated parking or loading spaces. Curbing installed at crosswalks and bikeways shall have barrier-free curb ramps constructed in accordance with the Design Standards for Curb Ramps for the Physically Handicapped of the New Jersey Department of Transportation.

Chapter 22, Section 505 (Buffers) Within any zone, other than a residential zone, in which the lot(s) submitted for plan approval are abutting a residential zone, the Borough's buffer and landscaping requirements shall apply. This section outlines the width, area, and planting and landscaping requirements. However, the current provisions do not provide incentives for developers to integrate buffers into a projects site design, nor do they mention that these areas could potentially be incorporated as stormwater management facilities.

Chapter 22, Section 507 (Curbing) The provisions in this section state that concrete curb shall be installed along every street within the development and along the front and side of all lots abutting existing roadways where curbing does not exist. Curbs shall be set in accordance with approved lines and grades and radial curbs shall be formed in an arc segment, on a smooth curve. Chord segments are prohibited. Standard curb-sections shall be ten (10') feet in length with preformed expansion joint material on not more than twenty (20') foot centers. The exposed curb face on local roads shall be six (6") inches and on County and State roads shall the County or State Engineer set the dimension. However, Section 520.4 of the Off-Street Parking provisions identifies that in lieu of concrete curbing in residential projects having off-street parking lots with six (6) or more spaces the approving authority may accept equivalent methods of defining the edge of paving, preventing vehicles from encroaching upon nonpaved areas, controlling drainage, and guiding traffic circulation. Although nonstructural BMP's are not specifically stated, these provisions do allow alternative methods of curbing to be utilized to improve the quality of stormwater runoff and increase the amount of groundwater recharge on site.

As illustrated above, Spring Lake Heights Borough has adopted a number of provisions to incorporate nonstructural stormwater management practices into their Land Development Regulations. However, several sections of the existing ordinance may be examined to determine if additional nonstructural language is practicable. For example, the Borough's landscaping requirements may be revised to require the use of native vegetation (which requires less fertilization and watering than non-native species). Also buffer areas may be utilized for stormwater management to disconnect impervious areas and to filter and treat stormwater. Secondly, design standards may be amended so as to promote the use of pervious paving materials along sidewalks, driveways, and parking areas. Although amendments may be made,

the Borough's existing provisions have been found to be compatible with N.J.A.C. 7:8-5.3 (Nonstructural Stormwater Management Strategies).

In addition, Appendix B provides a model ordinance that has been provided by the NJDEP to assist municipalities in drafting stormwater control ordinances that comply with the State's newly adopted stormwater management design and performance standards. Following the adoption of this plan a new Stormwater Management Control Ordinance per the NJDEP's new Stormwater Management Rules will be prepared and adopted by Spring Lake Heights Borough. A number of additional provisions relating to stormwater basin fees and maintenance, design standards which pertain to both structural and non-structural methods that must be incorporated into a projects design, safety standards for stormwater basins, and maintenance and repair fees and responsibility will all be included within the amended ordinance. Following adoption, the ordinances will be sent to the Monmouth County Stormwater Technical Advisory Committee for review and approval within 24 months of the EDPA. A copy will also be sent to the Department of Environmental Protection at the time of submission.

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. 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 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.

6.3 PLAN CONSISTENCY

Currently, no land within Spring Lake Heights is 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. If more stringent design standards do become effective for the Borough either through the adoption of a RSWMP, 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.

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 Spring Lake Heights 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, the 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 PLAN

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 Spring Lake Heights 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 Spring Lake Heights 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 is no specific sensitive receptor impacted, then the location of the mitigation project may be located anywhere within the municipality, preferably at a location that would provide the greatest benefit.

- 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 Figure 8, entitled Sensitive Receptor Map, Spring Lake Heights has taken care to indicate the sensitive receptor areas within the Borough that are especially susceptible to stormwater changes. As many of the mitigation measures that will be employed to these sensitive receptor areas are in the planning and preliminary design stage, when appropriate, Spring Lake Heights 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 Spring Lake Heights's 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.

Spring Lake Heights 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 Spring Lake Heights 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 Spring Lake Heights 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.

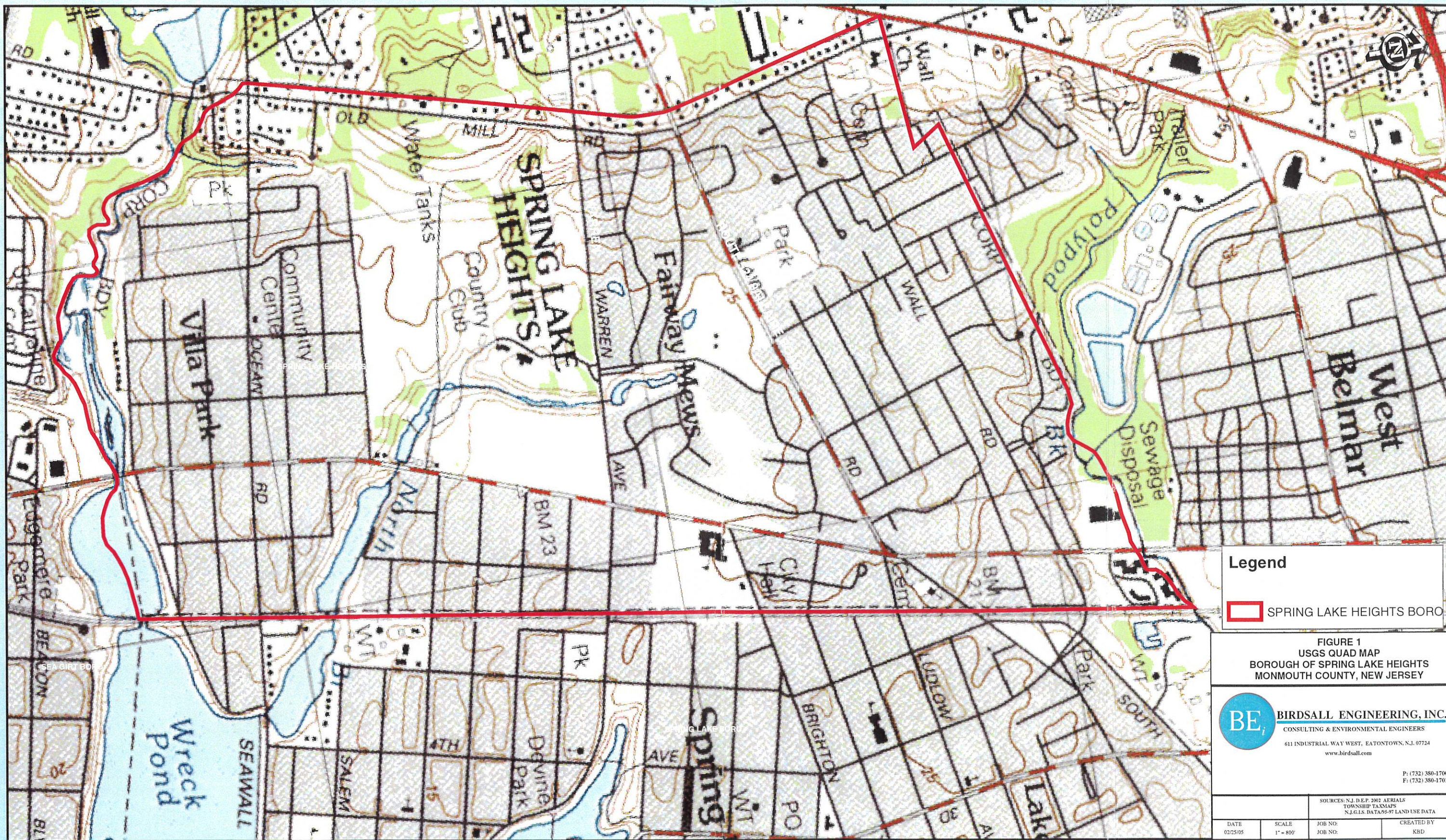
REQUIREMENTS FOR MITIGATION PROJECTS

Whether the applicant is proposing the mitigation project, or Spring Lake Heights 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 Spring Lake Heights Borough, or another entity, the entity responsible for the cost of the maintenance must be identified. Spring Lake Heights 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.

FIGURES



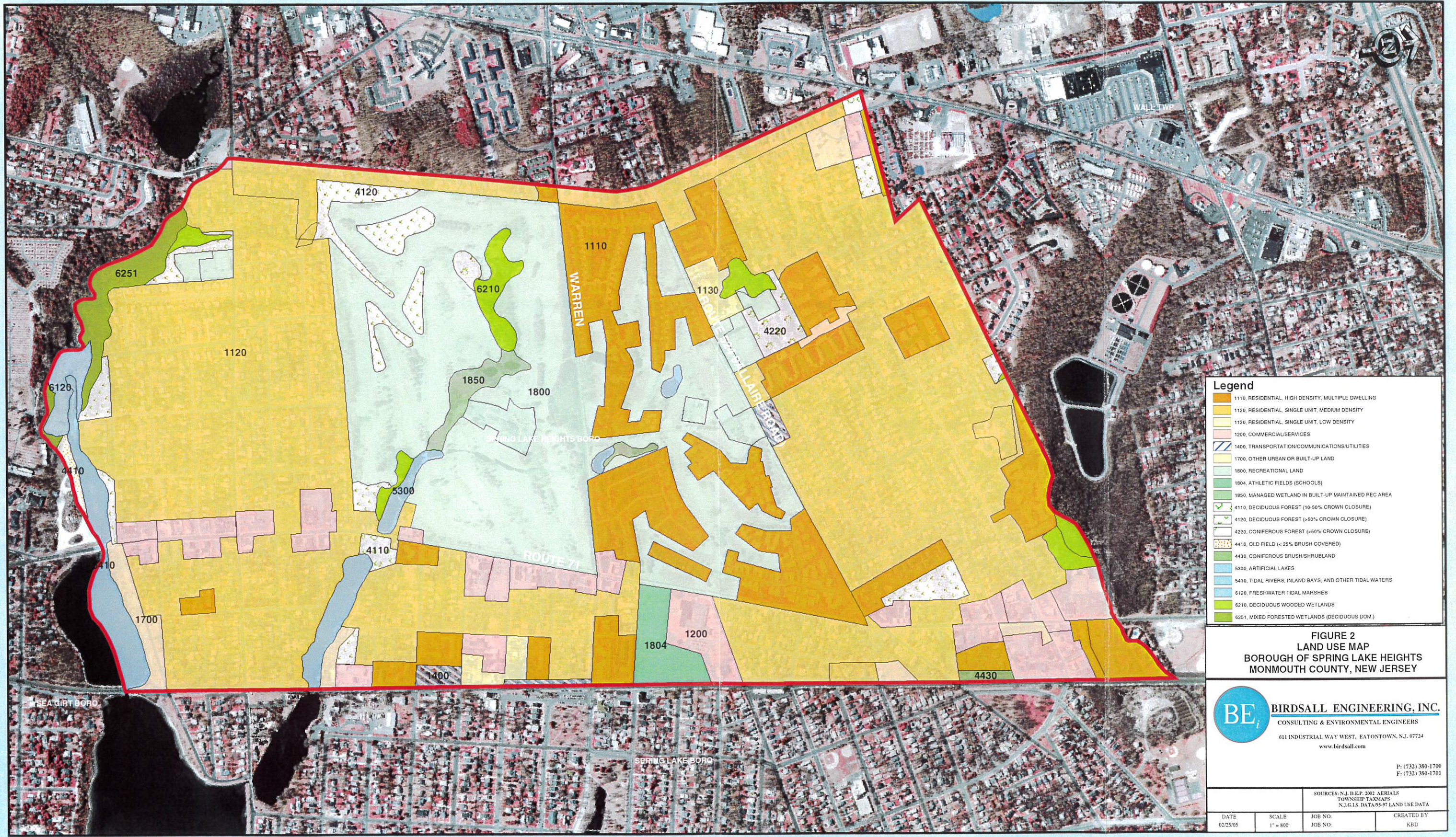
Legend

SPRING LAKE HEIGHTS BORO

FIGURE 1
 USGS QUAD MAP
 BOROUGH OF SPRING LAKE HEIGHTS
 MONMOUTH COUNTY, NEW JERSEY

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SOURCES: N.J. D.E.P. 2002 AERIALS				TOWNSHIP TAXMAPS				N.J.G.I.S. DATA/95-97 LAND USE DATA				P: (732) 380-1700			
												F: (732) 380-1701			



Legend

- 1110, RESIDENTIAL, HIGH DENSITY, MULTIPLE DWELLING
- 1120, RESIDENTIAL, SINGLE UNIT, MEDIUM DENSITY
- 1130, RESIDENTIAL, SINGLE UNIT, LOW DENSITY
- 1200, COMMERCIAL/SERVICES
- 1400, TRANSPORTATION/COMMUNICATIONS/UTILITIES
- 1700, OTHER URBAN OR BUILT-UP LAND
- 1800, RECREATIONAL LAND
- 1804, ATHLETIC FIELDS (SCHOOLS)
- 1850, MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA
- 4110, DECIDUOUS FOREST (>50% CROWN CLOSURE)
- 4120, DECIDUOUS FOREST (>50% CROWN CLOSURE)
- 4220, CONIFEROUS FOREST (>50% CROWN CLOSURE)
- 4410, OLD FIELD (< 25% BRUSH COVERED)
- 4430, CONIFEROUS BRUSH/SHRUBLAND
- 5300, ARTIFICIAL LAKES
- 5410, TIDAL RIVERS, INLAND BAYS, AND OTHER TIDAL WATERS
- 6120, FRESHWATER TIDAL MARSHES
- 6210, DECIDUOUS WOODED WETLANDS
- 6251, MIXED FORESTED WETLANDS (DECIDUOUS DOM.)

FIGURE 2
LAND USE MAP
 BOROUGH OF SPRING LAKE HEIGHTS
 MONMOUTH COUNTY, NEW JERSEY

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Legend

- FRESHWATER WETLANDS
- STREAMS
- TIDAL WATER
- NATURAL LAKES
- ARTIFICIAL LAKES
- H.U.C. 14 / SUBWATERSHED

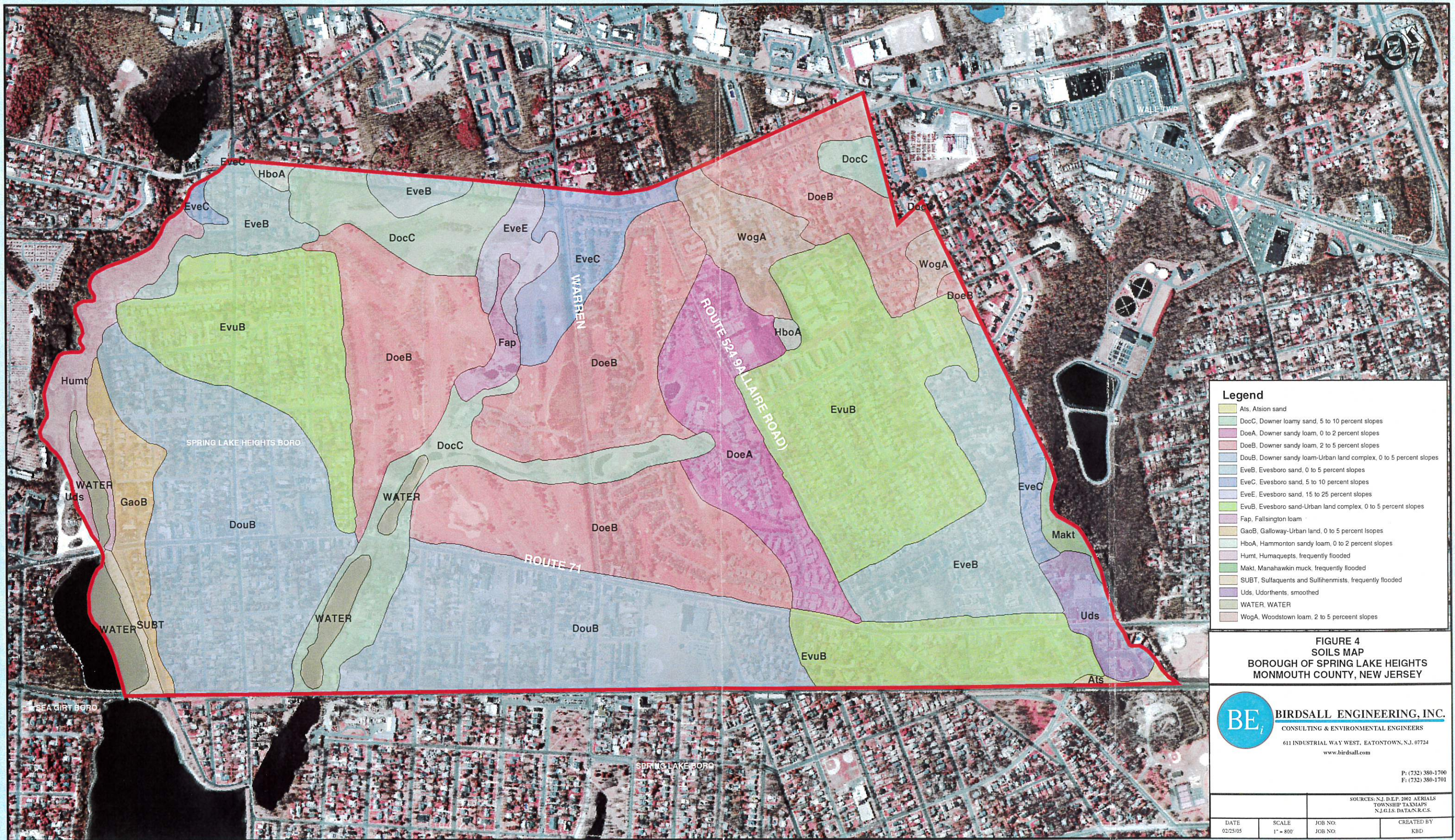
FIGURE 3
WATERWAYS MAP
 BOROUGH OF SPRING LAKE HEIGHTS
 MONMOUTH COUNTY, NEW JERSEY

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- Legend**
- Ats, Atsion sand
 - DocC, Downer loamy sand, 5 to 10 percent slopes
 - DoeA, Downer sandy loam, 0 to 2 percent slopes
 - DoeB, Downer sandy loam, 2 to 5 percent slopes
 - DouB, Downer sandy loam-Urban land complex, 0 to 5 percent slopes
 - EveB, Evesboro sand, 0 to 5 percent slopes
 - EveC, Evesboro sand, 5 to 10 percent slopes
 - EveE, Evesboro sand, 15 to 25 percent slopes
 - EvuB, Evesboro sand-Urban land complex, 0 to 5 percent slopes
 - Fap, Fallsington loam
 - GaoB, Galloway-Urban land, 0 to 5 percent slopes
 - HboA, Hammonton sandy loam, 0 to 2 percent slopes
 - Humt, Humaquepts, frequently flooded
 - Makt, Manahawkin muck, frequently flooded
 - SUBT, Sulfaquents and Sulfihermists, frequently flooded
 - Uds, Udorthents, smoothed
 - WATER, WATER
 - WogA, Woodstown loam, 2 to 5 percent slopes

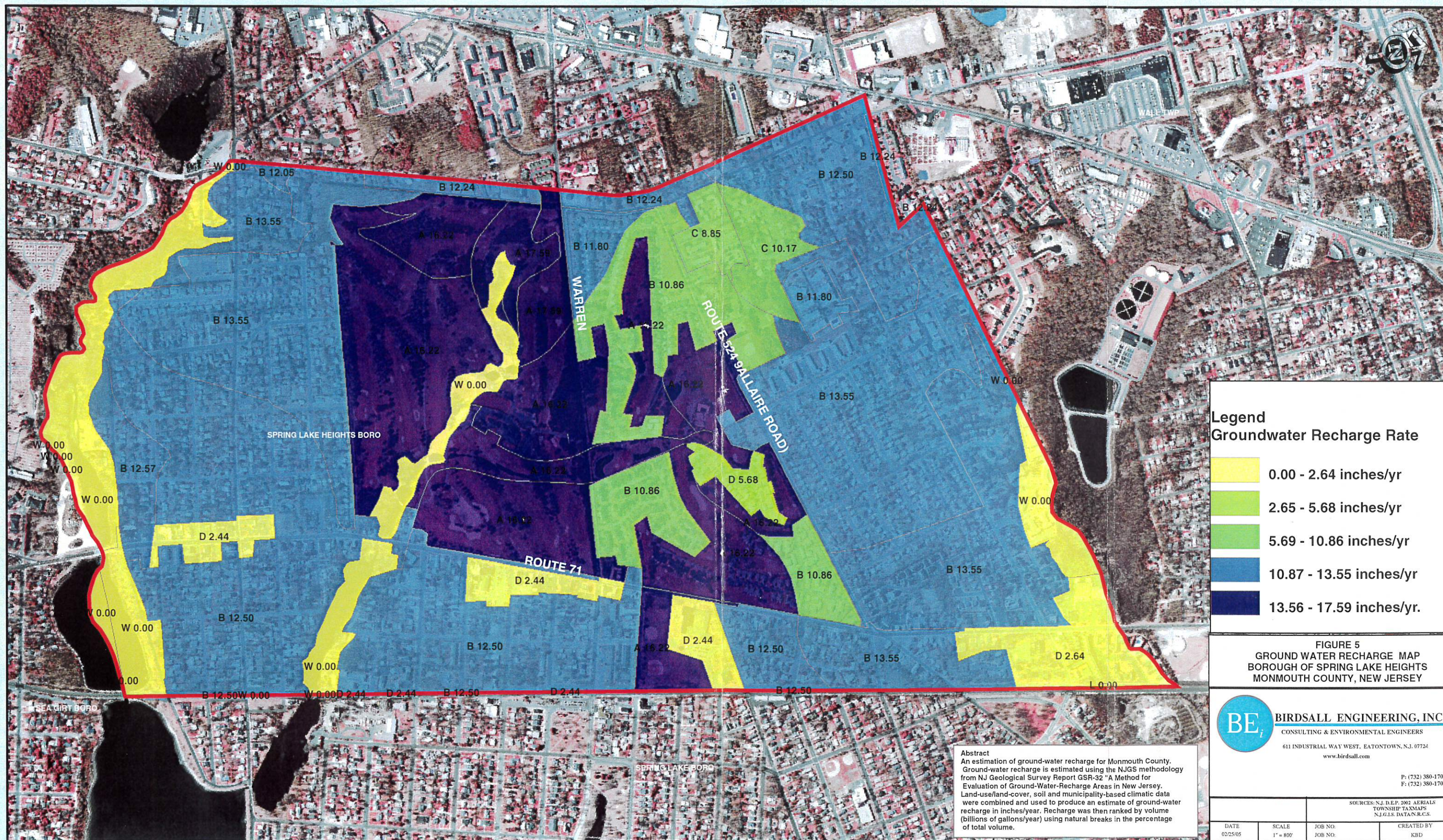
FIGURE 4
SOILS MAP
 BOROUGH OF SPRING LAKE HEIGHTS
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SOURCES: N.J. D.E.P. 2002 AERIALS
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Legend
Groundwater Recharge Rate

- 0.00 - 2.64 inches/yr
- 2.65 - 5.68 inches/yr
- 5.69 - 10.86 inches/yr
- 10.87 - 13.55 inches/yr
- 13.56 - 17.59 inches/yr.

FIGURE 5
GROUND WATER RECHARGE MAP
BOROUGH OF SPRING LAKE HEIGHTS
MONMOUTH COUNTY, NEW JERSEY

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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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SOURCES: N.J. D.E.P. 2002 AERIALS TOWNSHIP TAX MAPS N.J.G.I.S. DATA N.R.C.S.			P: (732) 380-1700 F: (732) 380-1701



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).

Legend

- PUBLIC SUPPLY WELLS
- WELLHEAD PROTECTED AREAS - TIER 1- 2 YEAR

FIGURE 6
WELLHEAD PROTECTED AREAS MAP
BOROUGH OF SPRING LAKE HEIGHTS
MONMOUTH COUNTY, NEW JERSEY

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F.E.M.A Legend

AE - Areas subject to 100-year flood with base flood elevation determined.

X500 - Areas between the limits of the 100-year and 500-year flood, or certain areas with average depths less than 1 foot or where the contributing drainage area is less than 1 square mile.

X - Areas outside the 500-year flood plain with less than 0.2% annual probability of flooding.

FIGURE 7
F.E.M.A. FLOOD MAP
BOROUGH OF SPRING LAKE HEIGHTS
MONMOUTH COUNTY, NEW JERSEY

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Legend

- FRESHWATER WETLANDS
- STREAMS
- TIDAL WATER
- NATURAL LAKES
- ARTIFICIAL LAKES

H.U.C. 14 / SUBWATERSHED

FIGURE 8
SENSITIVE RECEPTOR AREAS MAP
 BOROUGH OF SPRING LAKE HEIGHTS
 MONMOUTH COUNTY, NEW JERSEY

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Note:
 Spring Lake Heights has not yet identified any sensitive receptors. As sensitive receptors are identified, mapping will be updated accordingly.

SOURCES: N.J. D.E.P. 2002 AERIALS TOWNSHIP TAXMAPS N.J.G.I.S. DATA/LANDSCAPE VERSION 2

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APPENDIX A

**NJDEP MODEL STORMWATER CONTROL
ORDINANCE**

Chapter 22. Municipal Land Use Regulations

Article V. Required Improvements and Design Standards

§ 22-535. STORMWATER MANAGEMENT AND CONTROL.

[Added 6-7-2021 by Ord. No. 2021-05]

Editor's Note: Ord. No. 2021-05, adopted 6-7-2021, amended § **22-535** in entirety. Prior history includes Ord. No. 4-2006, Ord. No. 11A-2006, and Ord. No. 3-2007.

This section shall be known as and may be cited as the "Stormwater Control Regulations of the Borough of Spring Lake Heights".

§ 22-535.1. Scope and Purpose.

[Added 6-7-2021 by Ord. No. 2021-05]

- a. Policy Statement. Flood control, groundwater recharge, and pollutant reduction shall be achieved through the use of stormwater management measures, including green infrastructure Best Management Practices (GI BMPs) and nonstructural stormwater management strategies. GI BMPs and low impact development (LID) should be utilized to meet the goal of maintaining natural hydrology to reduce stormwater runoff volume, reduce erosion, encourage infiltration and groundwater recharge, and reduce pollution. GI BMPs and LID should be developed based upon physical site conditions and the origin, nature and the anticipated quantity, or amount, of potential pollutants. Multiple stormwater management BMPs may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge.
- b. Purpose. The purpose of this section is to establish minimum stormwater management requirements and controls for "major development," as defined below in Section **22-535.2**.
- c. Applicability.
 1. This section shall be applicable to the following major developments:
 - (a) Nonresidential major developments; and
 - (b) Aspects of residential major developments that are not pre-empted by the Residential Site Improvement Standards at N.J.A.C. 5:21.
 2. This section shall also be applicable to all major developments undertaken by The Borough of Spring Lake Heights.
- d. Compatibility with Other Permit and Ordinance Requirements. Development approvals issued pursuant to this section are to be considered an integral part of development approvals 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 section shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare.

This section 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 section 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.

§ 22-535.2. Definitions.

[Added 6-7-2021 by Ord. No. 2021-05]

For the purpose of this section, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this section clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directory. 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.

CAFRA CENTERS, CORES OR NODES

Means those areas with boundaries incorporated by reference or revised by the Department in accordance with N.J.A.C. 7:7-13.16.

CAFRA PLANNING MAP

Means the map used by the Department to identify the location of Coastal Planning Areas, CAFRA centers, CAFRA cores, and CAFRA nodes. The CAFRA Planning Map is available on the Department's Geographic Information System (GIS).

COMMUNITY BASIN

Means an infiltration system, sand filter designed to infiltrate, standard constructed wetland, or wet pond, established in accordance with N.J.A.C. 7:8-4.2(c)14, that is designed and constructed in accordance with the New Jersey Stormwater Best Management Practices Manual, or an alternate design, approved in accordance with N.J.A.C. 7:8-5.2(g), for an infiltration system, sand filter designed to infiltrate, standard constructed wetland, or wet pond and that complies with the requirements of this chapter.

COMPACTION

Means the increase in soil bulk density.

CONTRIBUTORY DRAINAGE AREA

Means the area from which stormwater runoff drains to a stormwater management measure, not including the area of the stormwater management measure itself.

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 Commissioners to review municipal stormwater management plans and implementing ordinance(s). The county review agency may either be:

- a. A county planning agency; or
- b. 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 Department of Environmental Protection.

DESIGN ENGINEER

Means a person professionally qualified and duly licensed in New Jersey to perform engineering services that may include, but not necessarily be limited to, development of project requirements, creation and development of project design and preparation of drawings and specifications.

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.

DEVELOPMENT

Means the division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlarge-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 land, 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 exempted by the Right to Farm Act, N.J.S.A. 4:1C-1 et seq.

DISTURBANCE

Means the placement or reconstruction of impervious surface or motor vehicle surface, or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation. Milling and repaving is not considered disturbance for the purposes of this definition.

DRAINAGE AREA

Means a geographic area within which stormwater, sediments, or dissolved materials drain to a particular receiving waterbody or to a particular point along a receiving waterbody.

EMPOWERMENT NEIGHBORHOODS

Means neighborhoods 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.

ENVIRONMENTALLY CONSTRAINED AREA

Means the following areas where the physical alteration of the land is in some way restricted, either through regulation, easement, deed restriction or ownership such as: wetlands, floodplains, threatened and endangered species sites or designated habitats, and parks and preserves. Habitats of endangered or threatened species are identified using the Department's Landscape Project as approved by the Department's Endangered and Nongame Species Program.

ENVIRONMENTALLY CRITICAL AREA

Means an area or feature which is of significant environmental value, including but not limited to: stream corridors, natural heritage priority sites, habitats of endangered or threatened species, large areas of contiguous 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 Department's Endangered and Nongame Species Program.

EROSION

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

GREEN INFRASTRUCTURE

Means a stormwater management measure that manages stormwater close to its source by:

- a. Treating stormwater runoff through infiltration into subsoil;
- b. Treating stormwater runoff through filtration by vegetation or soil; or
- c. Storing stormwater runoff for reuse.

HUC 14 or HYDROLOGIC UNIT CODE 14

Means an area within which water drains to a particular receiving surface water body, also known as a sub watershed, which is identified by a fourteen-digit hydrologic unit boundary designation, delineated within New Jersey by the United States Geological Survey.

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

The process by which water seeps into the soil from precipitation.

LEAD PLANNING AGENCY

Means one or more public entities having stormwater management planning authority designated by the regional stormwater management planning committee pursuant to N.J.A.C. 7:8-3.2, that serves as the primary representative of the committee.

MAJOR DEVELOPMENT

Means an individual "development," as well as multiple developments that individually or collectively result in:

- a. The disturbance of one or more acres of land since February 2, 2004;
- b. The creation of one-quarter acre or more of "regulated impervious surface" since February 2, 2004;
- c. The creation of one-quarter acre or more of regulated motor vehicle surface since March 2, 2021;
- d. A combination of paragraphs b and c above that totals an area of 1/4 acre or more. The same surface shall not be counted twice when determining if the combination area equals 1/4 acre or more.

Major development includes all developments that are part of a common plan of development or sale (for example, phased residential development) that collectively or individually meet any one or more of paragraphs a, b, c, or d above. Projects undertaken by any government agency that 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."

MOTOR VEHICLE

Means land vehicles propelled other than by muscular power, such as automobiles, motorcycles, autocycles, and low speed vehicles. For the purposes of this definition, motor vehicle does not include farm equipment, snowmobiles, all-terrain vehicles, motorized wheelchairs, go-carts, gas buggies, golf carts, ski-slope grooming machines, or vehicles that run only on rails or tracks.

MOTOR VEHICLE SURFACE

Means any pervious or impervious surface that is intended to be used by "motor vehicles" and/or aircraft, and is directly exposed to precipitation including, but not limited to, driveways, parking areas, parking garages, roads, racetracks, and runways.

MUNICIPALITY

Means any City, Borough, town, Township, or village.

NEW JERSEY STORMWATER BEST MANAGEMENT PRACTICES (BMP) MANUAL or BMP MANUAL

Means the manual maintained by the Department providing, in part, design specifications, removal rates, calculation methods, and soil testing procedures approved by the Department as being capable of contributing to the achievement of the stormwater management standards specified in

this chapter. The BMP Manual is periodically amended by the Department as necessary to provide design specifications on additional best management practices and new information on already included practices reflecting the best available current information regarding the particular practice and the Department's determination as to the ability of that best management practice to contribute to compliance with the standards contained in this chapter. Alternative stormwater management measures, removal rates, or calculation methods may be utilized, subject to any limitations specified in this chapter, provided the design engineer demonstrates to the municipality, in accordance with § 22-535.4f and N.J.A.C. 7:8-5.2(g), that the proposed measure and its design will contribute to achievement of the design and performance standards established by this chapter.

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.

REGULATED IMPERVIOUS SURFACE

Means any of the following, alone or in combination:

- a. A net increase of impervious surface;
- b. The total area of impervious surface collected by a new stormwater conveyance system (for the purpose of this definition, a "new stormwater conveyance system" is a stormwater conveyance system that is constructed where one did not exist immediately prior to its construction or an existing system for which a new discharge location is created);
- c. The total area of impervious surface proposed to be newly collected by an existing stormwater conveyance system; and/or
- d. The total area of impervious surface collected by an existing stormwater conveyance system where the capacity of that conveyance system is increased.

REGULATED MOTOR VEHICLE SURFACE

Means any of the following, alone or in combination:

- a. The total area of motor vehicle surface that is currently receiving water;

- b. A net increase in motor vehicle surface; and/or quality treatment either by vegetation or soil, by an existing stormwater management measure, or by treatment at a wastewater treatment plant, where the water quality treatment will be modified or removed.

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 or conveyed by snow removal equipment.

STORMWATER MANAGEMENT BMP

Means an excavation or embankment and related areas designed to retain stormwater runoff. A stormwater management BMP may either be normally dry (that is, a detention basin or infiltration system), 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 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 non-stormwater discharges into stormwater conveyances.

STORMWATER MANAGEMENT PLANNING AGENCY

Means a public body authorized by legislation to prepare stormwater management plans.

STORMWATER MANAGEMENT PLANNING AREA

Means the geographic area for which a stormwater management planning agency is authorized to prepare stormwater management plans, or a specific portion of that area identified in a stormwater management plan prepared by that agency.

STORMWATER RUNOFF

Means water flow on the surface of the ground or in storm sewers, resulting from precipitation.

TIDAL FLOOD HAZARD AREA

Means a flood hazard area in which the flood elevation resulting from the two-, ten-, or one-hundred-year storm, as applicable, is governed by tidal flooding from the Atlantic Ocean. Flooding in a tidal flood hazard area may be contributed to, or influenced by, stormwater runoff from inland areas, but the depth of flooding generated by the tidal rise and fall of the Atlantic Ocean is greater than flooding from any fluvial sources. In some situations, depending upon the extent of the storm

surge from a particular storm event, a flood hazard area may be tidal in the one-hundred-year storm, but fluvial in more frequent storm events.

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:

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

WATER CONTROL STRUCTURE

Means a structure within, or adjacent to, a water, which intentionally or coincidentally alters the hydraulic capacity, the flood elevation resulting from the two-, ten-, or one-hundred-year storm, flood hazard area limit, and/or floodway limit of the water. Examples of a water control structure may include a bridge, culvert, dam, embankment, ford (if above grade), retaining wall, and weir.

WATERS OF THE STATE

Means the ocean and its estuaries, all springs, streams, wetlands, and bodies of surface or groundwater, 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.

§ 22-535.3. Design and Performance Standards for Stormwater Management Measures.

[Added 6-7-2021 by Ord. No. 2021-05]

- a. Stormwater management measures for major development shall be designed to provide erosion control, groundwater recharge, stormwater runoff quantity control, and stormwater runoff quality treatment as follows:
 1. The minimum standards for erosion control are those established under the Soil and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules at N.J.A.C. 2:90.
 2. The minimum standards for groundwater recharge, stormwater quality, and stormwater runoff quantity shall be met by incorporating green infrastructure.
- b. The standards in this section 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.

§ 22-535.4. Stormwater Management Requirements for Major Development.

[Added 6-7-2021 by Ord. No. 2021-05]

- a. The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with § 22-535.10.
- 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 muhlenbergi* (bog turtle).
- c. The following linear development projects are exempt from the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity requirements of § **22-535.4p, q and r**:
 1. The construction of an underground utility line provided that the disturbed areas are revegetated upon completion; and
 2. The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable; and
 3. The construction of a public pedestrian access, such as a sidewalk or trail with a maximum width of 14 feet, provided that the access is made of permeable material.
- d. A waiver from strict compliance from the green infrastructure, groundwater recharge, stormwater runoff quality, and stormwater runoff quantity requirements of § **22-535.4o, p, q and r** 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 stormwater management measures, the option selected complies with the requirements of § **22-535.4o, p, q and r** to the maximum extent practicable;
 3. The applicant demonstrates that, in order to meet the requirements of § **22-535.4o, p, q and r** 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 22-535.4d3 above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of § **22-535.4o, p, q and r** that were not achievable onsite.
- e. Tables 1 through 3 below summarize the ability of stormwater best management practices identified and described in the New Jersey Stormwater Best Management

Practices Manual to satisfy the green infrastructure, groundwater recharge, stormwater runoff quality and stormwater runoff quantity standards specified in § **22-535.4o, p, q and r**. When designed in accordance with the most current version of the New Jersey Stormwater Best Management Practices Manual, the stormwater management measures found at N.J.A.C. 7:8-5.2(f) Tables 5-1, 5-2 and 5-3 and listed below in Tables 1, 2 and 3 are presumed to be capable of providing stormwater controls for the design and performance standards as outlined in the tables below. Upon amendments of the New Jersey Stormwater Best Management Practices to reflect

additions or deletions of BMPs meeting these standards, or changes in the presumed performance of BMPs designed in accordance with the New Jersey Stormwater BMP Manual, the Department shall publish in the New Jersey Registers a notice of administrative change revising the applicable table. The most current version of the BMP Manual can be found on the Department's website at: https://njstormwater.org/bmp_manual2.htm.

- f. Where the BMP tables in the NJ Stormwater Management Rule are different due to updates or amendments with the tables in this section the BMP Tables in the Stormwater Management rule at N.J.A.C. 7:8-5.2(f) shall take precedence.

Table 1 Green Infrastructure BMPs for Groundwater Recharge, Stormwater Runoff Quality, and/or Stormwater Runoff Quantity				
Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Minimum Separation from Seasonal High Water Table (feet)
Cistern	0	Yes	No	—
Dry well ^(a)	0	No	Yes	2
Grass swale	50 or less	No	No	2 ^(e) 1 ^(f)
Green roof	0	Yes	No	—
Manufactured treatment device ^{(a) (g)}	50 or 80	No	No	Dependent upon the device
Pervious paving system ^(a)	80	Yes	Yes ^(b) No ^(c)	2 ^(b) 1 ^(c)
Small-scale bioretention basin ^(a)	80 or 90	Yes	Yes ^(b) No ^(c)	2 ^(b) 1 ^(c)
Small-Scale infiltration basin ^(a)	80	Yes	Yes	2
Small-scale sand filter	80	Yes	Yes	2
Vegetative filter strip	60-80	No	No	—

(Notes to corresponding to annotations ^(a) through ^(g) are found at Table 3)

Table 2 Green Infrastructure BMPs for Stormwater Runoff Quantity (or for Groundwater Recharge and/or Stormwater Runoff Quality with a Waiver or Variance from N.J.A.C. 7:8-5.3)				
Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Minimum Separation from Seasonal High Water Table (feet)
Bioretention system	80 or 90	Yes	Yes ^(b) No ^(c)	2 ^(b) 1 ^(c)
Infiltration basin	80	Yes	Yes	2

Table 2 Green Infrastructure BMPs for Stormwater Runoff Quantity (or for Groundwater Recharge and/or Stormwater Runoff Quality with a Waiver or Variance from N.J.A.C. 7:8-5.3)				
Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Minimum Separation from Seasonal High Water Table (feet)
Sand filter ^(b)	80	Yes	Yes	2
Standard constructed wetland	90	Yes	No	N/A
Wet pond ^(d)	50-90	Yes	No	N/A

(Notes to corresponding to annotations ^(b) through ^(d) are found at Table 3)

Table 3 BMPs for Groundwater Recharge, Stormwater Runoff Quality, and/or Stormwater Runoff Quantity only with a Waiver or Variance from N.J.A.C. 7:8-5.3				
Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Minimum Separation from Seasonal High Water Table (feet)
Blue roof	0	Yes	No	N/A
Extended detention basin	40-60	Yes	No	1
Manufactured treatment device ^(h)	50 or 80	No	No	Dependent upon the device
Sand filter ^(c)	80	Yes	No	1
Subsurface gravel wetland	90	No	No	1
Wet pond	50-90	Yes	No	N/A

Notes to Tables 1, 2, and 3:

- (a) Subject to the applicable contributory drainage area limitation specified at § 22-535.4o2;
- (b) Designed to infiltrate into the subsoil;
- (c) Designed with underdrains;
- (d) Designed to maintain at least a ten-foot-wide area of native vegetation along at least 50% of the shoreline and to include a stormwater runoff retention component designed to capture stormwater runoff for beneficial reuse, such as irrigation;
- (e) Designed with a slope of less than 2%;
- (f) Designed with a slope of equal to or greater than 2%;
- (g) Manufactured treatment devices that meet the definition of green infrastructure at § 22-535.2;
- (h) Manufactured treatment devices that do not meet the definition of green infrastructure at § 22-535.2.

- g. An alternative stormwater management measure, alternative removal rate, and/or alternative method to calculate the removal rate may be used if the design engineer demonstrates the capability of the proposed alternative stormwater management measure and/or the validity of the alternative rate or method to the municipality. A copy of any approved alternative stormwater management measure, alternative removal rate, and/or alternative method to calculate the removal rate shall be provided to the Department in accordance with § **22-535.6b**. Alternative stormwater management measures may be used to satisfy the requirements at § **22-535.4o** only if the measures meet the definition of green infrastructure at § **22-535.2**. Alternative stormwater management measures that function in a similar manner to a BMP listed at § 22-535.4o2 are subject to the contributory drainage area limitation specified at § 22-535.4o2 for that similarly functioning BMP. Alternative stormwater management measures approved in accordance with this subsection that do not function in a similar manner to any BMP listed at § 22-535.4o2 shall have a contributory drainage area less than or equal to 2.5 acres, except for alternative stormwater management measures that function similarly to cisterns, grass swales, green roofs, standard constructed wetlands, vegetative filter strips, and wet ponds, which are not subject to a contributory drainage area limitation. Alternative measures that function similarly to standard constructed wetlands or wet ponds shall not be used for compliance with the stormwater runoff quality standard unless a variance in accordance with N.J.A.C. 7:8-4.6 or a waiver from strict compliance in accordance with § **22-535.4d** is granted from § **22-535.4o**.
- h. Whenever the stormwater management design includes one or more BMPs that will infiltrate stormwater into subsoil, 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 or other subsurface structures within the zone of influence of the groundwater mound, or interference with the proper functioning of the stormwater management measure itself.
- i. Design standards for stormwater management measures are as follows:
1. Stormwater management measures shall be designed to take into account the existing site conditions, including, but not limited to, 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);
 2. 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 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 the width of the diameter of the orifice or one-third 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 § **22-535.8c**;
 3. 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; and
 4. Stormwater management BMPs shall be designed to meet the minimum safety standards for stormwater management BMPs at § **22-535.8**; and
 5. The size of the orifice at the intake to the outlet from the stormwater management BMP shall be a minimum of 2 1/2 inches in diameter.
- j. 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. Manufactured treatment devices that do not meet the definition of green infrastructure at § **22-535.2** may be used only under the circumstances described at § 22-535.4o4.

- k. Any application for a new agricultural development that meets the definition of major development at § **22-535.2** shall be submitted to the Soil Conservation District for review and approval in accordance with the requirements at § **22-535.4o, p, q** and **r** and any applicable Soil Conservation District guidelines for stormwater runoff quantity and erosion control. For purposes of this subsection, "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.
- l. If there is more than one drainage area, the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards at § **22-535.4p, q** and **r** shall be met in each drainage area, unless the runoff from the drainage areas converge onsite and no adverse environmental impact would occur as a result of compliance with any one or more of the individual standards being determined utilizing a weighted average of the results achieved for that individual standard across the affected drainage areas.
- m. Any stormwater management measure authorized under the municipal stormwater management plan or ordinance shall be reflected in a deed notice recorded in the Office of the County Clerk. A form of deed notice shall be submitted to the municipality for approval prior to filing. The deed notice shall contain a description of the stormwater management measure(s) used to meet the green infrastructure, groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards at § **22-535.4o, p, q** and **r** and shall identify the location of the stormwater management measure(s) in NAD 1983 State Plane New Jersey FIPS 2900 US feet or latitude and longitude in decimal degrees. The deed notice shall also reference the maintenance plan required to be recorded upon the deed pursuant to § 22-535.10b5. Prior to the commencement of construction, proof that the above required deed notice has been filed shall be submitted to the municipality. Proof that the required information has been recorded on the deed shall be in the form of either a copy of the complete recorded document or a receipt from the Clerk or other proof of recordation provided by the recording office. However, if the initial proof provided to the municipality is not a copy of the complete recorded document, a copy of the complete recorded document shall be provided to the municipality within 180 calendar days of the authorization granted by the municipality.
- n. A stormwater management measure approved under the municipal stormwater management plan or ordinance may be altered or replaced with the approval of the municipality, if the municipality determines that the proposed alteration or replacement meets the design and performance standards pursuant to § **22-535.4** and provides the same level of stormwater management as the previously approved stormwater management measure that is being altered or replaced. If an alteration or replacement is approved, a revised deed notice shall be submitted to the municipality for approval and subsequently recorded with the Office of the County Clerk and shall contain a description and location of the stormwater management measure, as well as reference to the maintenance plan, in accordance with paragraph m above. Prior to the commencement of construction, proof that the above required deed notice has been filed shall be submitted to the municipality in accordance with paragraph m above.
- o. Green Infrastructure Standards.
 - 1. This subsection specifies the types of green infrastructure BMPs that may be used to satisfy the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards.
 - 2. To satisfy the groundwater recharge and stormwater runoff quality standards at § **22-535.4p** and **q**, the design engineer shall utilize green infrastructure BMPs identified in Table 1 at § **22-535.4f** and/or an alternative stormwater management measure approved in accordance with § **22-535.4g**. The following green infrastructure BMPs are subject to the following maximum contributory drainage area limitations:

Best Management Practice	Maximum Contributory Drainage Area
Dry well	1 acre
Manufactured treatment device	2.5 acres
Pervious pavement systems	Area of additional inflow cannot exceed three times the area occupied by the BMP
Small-scale bioretention systems	2.5 acres
Small-scale infiltration basin	2.5 acres
Small-scale sand filter	2.5 acres

3. To satisfy the stormwater runoff quantity standards at § **22-535.4r**, the design engineer shall utilize BMPs from Table 1 or from Table 2 and/or an alternative stormwater management measure approved in accordance with § **22-535.4g**.
 4. If a variance in accordance with N.J.A.C. 7:8-4.6 or a waiver from strict compliance in accordance with § **22-535.4d** is granted from the requirements of this subsection, then BMPs from Table 1, 2, or 3, and/or an alternative stormwater management measure approved in accordance with § **22-535.4g** may be used to meet the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards at § **22-535.4p, q** and **r**.
 5. For separate or combined storm sewer improvement projects, such as sewer separation, undertaken by a government agency or public utility (for example, a sewerage company), the requirements of this subsection shall only apply to areas owned in fee simple by the government agency or utility, and areas within a right-of-way or easement held or controlled by the government agency or utility; the entity shall not be required to obtain additional property or property rights to fully satisfy the requirements of this subsection. Regardless of the amount of area of a separate or combined storm sewer improvement project subject to the green infrastructure requirements of this subsection, each project shall fully comply with the applicable groundwater recharge, stormwater runoff quality control, and stormwater runoff quantity standards at § **22-535.4 p, q** and **r**, unless the project is granted a waiver from strict compliance in accordance with § **22-535.4d**.
- p. Groundwater Recharge Standards.
1. This subsection contains the minimum design and performance standards for groundwater recharge as follows.
 2. The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at § **22-535.5**, either:
 - (a) Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100% of the average annual pre-construction 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 two-year storm is infiltrated.
 3. This groundwater recharge requirement does not apply to projects within the "urban redevelopment area," or to projects subject to paragraph 4 below.
 4. 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 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.

q. Stormwater Runoff Quality Standards.

1. This subsection contains the minimum design and performance standards to control stormwater runoff quality impacts of major development. Stormwater runoff quality standards are applicable when the major development results in an increase of 1/4 acre or more of regulated motor vehicle surface.
2. Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality design storm as follows:
 - (a) Eighty percent TSS removal of the anticipated load, expressed as an annual average shall be achieved for the stormwater runoff from the net increase of motor vehicle surface.
 - (b) If the surface is considered regulated motor vehicle surface because the water quality treatment for an area of motor vehicle surface that is currently receiving water quality treatment either by vegetation or soil, by an existing stormwater management measure, or by treatment at a wastewater treatment plant is to be modified or removed, the project shall maintain or increase the existing TSS removal of the anticipated load expressed as an annual average.
3. 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 Pollutant Discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A, or in a discharge specifically exempt under a NJPDES permit from this requirement. Every major development, including any that discharge into a combined sewer system, shall comply with paragraph 2 above, unless the major development is itself subject to a NJPDES permit with a numeric effluent limitation for TSS or the NJPDES permit to which the major development is subject exempts the development from a numeric effluent limitation for TSS.
4. 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 Table 4, below. The calculation of the volume of runoff may take into account the implementation of stormwater management measures.

Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
1	0.00166	41	0.1728	81	1.0906
2	0.00332	42	0.1796	82	1.0972
3	0.00498	43	0.1864	83	1.1038
4	0.00664	44	0.1932	84	1.1104
5	0.00830	45	0.2000	85	1.1170

Table 4 - Water Quality Design Storm Distribution					
Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
6	0.00996	46	0.2117	86	1.1236
7	0.01162	47	0.2233	87	1.1302
8	0.01328	48	0.2350	88	1.1368
9	0.01494	49	0.2466	89	1.1434
10	0.01660	50	0.2583	90	1.1500
11	0.01828	51	0.2783	91	1.1550
12	0.01996	52	0.2983	92	1.1600
13	0.02164	53	0.3183	93	1.1650
14	0.02332	54	0.3383	94	1.1700
15	0.02500	55	0.3583	95	1.1750
16	0.03000	56	0.4116	96	1.1800
17	0.03500	57	0.4650	97	1.1850
18	0.04000	58	0.5183	98	1.1900
19	0.04500	59	0.5717	99	1.1950
20	0.05000	60	0.6250	100	1.2000
21	0.05500	61	0.6783	101	1.2050
22	0.06000	62	0.7317	102	1.2100
23	0.06500	63	0.7850	103	1.2150
24	0.07000	64	0.8384	104	1.2200
25	0.07500	65	0.8917	105	1.2250
26	0.08000	66	0.9117	106	1.2267
27	0.08500	67	0.9317	107	1.2284
28	0.09000	68	0.9517	108	1.2300
29	0.09500	69	0.9717	109	1.2317
30	0.10000	70	0.9917	110	1.2334
31	0.10660	71	1.0034	111	1.2351
32	0.11320	72	1.0150	112	1.2367
33	0.11980	73	1.0267	113	1.2384
34	0.12640	74	1.0383	114	1.2400
35	0.13300	75	1.0500	115	1.2417
36	0.13960	76	1.0568	116	1.2434
37	0.14620	77	1.0636	117	1.2450
38	0.15280	78	1.0704	118	1.2467
39	0.15940	79	1.0772	119	1.2483
40	0.16600	80	1.0840	120	1.2500

5. 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:

$$R = A + B - (A \times B)/100$$

Where:

- R = total TSS percent load removal from application of both BMPs.
- A = the TSS percent removal rate applicable to the first BMP.
- B = the TSS percent removal rate applicable to the second BMP.

6. Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated 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 green infrastructure BMPs that optimize nutrient removal while still achieving the performance standards in § 22-535.4 p, q and r.
 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 in stormwater runoff to waters classified as FW1.
 8. The Flood Hazard Area Control Act Rules at N.J.A.C. 7:13-4.1(c)1 establish 300-foot riparian zones along Category One waters, as designated in the Surface Water Quality Standards at N.J.A.C. 7:9B, and certain upstream tributaries to Category One waters. A person shall not undertake a major development that is located within or discharges into a 300-foot riparian zone without prior authorization from the Department under N.J.A.C. 7:13.
 9. Pursuant to the Flood Hazard Area Control Act Rules at N.J.A.C. 7:13-11.2(j)3.i, runoff from the water quality design storm that is discharged within a 300-foot riparian zone shall be treated in accordance with this subsection to reduce the post-construction load of total suspended solids by 95% of the anticipated load from the developed site, expressed as an annual average.
 10. This stormwater runoff quality standards do not apply to the construction of one individual single-family dwelling, provided that it is not part of a larger development or subdivision that has received preliminary or final site plan approval prior to December 3, 2018, and that the motor vehicle surfaces are made of permeable material(s) such as gravel, dirt, and/or shells.
- r. Stormwater Runoff Quantity Standards.
1. This subsection contains the minimum design and performance standards to control stormwater runoff quantity impacts of major development.
 2. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at § 22-535.5, complete one of the following:
 - (a) Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the two-, ten- and one-hundred-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;
 - (b) 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 two-, ten- and one-hundred-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;
 - (c) Design stormwater management measures so that the post-construction peak runoff rates for the two-, ten- and one-hundred-year storm events are 50%, 75% and 80%, 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; or

- (d) In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with paragraphs 2(a), 2(b) and 2(c) above is required unless the design engineer demonstrates through hydrologic and hydraulic analysis that the increased volume, change in timing, or increased rate of the stormwater runoff, or any combination of the three will not result in additional flood damage below the point of discharge of the major development. No analysis is required if the stormwater is discharged directly into any ocean, bay, inlet, or the reach of any watercourse between its confluence with an ocean, bay, or inlet and downstream of the first water control structure.
3. The stormwater runoff quantity standards shall be applied at the site's boundary to each abutting lot, roadway, watercourse, or receiving storm sewer system.

§ 22-535.5. Calculation of Stormwater Runoff and Groundwater Recharge.

[Added 6-7-2021 by Ord. No. 2021-05]

- 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 Chapters 7, 9, 10, 15 and 16 Part 630, Hydrology National Engineering Handbook, incorporated herein by reference as amended and supplemented. This methodology is additionally described in Technical Release 55 - Urban Hydrology for Small Watersheds (TR-55), dated June 1986, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the Natural Resources Conservation Service website at: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb10441_71.pdf or at United States Department of Agriculture Natural Resources Conservation Service, 220 Davison Avenue, Somerset, New Jersey 08873; or
 - (b) The Rational Method for peak flow and the Modified Rational Method for hydrograph computations. The rational and modified rational methods are described in "Appendix A-9 Modified Rational Method" in the Standards for Soil Erosion and Sediment Control in New Jersey, January 2014. This document is available from the State Soil Conservation Committee or any of the Soil Conservation Districts listed at N.J.A.C. 2:90-1.3(a)3. The location, address, and telephone number for each Soil Conservation District is available from the State Soil Conservation Committee, PO Box 330, Trenton, New Jersey 08625. The document is also available at: <http://www.nj.gov/agriculture/divisions/anr/pdf/2014NJSoilErosionControlStandardsComplete.pdf>.
 2. For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the pre-construction 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 above at § 22-535.5a1(a) and the Rational and Modified Rational Methods at § 22-535a1(b). 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 application. 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 hydrologic 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 all design storms, 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 or other methods 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: The New Jersey Geological Survey Report GSR-32, A Method for Evaluating Groundwater-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 the New Jersey Geological Survey website at: <https://www.nj.gov/dep/njgs/pricelst/gsreport/gsr32.pdf> or at New Jersey Geological and Water Survey, 29 Arctic Parkway, PO Box 420 Mail Code 29-01, Trenton, New Jersey 08625-0420.

§ 22-535.6. Sources for Technical Guidance.

[Added 6-7-2021 by Ord. No. 2021-05]

- a. Technical guidance for stormwater management measures can be found in the documents listed below, which are available to download from the Department's website at: http://www.nj.gov/dep/stormwater/bmp_manual2.htm.
 1. Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended and supplemented. Information is provided on stormwater management measures such as, but not limited to, those listed in Tables 1, 2, and 3.
 2. Additional maintenance guidance is available on the Department's website at: https://www.njstormwater.org/maintenance_guidance.htm.
- b. Submissions required for review by the Department should be mailed to: The Division of Water Quality, New Jersey Department of Environmental Protection, Mail Code 401-02B, PO Box 420, Trenton, New Jersey 08625-0420.

§ 22-535.7. Solids and Floatable Materials Control Standards.

[Added 6-7-2021 by Ord. No. 2021-05]

- a. Site design features identified under § **22-535.4f** above, or alternative designs in accordance with § **22-535.4g** above, to prevent discharge of trash and debris from drainage systems 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 § 22-535.7a2 below.

1. Design engineers shall use one of the following grates whenever they use 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:
 - (a) 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; or
 - (b) A different grate, if each individual clear space in that grate has an area of no more than 7.0 square inches, or is no greater than 0.5 inch 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 spacer 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 system floors used to collect stormwater from the surface into a storm drain or surface water body.
 - (c) For curb-opening inlets, including curb-opening inlets in combination inlets, 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 7.0 square inches, or be no greater than 2.0 inches across the smallest dimension.
2. The standard in paragraph a1 above does not apply:
 - (a) Where each individual clear space in the curb opening in existing curb-opening inlet does not have an area of more than 9.0 square inches;
 - (b) Where the municipality agrees that the standards would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets;
 - (c) Where flows from the water quality design storm as specified in N.J.A.C. 7:8 are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:
 - (1) A rectangular space 4.625 inches long and 1.5 inches wide (this option does not apply for outfall netting facilities); or
 - (2) A bar screen having a bar spacing of 0.5 inch.

Note that these exemptions do not authorize any infringement of requirements in the Residential Site Improvement Standards for bicycle safe grates in new residential development [N.J.A.C. 5:21-4.18(b)2 and 7.4(b)1].
 - (d) Where flows are conveyed through a trash rack that has parallel bars with one-inch spacing between the bars, to the elevation of the Water Quality Design Storm as specified in N.J.A.C. 7:8; or
 - (e) 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.

§ 22-535.9. 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 section, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan at § **22-535.9c** below as part of the submission of the application for approval.
 2. The applicant shall demonstrate that the project meets the standards set forth in this section.
 3. The applicant shall submit five copies of the materials listed in the checklist for site development stormwater plans in accordance with Section C of this section.
- b. Site Development Stormwater Plan Approval. The applicant's Site Development project shall be reviewed as a part of the review process by the municipal board or official from which municipal approval is sought. That municipal board or official shall consult the municipality's review engineer to determine if all of the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this section.
- c. Submission of Site Development Stormwater Plan. 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 one inch equals 200 feet or greater, showing two-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 One waters, wetlands and floodplains 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 man-made 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 surroundings should be submitted. 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 Plans. 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 will occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high groundwater elevations. A written description of the site plan and justification for proposed changes in natural conditions shall also be provided.
 4. Land Use Planning and Source Control Plan. This plan shall provide a demonstration of how the goals and standards of § **22-535.3** through § **22-535.5** 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 disturbed, 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 predevelopment and post-development conditions for the design storms specified in § **22-535.4**.
 - (b) When the proposed stormwater management control measures depend on the hydrologic properties of soils or require certain separation from the seasonal high water table, 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 soils 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 § 22-535.10.
8. Waiver from Submission Requirements. The municipal official or board reviewing an application under this section may, in consultation with the municipality's review engineer, waive submission of any of the requirements in § 22-535.9c1 through § 22-535.9c6 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.

§ 22-535.10. Maintenance and Repair.

[Added 6-7-2021 by Ord. No. 2021-05]

- a. Applicability. Projects subject to review as in § **22-535.1c** shall comply with the requirements of § 22-535.10 paragraphs b and c.
- b. 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). The plan shall contain information on BMP location, design, ownership, maintenance tasks and frequencies, and other details as specified in Chapter **8** of the NJ BMP Manual, as well as the tasks specific to the type of BMP, as described in the applicable chapter containing design specifics.
 3. If the maintenance plan identifies a person other than the property owner (for example, a developer, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's or entity's agreement to assume this responsibility, or of the owner's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.
 4. 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. The individual property owner may be assigned incidental tasks, such as weeding of a green infrastructure BMP, provided the individual agrees to assume these tasks; however, the individual cannot be legally responsible for all of the maintenance required.

5. If the party responsible for maintenance identified under § 22-535.10b3 above is not a public agency, the maintenance plan and any future revisions based on § 22-535.10b7 below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
 6. Preventative and corrective maintenance shall be performed to maintain the functional parameters (storage volume, infiltration rates, inflow/outflow capacity, etc.), of the stormwater management measure, including, but not limited to, 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 non-vegetated linings.
 7. The party responsible for maintenance identified under § 22-535.10b3 above shall perform all of the following requirements:
 - (a) 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;
 - (b) Evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed; and
 - (c) Retain and make available, upon request by any public entity with administrative, health, environmental, or safety authority over the site, the maintenance plan and the documentation required by § 22-535.10b6 and b7 above.
 8. The requirements of § 22-535.10b3 and b4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency, subject to all applicable municipal stormwater general permit conditions, as issued by the Department.
 9. 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 or repair, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have 14 days to effect maintenance and repair of the facility in a manner that is approved by the municipal engineer or his designee. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. 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. Nonpayment of such bill may result in a lien on the property.
- c. Nothing in this subsection 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.

§ 22-535.11. Fines and Penalties.

[Added 6-7-2021 by Ord. No. 2021-05]

- a. Any violation of any provision of this section shall be punishable by a fine not to exceed \$2,000 for each offense and/or imprisonment for a term not exceeding 90 days. The following individuals shall be subject to punishment:
 1. The homeowners' associations and private lot owners responsible for the preventative maintenance of residential stormwater management facilities shall be subject to fines, but not imprisonment, for its violations of this section.
 2. The owner, general agent, contractor, or occupant of a building, premises, or part thereof where such a violation has been committed or does exist; and

3. The owner or party responsible for the maintenance of nonresidential stormwater management facilities.
 4. Any agent, contractor, architect, engineer, builder, corporation, or other person who commits, takes part or assists in the violation.
- b. Continuing Violations. Each day that a violation continues shall constitute a separate offense.
 - c. Reservation of Rights. The imposition of penalties herein shall not preclude the Borough or any other person from instituting an action to prevent an unlawful construction, reconstruction, alteration, repair, conversion, or use or to restrain, correct or abate a violation, or to prevent the illegal occupancy of a building, land or premises.
 - d. Equitable Relief. In addition to the foregoing, the Borough of Spring Lake Heights may institute and maintain actions for equitable relief.

APPENDIX B

2004 LIST OF INTEGRATED WATERS

**Water Quality Testing Sites Along the Wreck Pond Brook Included in the
New Jersey 2004 Integrated List of Waterbodies**

Sublist	Watershed Region	WMA	Station Name/Waterbody	Site ID	Parameters	Data Source
3	Atlantic Coast	12	Wreck Pond Brook at Allenwood Rd In Wall	14	pH, Total Suspended Solids	Monmouth Co HD
1	Atlantic Coast	12	Wreck Pond Brook at Allenwood Rd in Wall	14	Phosphorus, Nitrate	Monmouth Co HD
4	Atlantic Coast	12	Wreck Pond Brook at Allenwood Rd in Wall	14	Fecal Coliform	Monmouth Co HD
3	Atlantic Coast	12	Wreck Pond Brook at Allenwood Rd in Wall	MB-14	Benthic Macroinvertebrates	Monmouth Co HD
5	Atlantic Coast	12	Wreck Pond Brook at Old Mill Rd in Wall	AN0483	Benthic Macroinvertebrates	NJDEP AMNET

AMBIENT SURFACE WATER MONITORING

The Monmouth County Department of Health (MCHD) monitors 68 representative stations throughout Monmouth County. Measurements are performed in the field and at the laboratory. The MCHD laboratory analyses the samples. Standards for the samples are: Fecal Coliform:-200 fecal colonies/100ml, Ammonia- 0,05 mg/L, Phosphorus- 0.1 mg/L. Standards for water quality testing can also be found at NJDEP's Surface Water Quality Standards Webpage.

WRECK POND BROOK, WALL

Collection Date	Fecal	Ammonia	Phosphorus	Ph	TSS	Turbidity	SWQS	Salinity (ppt)	Temperature (C)
9/14/2005	580	0.05	0.12	6.86	11.6	10.4		0.2	23.4
6/8/2005	1340			6.47	10.4	9.63	FW2NT	0.1	23.6
3/14/2005	10	0.1	0.064	6.91	11.2	13.2		0.02	4.8
12/2/2004	220		0.06	6.89	8	18.2		0.1	7.3
8/19/2004	550			6.86	4.4	9.3		0.1	25.1
5/12/2004	510	0.12	0.06	6.81	11.2	12.5		0.1	23.8
3/1/2004	< 10			6.58	7.6	8.36			
9/10/2003	1160	< 0.1	0.04	6	43.6	9.27			
6/19/2003	3100								
6/11/2003	380			6.55	10.8	11.7			
3/4/2003	10	0.24	0.05	5.93	4	5.4			
12/10/2002	10			6.57	4.8	4.3			
10/8/2002	260	0.76	0.13	6.9	39	7.6			
6/11/2002	80			7	4.4	9.3			
3/12/2002	10	0.14	0.04	8.2	8				
12/4/2001	390			7.75	6				
10/9/2001	40	0.1	0.02		3				
6/12/2001	50			7.45	7				
3/13/2001	60	0.29	0.1	5.84	22				
12/12/2000	136								
10/10/2000	510	0.13	0.067						
6/13/2000	10000								
3/14/2000	20	0.11	0.03						
12/15/1999	20								
10/13/1999	70	0.16	0.09						
6/15/1999	140								
3/2/1999	20	0.13	0.11						

APPENDIX C

**MONMOUTH COUNTY HEALTH DEPARTMENT
(MCHD) WATER QUALITY TESTING RESULTS**

Monmouth County Rapid Bioassessment

The Monmouth County Health Department (MCHD) also conducts Rapid Bioassessment (RBA) to determine the health of various stream across the county. The following tables illustrate the results of RBA testing that has been completed for Wreck Pond Brook upstream of Spring Lake Heights, in Wall Township.

Biological Assessment	NJIS Score	Habitat Assessment	Habitat Score
Non-Impaired	24-30	Optimal	16-20
Moderately Impaired	9-21	Suboptimal	11-15
Severely Impaired	0-6	Marginal	6-10
		Poor	0-5

Rapid Bioassessment Sites	Sample Date	NJIS Score	Habitat Assessment Score
Wreck Pond Brook, Allenwood Rd/Martins Rd, Wall Twp @ Coastal Site Code:14	5/30/2000	21	16.8
Wreck Pond Brook, Allenwood Rd/Martins Rd, Wall Twp @ Coastal Site Code:151	6/8/2000	18	17.1

APPENDIX D

**NJDEP AMNET PROGRAM WATER QUALITY
TESTING RESULTS**

Station: AN0483
Wreck Pond Brook, Old Mill Road, Wall Twp., Monmouth
Asbury Park USGS Quadrangle
Date Sampled: 08/17/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Hydrobiidae	8	67
Elmidae	4	14
Coenagrionidae	9	6
Naididae	7	4
Sphaeriidae	8	3
Gammaridae	4	2
Chironomidae	6	2
Planariidae	4	1
Tetrastemmatidae	7	1

Statistical Analysis

Number of Taxa: 9
Total Number of Individuals: 100
% Contribution of Dominant Family: 67.00 % (Hydrobiidae)
Family Biotic Index: 7.29
Scraper/Filterer Collector Ratio: 27.00
Shredder/Total Ratio: 0.02
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 3
Biological Condition: Severely Impaired
Habitat Analysis: 138
Deficiency(s) noted: Hydrobiidae Family Overwhelmingly Dominant -
Significant Organic Pollution - Paucity of Clean Water Organisms

Observations

Streamwater: Clear...Flow: Moderate...Width/Depth (ft): 15/2
Substrate: Cobbles, Gravel/Sand, Silt...StreamBank Vegetation/Stability: Grasses,
Trees, Shrubs/Fair
Canopy: Partly Open...Other: Suburban, Old Mill Pond upstr.; Brownish color, Storm
sewers, Pump station near
Macrophytes; Water temp. 25.4C / pH 6.8SU / DO 7.0mg/L / Cond. 155umhos
