

# **Municipal Stormwater Management Plan**

*for the*

**Borough of Moonachie  
Bergen County, New Jersey**



*Prepared by:*

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Revised February 2007**

A handwritten signature in black ink that reads "Stephen T. Boswell".

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NJ License No. 34680**

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## **Attachment A: Stormwater Control Ordinance**

## ***I. INTRODUCTION***

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This Municipal Stormwater Management Plan (hereinafter the MSWMP or the Plan) documents the strategy for the Borough of Moonachie (the Borough) to address stormwater-related impacts. The creation of this Plan is required by N.J.A.C. 7:14A-25 Municipal Stormwater Regulations.

This Plan contains the required elements described in N.J.A.C. 7:8 Stormwater Management Rules. The Plan addresses groundwater recharge, stormwater quantity and stormwater quality impacts by incorporating stormwater design and performance standards for new major developments, defined as projects that disturb one or more acres of land. These standards are intended to minimize the adverse impact of stormwater runoff on water quality, water quantity and the loss of groundwater recharge that provides baseflow in receiving water bodies.

A build-out analysis is not required in this Plan based upon existing zoning and land available for development. The Plan also addresses the review and update of existing ordinances, the Borough Master Plan and other planning documents to allow for project designs that include low-impact development techniques. The Borough Master Plan was last reviewed in 2004. The final component of this Plan is a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the Plan, specific stormwater management measures are identified to lessen the impact of existing development.

## ***II. GOALS***

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The goals of this MSWMP as well as a brief description of the Borough's strategies to implement the goals are as follows:

- ***Reduce flood damage, including damage to life and property.***

The Borough is currently incorporating several non-structural stormwater strategies into their Zoning and Site Plan ordinances. The purpose of some of these non-structural strategies is to reduce flooding and therefore reduce damage to life and property.

- ***Minimize, to the extent practical, any increase in stormwater runoff from any new development.***

Current Residential Site Improvement Standards (RSIS) require a reduction in runoff during all rain events for residential developments. Commercial developments will be required to follow all regulations in N.J.A.C. 7:8 and 7:15 to minimize any increase in stormwater runoff.

- ***Reduce soil erosion from any development or construction project.***

Currently, all development projects are required to obtain approval from the Bergen County Soil Conservation District if their area of disturbance is above 5,000 square feet. The BCSCD will only approve the application if the proper soil erosion measures have been proposed.

- ***Assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures.***

The Borough is working to eliminate pollution and minimize soil erosion by adopting various ordinances. Also, as part of their Stormwater Pollution Prevention Plan (SP3), the Borough

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is required to retro-fit all existing inlets with new NJDEP approved curb pieces. This will also help limit litter in the Borough's stormwater systems and prevent any blockages.

- ***Maintain groundwater recharge.***

The Borough currently enforces existing ordinances limiting the amount of development that can occur on any particular site. This can maintain or increase the groundwater recharge by simply limiting the amount of maximum impervious coverage allowed. The Borough is also working to reinforce its current ordinance with new non-structural stormwater strategies such as driveway swales or porous pavement which will allow for increased groundwater recharge.

- ***Prevent, to the greatest extent feasible, an increase in non-point pollution.***

The Borough has recently adopted several ordinances with applicable fines to help prevent non-point source pollution. These ordinances include litter, wildlife feeding, pet waste, and yard waste management.

- ***Maintain the integrity of stream channels for their biological functions, as well as for drainage.***

As stated above, the Borough has adopted wildlife feeding and pet waste ordinances. These ordinances will decrease the amount of biological pollutants allowed to reach the Borough's waterways and assist in reducing or preventing TMDL's.

- ***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***

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*values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water.*

As part of the SP3, the Borough began a public education program. The Borough is required to inform its residents concerning the consequences of pollution and instruct them in its prevention.

- ***Protect public safety through the proper design and operation of stormwater basins.***

The Borough will require that future development must meet the Safety Standards for Stormwater Management Basins as outlined in N.J.A.C. 7:8-6.

To achieve these goals, this Plan outlines specific stormwater design and performance standards for new development. Preventative and corrective maintenance strategies are included in the plan to ensure long-term effectiveness of stormwater management facilities. The plan also outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

### ***III. STORMWATER DISCUSSION***

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Land development can dramatically alter the hydrologic cycle (Image 1) of a site and ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration.

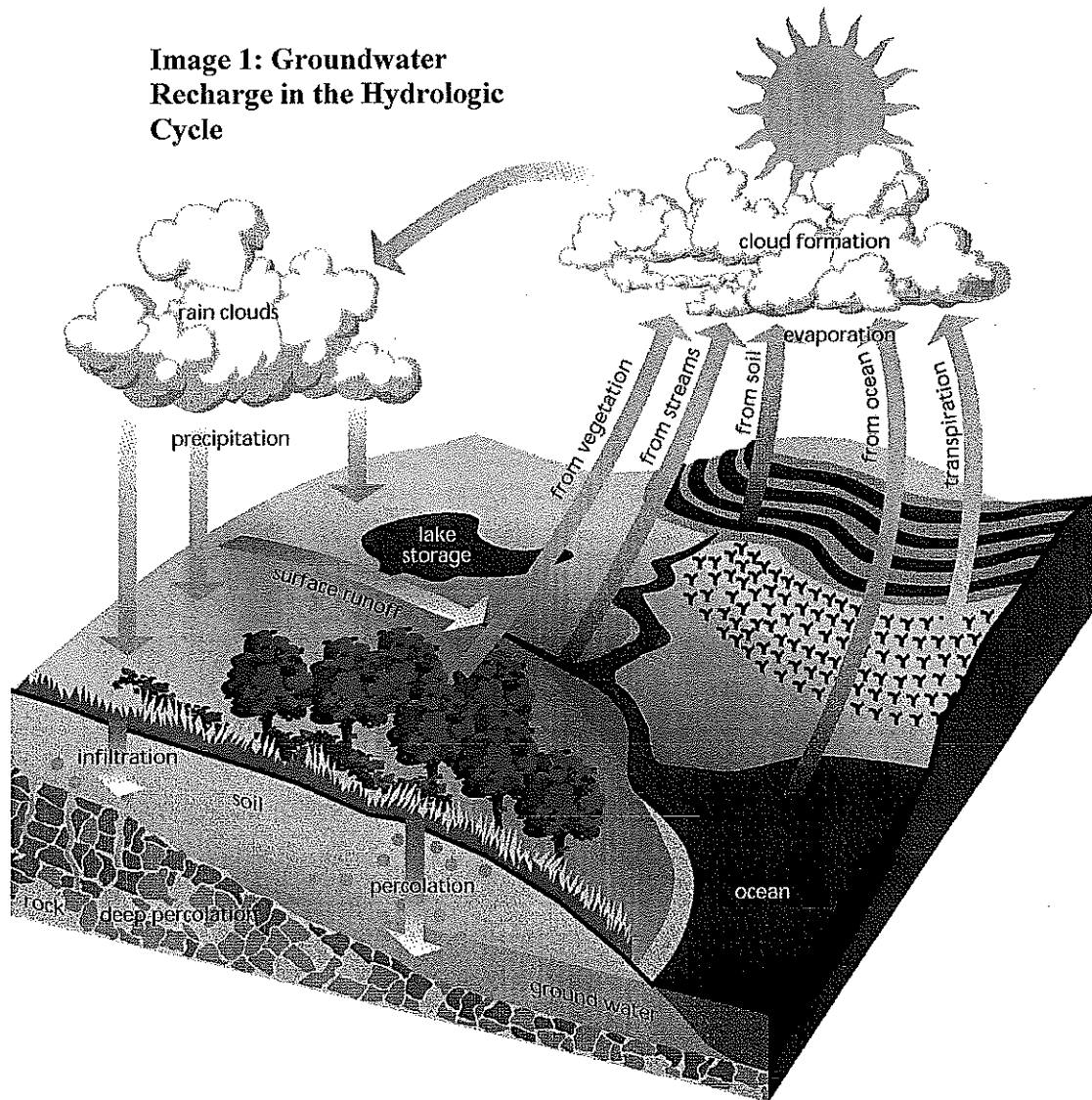
Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site.

Impervious areas that are connected to each other through gutters, channels and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel.

Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also

negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

**Image 1: Groundwater  
Recharge in the Hydrologic  
Cycle**





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In addition to increases in runoff peaks, volumes and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate a variety of pollutants from the atmosphere, fertilizers, animal wastes, and leakage and wear from vehicles. Pollutants can include metals, suspended solids, hydrocarbons, pathogens, and nutrients. In addition to increased pollutant loading, land development can adversely affect water quality and stream biota in more subtle ways. For example, stormwater falling on impervious surfaces or stored in detention or retention basins can become heated and raise the temperature of the downstream waterway, adversely affecting cold water fish species such as trout. Development can remove trees along stream banks that normally provide shading, stabilization, and leaf litter that falls into streams and becomes food for the aquatic community.

#### ***IV. BACKGROUND***

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Moonachie encompasses 1.62-square miles in southern Bergen County, New Jersey. The Borough is largely built-out with only 60.9-acres of remaining developable open space, equating to approximately 5.9% of Moonachie's total area. **Figure 1** illustrates Moonachie's waterways while **Figure 2** depicts the Borough boundary on the United States Geological Survey (USGS) Quadrangle Maps. Since there are no potable public supply wells in the Borough, a wellhead protection map is not provided.

The Borough depends entirely on sanitary sewers. The Borough's sanitary sewer systems are separated from their stormwater systems. Additionally, United Water supplies 100% of the Borough's potable water.

The Borough's population increased from 2,706 residents in 1980 to 2,817 in 1990. The population then decreased to 2,754 residents in 2000. In 1985, there were 1,022 dwelling units in the Borough. This number rose to 1,117 in 1990. The number then decreased to 1,074 in 2000. The population and dwelling unit data do not indicate a great increase in development. However, the Borough is primarily located in an industrial area. There has been a general increase in industrial development over the same period of time.

Since Moonachie is an older primarily developed community, increased stormwater runoff volumes and pollutant loadings have likely impacted the Borough's waterways. Dwelling units constructed since the 1980s implement some of the new performance standards and best management practices (BMP) to alleviate increased stormwater runoff and pollutant loadings. However, past development has likely not addressed groundwater recharge. It is also important to note that approximately one-half of the Borough is occupied by Teterboro Airport.

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The majority of the Borough lies within the New Jersey Meadowlands Planning Area (PA-9). This planning area is designated to the preservation of the Meadowlands Area. Additionally, there is a portion of the Borough that is considered PA-1 (Metropolitan). This planning area is designated to areas that are considered Urban Redevelopment Area and are not subject to groundwater recharge requirements. **Figure 3** indicates the planning areas in the Borough of Moonachie.

Moonachie lay in Watershed Management Area 5 (WMA-5) Hackensack, Pascack. The WMA-5 is divided into smaller sub-watersheds and assigned 14-digit hydrologic Unit Codes (HUC-14). Moonachie's three (3) different HUC-14s are shown in **Figure 4**.

The NJDEP is designating an increasing number of streams in the State as Category-1 (C1) waterways, especially those that provide drinking water and important habitat for threatened and endangered species as well as popular recreation fish such as trout. Streams can be designated as C1 based on their ecological significance, recreational or aesthetic significance, water supply significance, fisheries resources, shellfisheries or their location within publicly preserved open space. The C1 designation prevents further degradation in existing water quality. Moreover a 300' buffer is established around the C1 waterways and is referred to as a Special Water Resource Protection Area (SWRPA). The Borough contains no C1 designated waterways.

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Moonachie's major watercourses are as follows:

- Berry's Creek (FW2-NT/SE2) – [HUC-14 – 02030103180060]

The Berry's Creek generally flows from north to south through the western portion of the Borough. The State assigns the creek a Surface Water Quality Standard (SWQS) of FW2-NT designation indicating a general surface water classification (FW2), saline estuary (SE2) that does not support trout production or maintenance (NT). This waterway is tidally influenced.

- West Riser Ditch (FW2-NT/SE2) – [HUC-14 – 02030103180060]

The West Riser Ditch flows north to south through central Moonachie. The ditch is also designated as FW2-NT/SE2. This waterway is tidally influenced.

- East Riser Ditch (FW2-NT/SE2) – [HUC-14 – 02030103180060]

The East Riser Ditch flows north to south through Teterboro Airport. The ditch is also designated as FW2-NT/SE2. This waterway is tidally influenced.

- Losen Slote (FW2-NT/SE2) – [HUC-14 – 02030103180050]

The Losen Slote, a tributary to the Hackensack River, flows north to south along the Borough's eastern border. The watercourse also has a FW2-NT/SE2 designation. The Losen Slote is tidally influenced.

A Map depicting the Borough's major waterways is included as **Figure 1**.

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The NJDEP has established an Ambient Biomonitoring Network (AMNET) to document the health of the State's waterways at over 800 sites throughout New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a 5-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macroinvertebrate community dynamics.

The NJDEP and other regulatory agencies collect water quality chemical data on streams throughout the State. The State is required to develop a Total Maximum Daily Load (TMDL) for waterways, or portions thereof, that are found impaired by pollutants. A 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 assigned to the various sources of the pollutant, such as stormwater and wastewater discharges, which require an NJPDES permit to discharge, and nonpoint source, which includes 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, re-forestation of stream corridors, retrofitting stormwater systems and other BMPs.

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. This combined report presents the extent to which New Jersey waters are attaining water quality standards and identifies waters that are

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impaired. Sublist 5 of the Integrated List identifies waters impaired or threatened by pollutants, for which one (1) or more TMDLs are needed. The Borough's waterways have no established TMDLs. However, Berry's Creek has been subject to past industrial discharges and is known to have contaminants in its sediment. These contaminants are named on Sublist 5 of the Integrated List and given a priority ranking. For the Berry's Creek, Arsenic, Copper, Dioxin, Lead, Mercury, and PCBs receive a Medium priority ranking, and Turbidity receives a Low priority ranking.

At locations throughout the Borough water quantity problems include flooding and stream bank erosion. Since the Borough is topographically flat, lies at a low elevation and has a very high water table, flooding occurs frequently. Tide Gates located on Berry's Creek at Grant Street and Purcell Court are not functioning properly. Bergen County is responsible for their maintenance and is investigating options for repairing the tide gates. The East Riser Ditch, located south of the intersection of Commercial Avenue and Caesar Place, overflows its banks and floods the area during heavy storms. Additionally, the entire southern portion of the Borough floods regularly during heavy rainfalls. Lastly, several trailer parks located in the southern portion of the Borough have undersized drainage systems that are also in a state of disrepair.

## ***V. DESIGN AND PERFORMANCE STANDARDS***

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The Borough has reviewed its existing ordinances and adopted the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include language for maintenance of stormwater management measures consistent with the Stormwater Management Rules at N.J.A.C. 7:8-5.8 Maintenance Requirements, and the safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins. The ordinances have been submitted to Bergen County for review and have received approval.

In addition to the adoption of the above performance standards during construction projects, Borough inspectors will observe projects to ensure that the stormwater management measures are constructed and function as designed. The Borough will also assume responsibility for the operation and maintenance of the stormwater management facilities.

## ***VI. PLAN CONSISTENCY***

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The Borough is not within a Regional Stormwater Management Planning Area and no TMDLs have been established for waters within the Borough, therefore this Plan does not need to be consistent with any regional stormwater management plans (RSWMP) nor any TMDLs. If any RSWMPs or TMDLs are developed in the future, this MSWMP will be updated as necessary to be consistent. Bergen County is currently creating a County Stormwater Management Plan that should be complete in 2005. This MSWMP will be updated as necessary to be consistent with the County Stormwater Management Plan.

The MSWMP is consistent with the Residential Site Improvement Standards (RSIS) detailed in N.J.A.C. 5:21. The Borough will utilize the most current RSIS during the stormwater management review of residential development. This MSWMP will be updated to be consistent with any future changes to the RSIS.

A significant portion of the Borough's area lies within the New Jersey Meadowlands region. Any new development and redevelopment plans will be coordinated with the New Jersey Meadowlands Commission (NJMC).

The Borough's existing ordinances also require new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. Any project with over 5,000 square feet of disturbance will require approval from Bergen County Soil Conservation District. Additionally, if a project disturbs over 1-acre, a Request for Authorization (RFA) must be submitted to the NJDEP Bureau of Non-Point Pollution Control. Construction shall not begin until all required approvals are received. During construction, Borough inspectors will observe



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on-site soil erosion and sediment control measures and report any inconsistencies to the local Soil Conservation District.

As mentioned previously, a TMDL is required for the Berry's Creek, as it appears on Sublist 5 of the Integrated List. TMDL parameters for the Berry's Creek include Mercury, Arsenic, Lead, Copper, PCB's, and Turbidity. Several long-term strategies including implementation of a Canada Geese management plan, implementation of better stormwater management BMP's (including increasing the frequency of street sweeping operations), and adoption of Pet Waste management ordinances may assist the Borough in decreasing the levels of contaminants in these waterways.

## ***VII. NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES***

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The Borough has adopted Ordinance #2006-1 – Stormwater Control Ordinance. In this ordinance, there are requirements for nonstructural stormwater managements strategies outlined in Section 6:B. The ordinance was adopted on March 23, 2006, and submitted to the County Planning Board on May 3, 2006. The County has reviewed and approved this ordinance.

## ***VIII. LAND USE/BUILD-OUT ANALYSIS***

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As previously mentioned, a detailed land use analysis is not required since Moonachie does not contain more than 640-acres of developable land. In support of the aforementioned we have included **Figure 6** illustrating the existing land use in the Borough based on NJDEP's 1995/97 GIS information. Moreover, **Figure 4** illustrates the HUC-14s within the Borough; **Figure 5** presents Moonachie's groundwater recharge areas; **Figure 7** presents the Borough's zoning;; **Figure 8** illustrates the Borough's constrained lands; and **Figure 9** depicts floodplains located within the Borough. By overlaying the figures referenced above Boswell McClave determined that a build-out analysis is not required.

## ***IX. MITIGATION PLANS***

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This mitigation plan is provided for a proposed development that is granted a variance or exemption from the stormwater management design and performance standards. Presented is a hierarchy of mitigation options.

### **Mitigation Project Criteria**

- A. The mitigation project must be implemented in the same drainage area (HUC-14) as the proposed development. The project must provide additional groundwater recharge benefits or protection from stormwater runoff quality and quantity from previously developed property that does not currently meet the design and performance standards outlined in the MSWMP. The developer must ensure the long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater BMP Manual.

The applicant can select one (1) of the following projects listed to compensate for the deficit from the performance standards resulting from the proposed project. More detailed information or a list of additional projects can be obtained from the Borough Engineer. Listed below are general projects that can be used to address the mitigation requirement.

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**1. Water Quality**

- a) Retrofit an existing stormwater management facility on a Borough-owned property to provide the removal of 80 percent of total suspended solids (TSS) from the parking lot runoff.
- b) Retrofit the existing parking area on a Borough-owned property to provide the removal of 80 percent of TSS.

**2. Water Quantity**

- a) Install stormwater management measures in an open space to reduce the peak flow from an upstream development on the receiving stream by 20 cubic feet per second (cfs), 35 cfs, and 100 cfs for the 2, 10, and 100-year storms respectively.

**3. Groundwater Recharge**

- a) Retrofit an existing Borough-owned property to provide an additional 300,000 cubic feet of average annual groundwater recharge.
- b) Replace an existing deteriorated impervious parking lot on a Borough-owned property.

- B. If a suitable site cannot be located in the same drainage area as the proposed development, as discussed in Option A, the mitigation project may provide mitigation that is not equivalent to the impacts for which the variance or exemption is sought, but that addresses the same issue. For example, if a variance is given because the 80 percent TSS requirement is not met, the selected project may address water quality impacts due to a fecal impairment. Listed below are specific projects that can be used to address the mitigation option.

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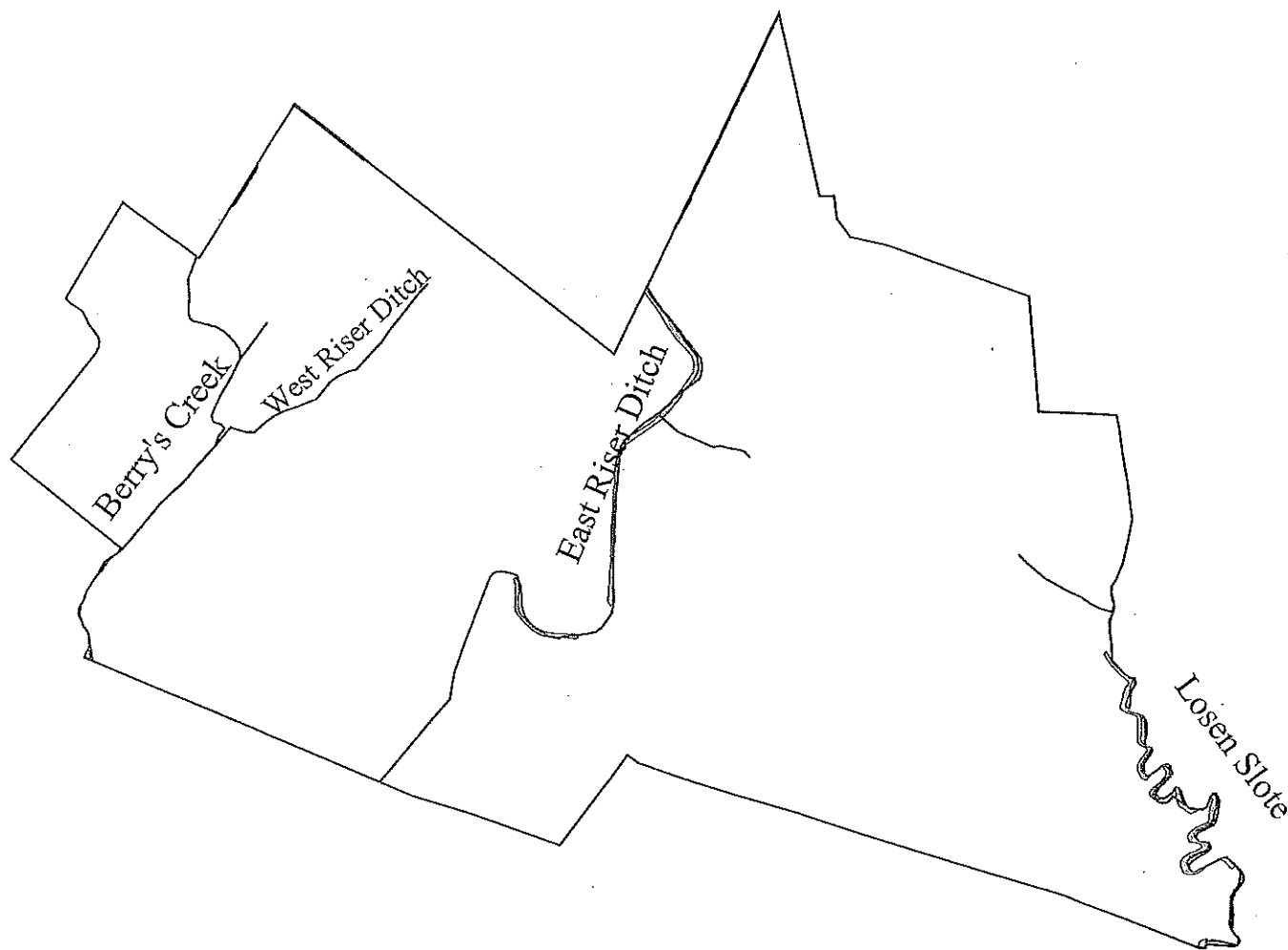
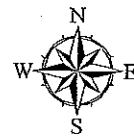
**1. Water Quality**

- a) Re-establish a vegetative buffer (minimum 50 foot wide) along 1,500 linear feet of the shoreline at one of the Borough's lakes or ponds as a goose control measure and to filter stormwater runoff from the high goose traffic areas.
- b) Provide goose management measures, including public education at the Borough's parks.

The municipality may allow a developer to provide funding or partial funding to the municipality for a project that has been identified by the Borough Engineer or towards the development of a RSMP. The funding must be equal to or greater than the cost to implement the mitigation outlined above, including costs associated with purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure.

## ***FIGURES***

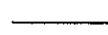
# Figure 1: Borough of Moonachie Waterways



## Legend



Lakes



Streams

\*All waterways in the Borough of Moonachie have a FW2-NT/SE2 stream classification.

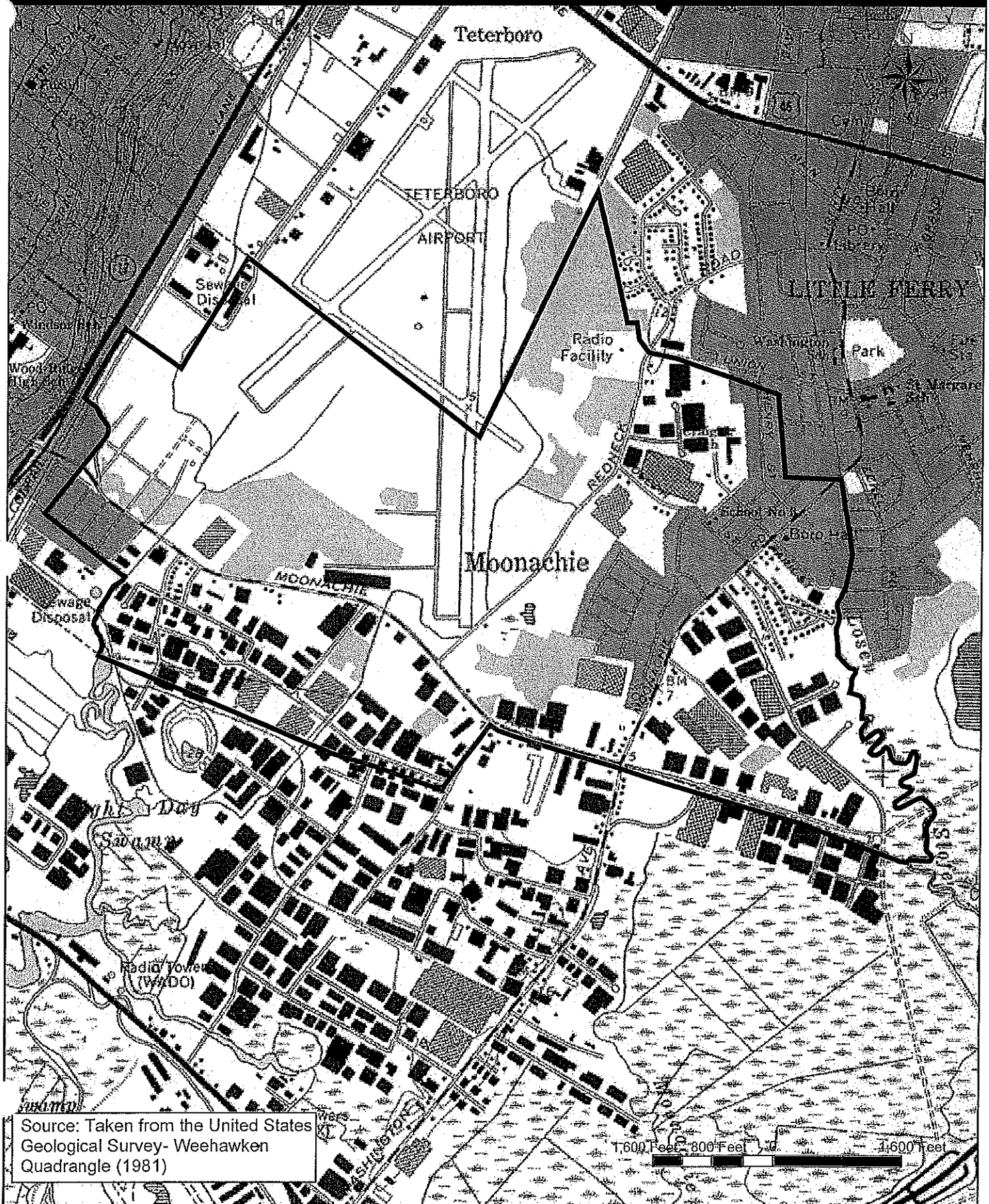
Source: Waterways layer taken from the New Jersey Department of Environmental Protection, Streams and Lakes shapefile(11/99), Surface Water Quality Standards shapefile (11/2003) & National Soil Information System (NASIS) database for Bergen County (2005).

1,600 Feet 800 Feet 0 1,600 Feet

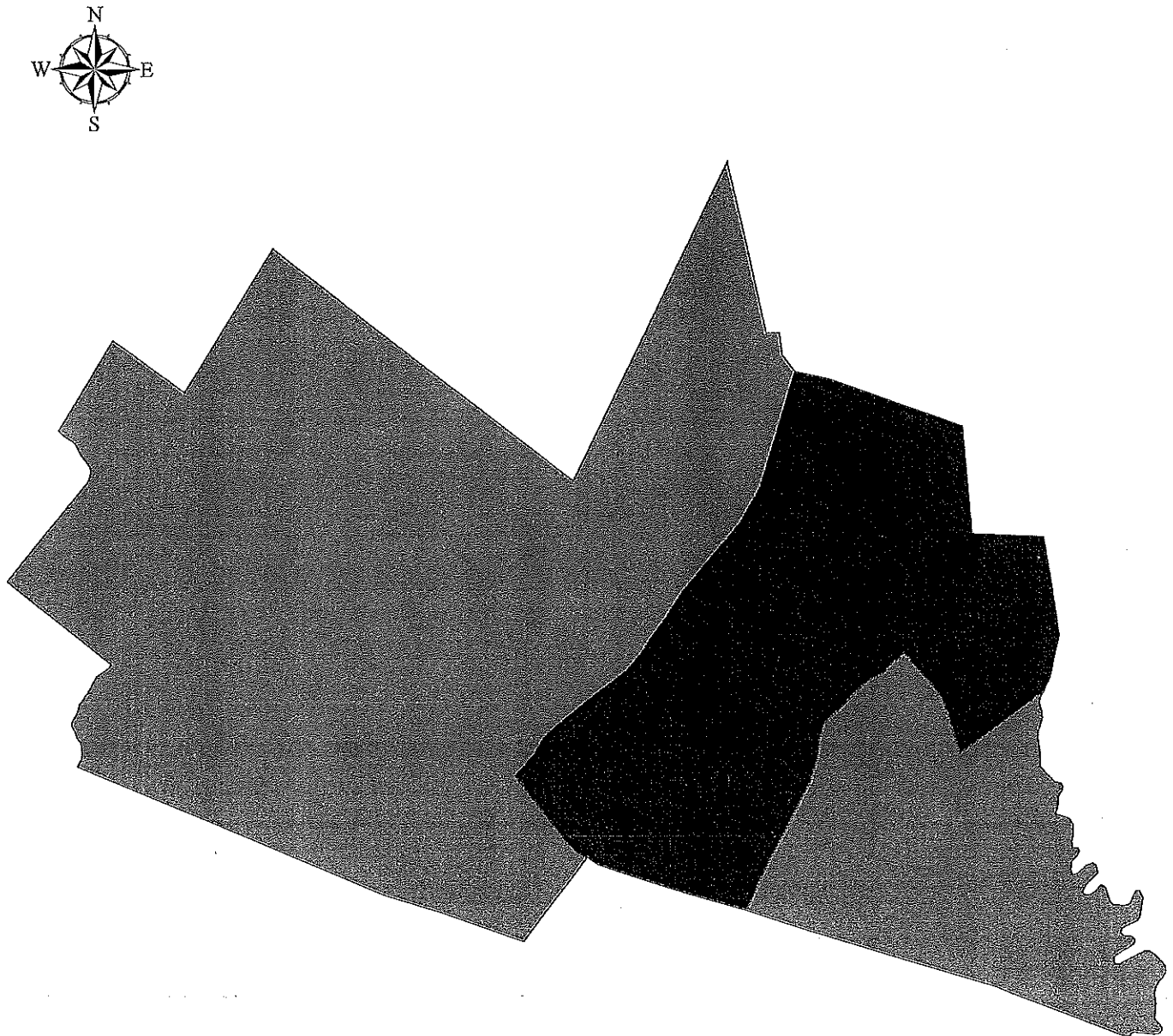




Figure 2: Borough of Moonachie Boundary on USGS Quadrangle Maps



**Figure 3: Planning Management Areas within the Borough of Moonachie**



Source: Planning Management Areas taken from the New Jersey Department of Community Affairs, Planning Management Areas layer (March 2001).

1,600 Feet 800 Feet 0 1,600 Feet

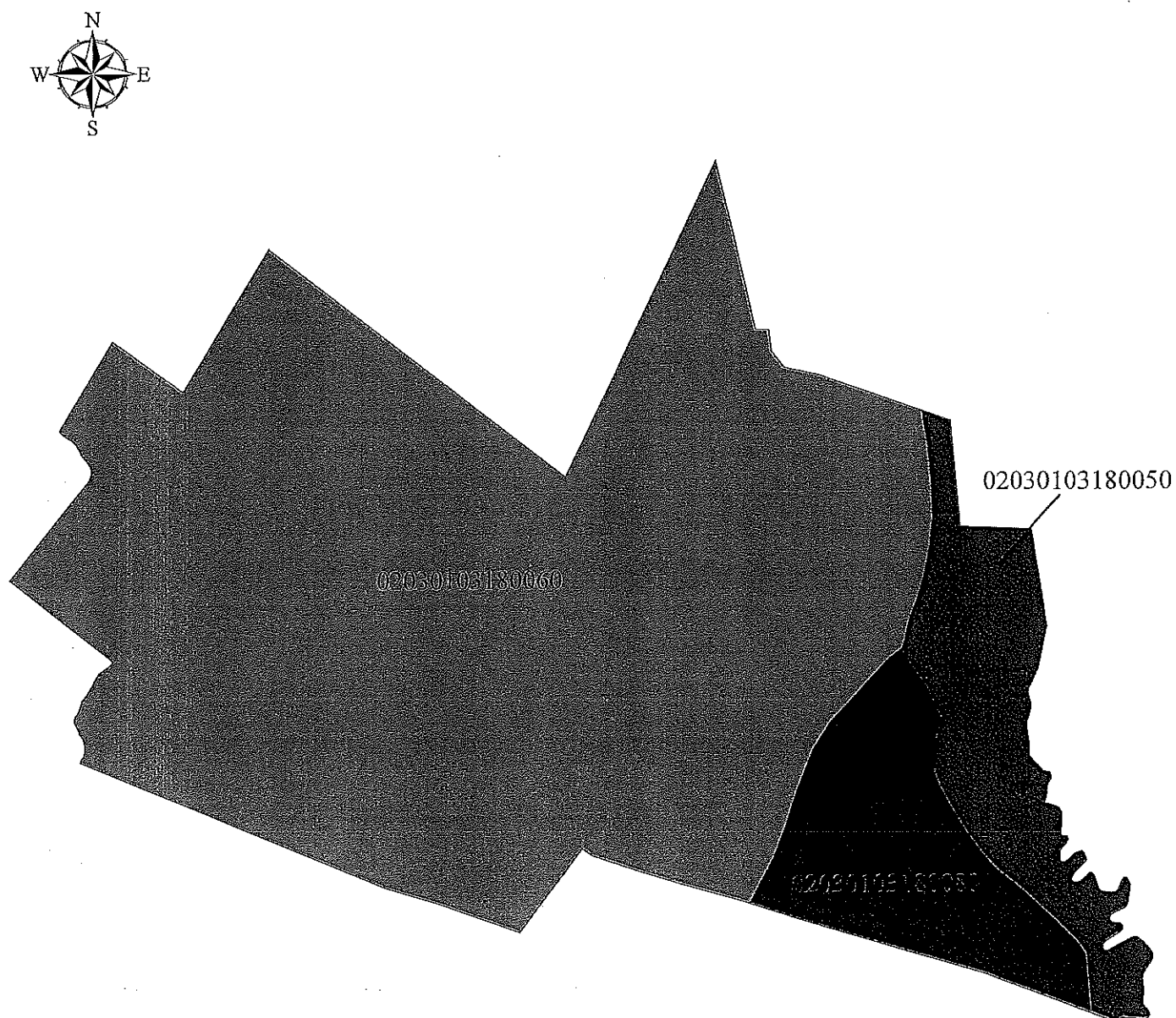
## Legend

### Planning Areas

 METROPOLITAN - (PA-1)

 NEW JERSEY MEADOWLANDS - (PA-9)

**Figure 4: Hydrologic Units (HUC-14) in the Borough of Moonachie**



Source: Watershed information taken from the New Jersey Department of Environmental Protection HUC-14 shapefile (12/2000)

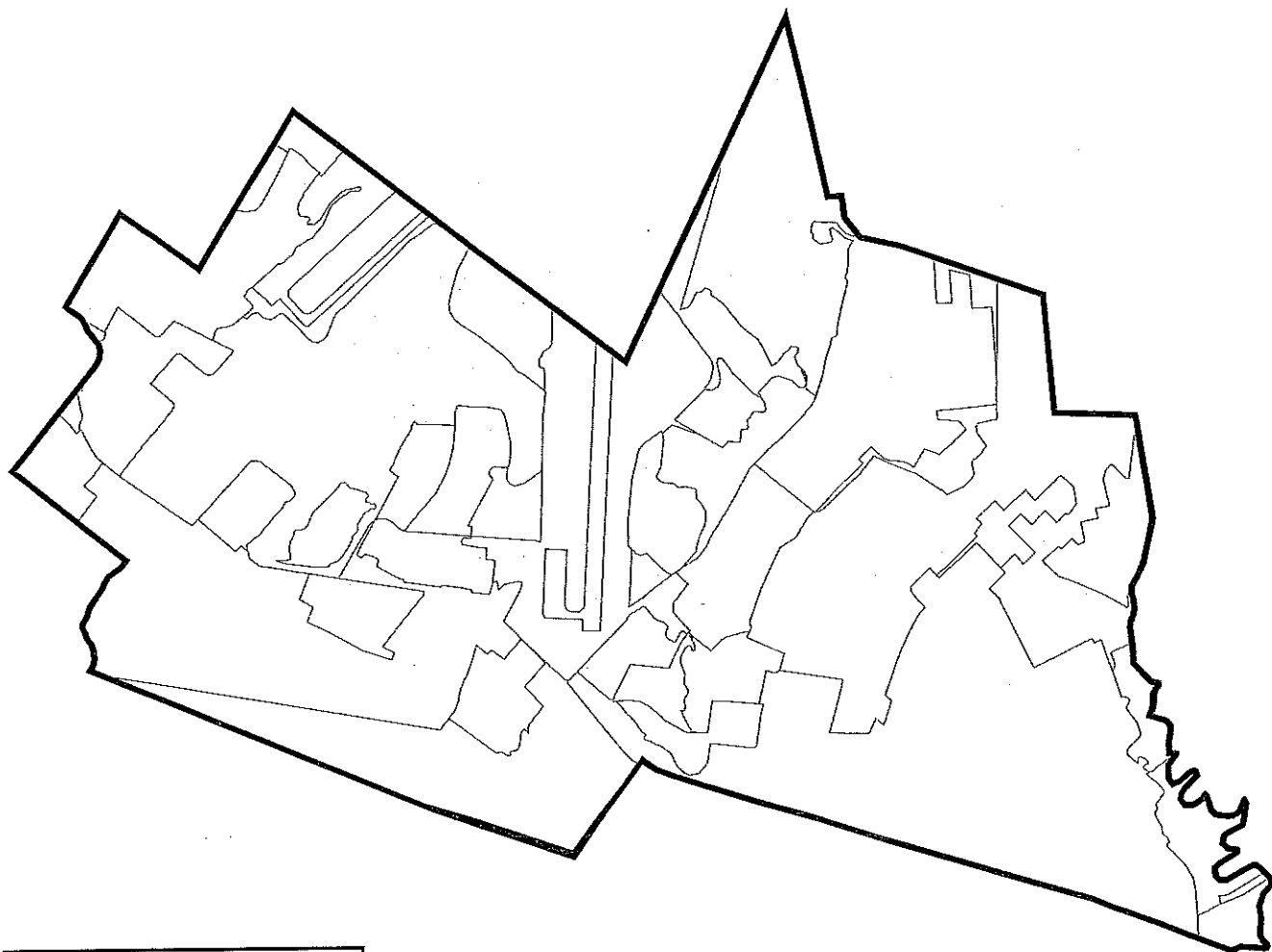
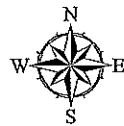
1,600 Feet 800 Feet 0 1,600 Feet

### Legend

#### HUC14 - Sub-Watershed Name

- 02030103180050 Hackensack R (Bellmans Ck to Ft Lee Rd)
- 02030103180060 Berrys Creek (above Paterson Ave)
- 02030103180050 Hackensack R (Rt 3 to Bellmans Ck)

# Figure 8: Groundwater Recharge 40-45 ft. Below Surface of Woodbridge



## Legend

**Inches/year**

0.00

0.01 - 10.37

10.38 - 10.68

Source: Taken from the New Jersey  
Geological Survey, shapefile DGSO2-3  
(Publication Date Not Available)

1,100 Feet 550 Feet 0 1,100 Feet

# Figure 6: Existing Land Use in the Borough of Moonachie



## 1995/97 Land Use/Land Cover

- ARTIFICIAL LAKES
- ATHLETIC FIELDS (SCHOOLS)
- COMMERCIAL/SERVICES
- DECIDUOUS BRUSH/SHRUBLAND
- DECIDUOUS FOREST (10-50% CROWN CLOSURE)
- DECIDUOUS FOREST (>50% CROWN CLOSURE)
- DECIDUOUS SCRUB/SHRUB WETLANDS
- DECIDUOUS WOODED WETLANDS
- DISTURBED WETLANDS (MODIFIED)
- HERBACEOUS WETLANDS

## Legend

- INDUSTRIAL
- MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE
- OLD FIELD (< 25% BRUSH COVERED)
- OTHER URBAN OR BUILT-UP LAND
- RECREATIONAL LAND
- RESIDENTIAL, HIGH DENSITY, MULTIPLE DWELLING
- RESIDENTIAL, SINGLE UNIT, MEDIUM DENSITY
- SALINE MARSHES
- STREAMS AND CANALS
- TIDAL RIVERS, INLAND BAYS, AND OTHER TIDAL WATERS
- TRANSPORTATION/COMMUNICATIONS/UTILITIES

Source: Land Use Information taken from the New Jersey Department of Environmental Protection, 1995/97 Land Use/Land Cover shapefile (2000).

1,600 Feet 800 Feet 0 1,600 Feet









Figure 7: Zoning Districts in the Borough of Moonachie



1,600 Feet 800 Feet 0 1,600 Feet

Source: Borough of Moonachie Zoning Map,  
Malcolm Kasler & Associates, October 1976.

**Legend**

-  R-1 (One-Family Residential)
-  (R-2) Two-Family Residential
-  MHP (Mobile Home Park)
-  B-1 (General Business)
-  B-2 (Limited Business)
-  M (Manufacturing)

**Figure 8: Freshwater Wetlands and Water Land Uses  
within the Borough of Moonachie (Constrained Land)**



1,600 Feet 800 Feet 0 1,600 Feet

Source: Wetlands layer taken from the New Jersey Department of Environmental Protection, wetlands shapefile (11/1999) & Waterways information taken from National Soil Information System (NASIS) for Bergen County (2005).

### Legend




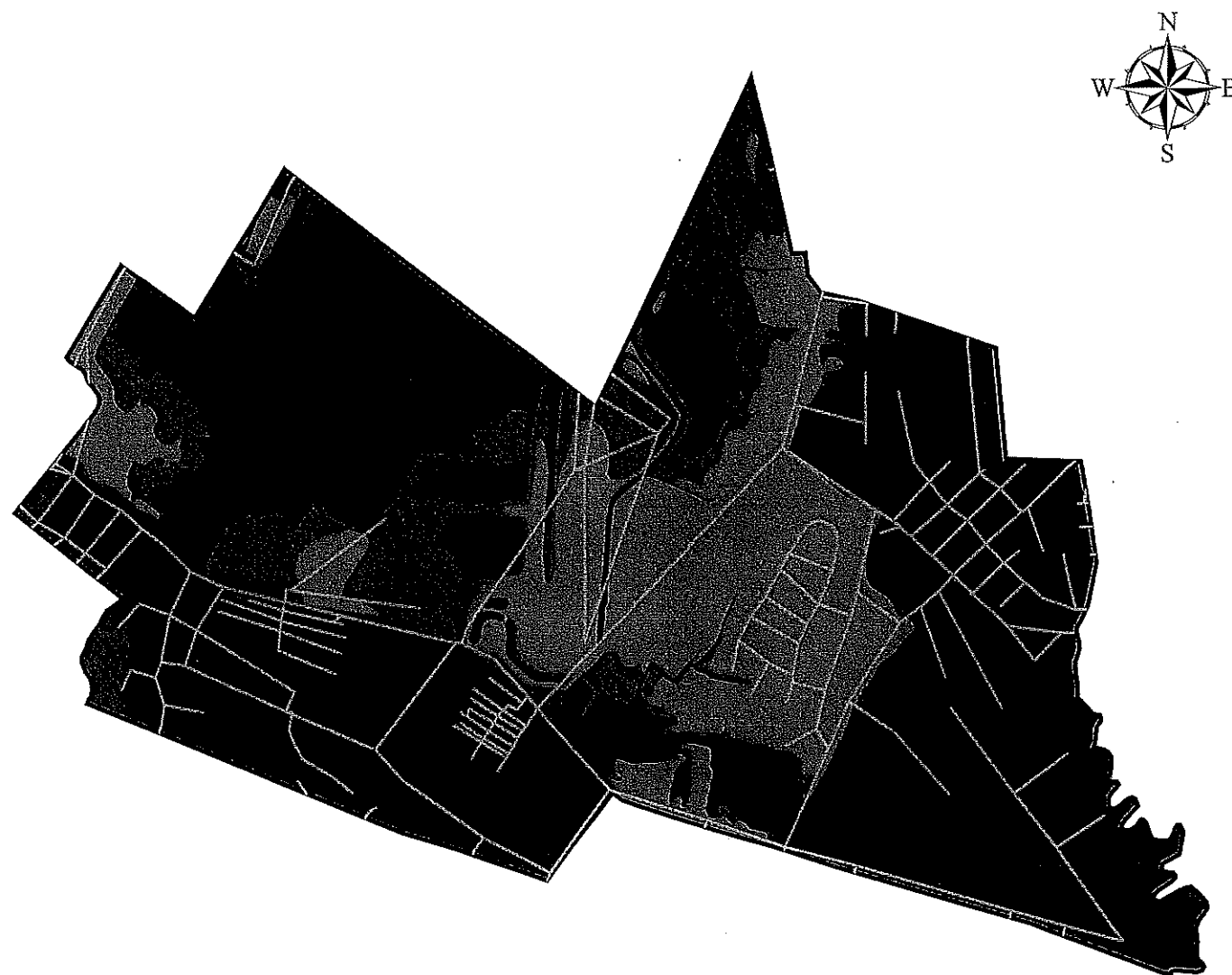
-  Wetlands
-  Streams
-  Lakes











Figure 9: Borough of Moonachie Floodplains Map




Legend

**FEMA Flood**

**ZONE**

-  100IC - 100-year discharge contained in channel/culvert
-  500IC - 500-year discharge contained in channel/culvert
-  A - 100-year flood; no base elevations determined
-  AE - 100-year flood; base elevations determined
-  AH - Flood depth of 1-3 feet (usually areas of sloping); average depth determined
-  AO - Flood depth of 1-3 feet (usually sheet flow on sloping terrain); average depth determined
-  FWIC - Floodway contained in culvert
-  X - Areas outside 500-year floodplain
-  X500 - Area of 500-year flood
-  Roads

1,600 Feet    800 Feet    0    1,600 Feet



Source: Federal Emergency Management Agency (FEMA)  
Q3 Flood Data, Bergen County, New Jersey, 1996.



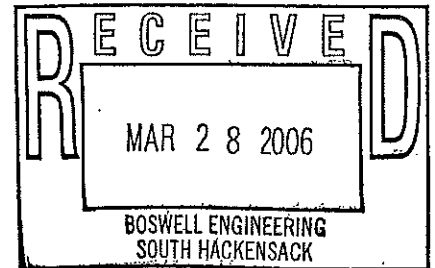
# BOROUGH OF MOONACHIE

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Telephone: (201) 641-1813

Moonachie, New Jersey 07074  
Fax: (201) 641-9542



SUPRIYA SANYAL  
Borough Clerk



March 27<sup>th</sup>, 2006

Mr. Peter Kortright, Director  
County of Bergen  
Department of Planning & Economic Development  
One Bergen County Plaza, 4<sup>th</sup> Floor  
Hackensack, NJ 07601

Dear Mr. Kortright:

Enclosed is a copy of Ordinance #2006-1, which has been passed by the Borough Council on second and final reading and was approved by the Mayor on March 23, 2006 herewith forwarded for your approval.

Yours truly,

A handwritten signature in cursive script, appearing to read "Supriya Sanyal".

Supriya Sanyal  
Borough Clerk

Cc: Richard Fox, Boswell Engineering

*Jim Fordham*

*MO-317*

BOROUGH OF MOONACHIE  
BERGEN COUNTY, NEW JERSEY

ORDINANCE #2006-1

AN ORDINANCE TO AMEND THE BOROUGH OF MOONACHIE  
CODE SPECIFICALLY IN CHAPTER 19-6 BY THE ADDITION  
THERE TO CERTAIN PROVISIONS TO THE RULES AND  
REGULATIONS ON STORMWATER CONTROL ORDINANCE  
AND NON-STRUCTURAL STORMWATER STRATEGIES IN THE  
BOROUGH OF MOONACHIE, BERGEN COUNTY, NEW JERSEY

BE IT ORDAINED BY THE BOROUGH COUNCIL OF THE BOROUGH OF  
MOONACHIE, IN THE COUNTY OF BERGEN, NEW JERSEY, AS FOLLOWS:

**Section 1: Scope and Purpose**

**A. Policy Statement**

Flood control, groundwater recharge, and pollutant reduction through nonstructural or low impact techniques shall be explored before relying on structural Best Management Practices (BMPs). Structural BMPs should be integrated with nonstructural stormwater management strategies and proper maintenance plans. Nonstructural strategies include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site or from being exposed to stormwater. Source control plans should be developed based upon physical site conditions and the origin, nature, and the anticipated 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**

It is the purpose of this ordinance to establish minimum stormwater management requirements and controls for "major development," as defined in Section 2.

**C. Applicability**

1. This ordinance shall be applicable to all site plans and subdivisions for the following major developments that require preliminary or final site plan or subdivision review:
  - a. Non-residential 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 ordinance shall also be applicable to all major developments undertaken in the Borough of Moonachie.

#### D. Compatibility with Other Permit and Ordinance Requirements

Development approvals issued for subdivisions and site plans pursuant to this ordinance are to be considered an integral part of development approvals under the subdivision and site plan review process and do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance. In their interpretation and application, the provisions of this ordinance shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare.

This ordinance is not intended to interfere with, abrogate, or annul any other ordinances, rule or regulation, statute, or other provision of law except that, where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.

### Section 2: Definitions

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

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

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

“Compaction” means the increase in soil bulk density.

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

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

A county planning agency; or

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

“Department” means the New Jersey Department of Environmental Protection.

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

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

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

"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.

"Environmentally critical areas" means an area or feature which is of significant environmental value, including but not limited to: stream corridors; natural heritage priority sites; habitat of endangered or threatened species; large areas of 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.

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

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

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

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

"Major development" means any "development" that provides for ultimately disturbing one or more acres of land. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

"Municipality" means any city, borough, town, township, or village.

"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, the Borough of Moonachie, or political subdivision of this State subject to municipal jurisdiction pursuant to the Municipal Land Use Law , N.J.S.A. 40:55D-1 et seq.

"Pollutant" means any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance (except those regulated under the Atomic

Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.), thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff, or other residue discharged directly or indirectly to the land, ground waters or surface waters of the State, or to a domestic treatment works. "Pollutant" includes both hazardous and nonhazardous pollutants.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

### **Section 3: General Standards**

#### **A. Design and Performance Standards for Stormwater Management Measures**

1. Stormwater management measures for major development shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards in Section 4. To the maximum extent practicable, these standards shall be met by incorporating nonstructural stormwater management strategies into the design. If these strategies alone are not sufficient to meet these standards, structural stormwater management measures necessary to meet these standards shall be incorporated into the design.
2. The standards in this ordinance apply only to new major development and are intended to minimize the impact of stormwater runoff on water quality and water quantity in receiving water bodies and maintain groundwater recharge. The standards do not apply to new major development to the extent that alternative design and performance standards are applicable under a regional stormwater management plan or Water Quality Management Plan adopted in accordance with Department rules.

### **Section 4: Stormwater Management Requirements for Major Development**

- A. The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with Section 10.
- B. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department Landscape Project or Natural Heritage Database established under N.J.S.A. 13:1B-15.147 through 15.150, particularly *Helonias bullata* (swamp pink) and/or *Clemmys muhlnebergi* (bog turtle).

C. The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Sections 4.F and 4.G:

1. The construction of an underground utility line provided that the disturbed areas are revegetated upon completion;
2. The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable; 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 groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Sections 4.F and 4.G may be obtained for the enlargement of an existing public roadway or railroad; or the construction or enlargement of a public pedestrian access, provided that the following conditions are met:

1. The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;
2. The applicant demonstrates through an alternatives analysis, that through the use of nonstructural and structural stormwater management strategies and measures, the option selected complies with the requirements of Sections 4.F and 4.G to the maximum extent practicable;
3. The applicant demonstrates that, in order to meet the requirements of Sections 4.F and 4.G, existing structures currently in use, such as homes and buildings, would need to be condemned; and
4. The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under D.3 above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of Sections 4.F and 4.G that were not achievable on-site.

#### E. Nonstructural Stormwater Management Strategies

1. To the maximum extent practicable, the standards in Sections 4.F and 4.G shall be met by incorporating nonstructural stormwater management strategies set forth at Section 4.E into the design. The applicant shall identify the nonstructural measures incorporated into the design of the project. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management measures identified in Paragraph 2 below into the design of a particular project, the applicant shall identify the strategy considered and provide a basis for the contention.

2. Nonstructural stormwater management strategies incorporated into site design shall:
  - a. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
  - b. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;
  - c. Maximize the protection of natural drainage features and vegetation;
  - d. Minimize the decrease in the "time of concentration" from pre-construction to post construction. "Time of concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the watershed to the point of interest within a watershed;
  - e. Minimize land disturbance including clearing and grading;
  - f. Minimize soil compaction;
  - g. Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
  - h. Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas;
  - i. Provide other source controls to prevent or minimize the use or exposure of pollutants at the site, in order to prevent or minimize the release of those pollutants into stormwater runoff. Such source controls include, but are not limited to:
    - (1) Site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Section 4.E.3. below;
    - (2) Site design features that help to prevent discharge of trash and debris from drainage systems;
    - (3) Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and
    - (4) When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules.
3. Site design features identified under Section 4.E.2.i.(2) above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see Section 4.E.3.c below.



a. Design engineers shall use either 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:

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

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

Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of 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 basin floors.

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

c. This standard does not apply:

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

(2) Where flows from the water quality design storm as specified in Section 4.G.1 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:

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

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

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

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

4. Any land area used as a nonstructural stormwater management measure to meet the performance standards in Sections 4.F and 4.G shall meet one of the following requirements:

- a) Be dedicated to a government agency as approved by the appropriate reviewing agency, or
- b) Subjected to a conservation restriction filed with the appropriate County Clerk's office, or
- c) Subjected to an approved equivalent restriction that ensures that measure or an equivalent stormwater management measure approved by the reviewing agency is maintained in perpetuity.

5. Guidance for nonstructural stormwater management strategies is available in the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 7, or found on the Department's website at [www.njstormwater.org](http://www.njstormwater.org).

F. Erosion Control, Groundwater Recharge and Runoff Quantity Standards

- 1. This subsection contains minimum design and performance standards to control erosion, encourage and control infiltration and groundwater recharge, and control stormwater runoff quantity impacts of major development.
  - a. The minimum design and performance standards for erosion control are those established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq. and implementing rules.
  - b. The minimum design and performance standards for groundwater recharge are as follows:
    - (1) The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at Section 5, either:
      - (a) Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100 percent 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 2-year storm is infiltrated.
    - (2) This groundwater recharge requirement does not apply to projects within the "urban redevelopment area," or to projects subject to (3) below.
    - (3) The following types of stormwater shall not be recharged:
      - (a) Stormwater from areas of high pollutant loading. High pollutant loading areas are areas in industrial and commercial developments where solvents and/or petroleum products are loaded/unloaded, stored, or applied, areas where

pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than "reportable quantities" as defined by the United States Environmental Protection Agency (EPA) at 40 CFR 302.4; areas where recharge would be inconsistent with Department approved remedial action work plan or landfill closure plan and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities; and

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

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

c. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at Section 5, complete one of the following:

- (1) Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the two, 10, and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;
- (2) Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the two, 10, and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area;
- (3) Design stormwater management measures so that the post-construction peak runoff rates for the 2, 10 and 100 year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed. The percentages shall not be applied to post-construction stormwater runoff into tidal flood hazard areas if the

increased volume of stormwater runoff will not increase flood damages below the point of discharge; or

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

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

#### G. Stormwater Runoff Quality Standards

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

Table 1: Water Quality Design Storm Distribution			
Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
0	0.0000	65	0.8917
5	0.0083	70	0.9917
10	0.0166	75	1.0500
15	0.0250	80	1.0840
20	0.0500	85	1.1170
25	0.0750	90	1.1500

30	0.1000	95	1.1750
35	0.1330	100	1.2000
40	0.1660	105	1.2250
45	0.2000	110	1.2334
50	0.2583	115	1.2417
55	0.3583	120	1.2500
60	0.6250		

2. For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 7, or found on the Department's website at [www.njstormwater.org](http://www.njstormwater.org). The BMP Manual and other sources of technical guidance are listed in Section 7. TSS reduction shall be calculated based on the removal rates for the BMPs in Table 2 below. Alternative removal rates and methods of calculating removal rates may be used if the design engineer provides documentation demonstrating the capability of these alternative rates and methods to the review agency. A copy of any approved alternative rate or method of calculating the removal rate shall be provided to the Department at the following address: Division of Watershed Management, New Jersey Department of Environmental Protection, PO Box 418 Trenton, New Jersey, 08625-0418.
3. If more than one BMP in series is necessary to achieve the required 80 percent TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:

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

Where

R = total TSS percent load removal from application of both BMPs, and

A = the TSS percent removal rate applicable to the first BMP

B = the TSS percent removal rate applicable to the second BMP

Table 2: TSS Removal Rates for BMPs	
Best Management Practice	TSS Percent Removal Rate
Bioretention Systems	90
Constructed Stormwater	90

Wetland	
Extended Detention Basin	40-60
Infiltration Structure	80
Manufactured Treatment Device	See Section 6.C
Sand Filter	80
Vegetative Filter Strip	60-80
Wet Pond	50-90

4. If there is more than one onsite drainage area, the 80 percent TSS removal rate shall apply to each drainage area, unless the runoff from the subareas converge on site in which case the removal rate can be demonstrated through a calculation using a weighted average.
5. Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load 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 nonstructural strategies and structural measures that optimize nutrient removal while still achieving the performance standards in Sections 4.F and 4.G.
6. Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Section 7.
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. Special water resource protection areas shall be established along all waters designated Category One at N.J.A.C. 7:9B, and perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the USGS Quadrangle Maps or in the County Soil Surveys, within the associated HUC14 drainage area. These areas shall be established for the protection of water quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:
  - a. The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:
    - (1) A 300-foot special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the waterway from the top of the bank outwards or from the centerline of the waterway where the bank is not defined,

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

- b. All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the Standard for Off-Site Stability in the "Standards For Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act , N.J.S.A. 4:24-39 et seq.
- c. If stormwater discharged outside of and flowing through the special water resource protection area cannot comply with the Standard For Off-Site Stability in the "Standards for Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act , N.J.S.A. 4:24-39 et seq., then the stabilization measures in accordance with the requirements of the above standards may be placed within the special water resource protection area, provided that:
  - (1) Stabilization measures shall not be placed within 150 feet of the Category One waterway;
  - (2) Stormwater associated with discharges allowed by this section shall achieve a 95 percent TSS post-construction removal rate;
  - (3) Temperature shall be addressed to ensure no impact on the receiving waterway;
  - (4) The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable;
  - (5) A conceptual project design meeting shall be held with the appropriate Department staff and Soil Conservation District staff to identify necessary stabilization measures; and
  - (6) All encroachments proposed under this section shall be subject to review and approval by the Department.
- d. A stream corridor protection plan may be developed by a regional stormwater management planning committee as an element of a regional stormwater management plan, or by a municipality through an adopted municipal stormwater management plan. If a stream corridor protection plan for a waterway subject to Section 4.G(8) has been approved by the Department of Environmental Protection, then the provisions of the plan shall be the applicable special water resource protection area requirements for that waterway. A stream corridor protection plan for a waterway subject to G.8 shall

maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in G.8.a.(1) above. In no case shall a stream corridor protection plan allow the reduction of the Special Water Resource Protection Area to less than 150 feet as measured perpendicular to the waterway subject to this subsection.

- e. Paragraph G.8 does not apply to the construction of one individual single family dwelling that is not part of a larger development on a lot receiving preliminary or final subdivision approval on or before February 2, 2004 , provided that the construction begins on or before February 2, 2009.

## **Section 5:                    Calculation of Stormwater Runoff and Groundwater Recharge**

- A.     Stormwater runoff shall be calculated in accordance with the following:
  - 1. The design engineer shall calculate runoff using one of the following methods:
    - a. The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook Section 4 – Hydrology and Technical Release 55 – Urban Hydrology for Small Watersheds; or
    - b. The Rational Method for peak flow and the Modified Rational Method for hydrograph computations.
  - 2. For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the 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 at Section 5.A.1.a and the Rational and Modified Rational Methods at Section 5.A.1.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 and 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:

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

## **Section 6A: Standards for Structural Stormwater Management Measures**

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

1. Structural stormwater management measures shall be designed to take into account the existing site conditions, including, for example, environmentally critical areas, wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone).
2. Structural stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure as appropriate, and shall have parallel bars with one-inch (1") spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than one-third (1/3) the width of the diameter of the orifice or one-third (1/3) the width of the weir, with a minimum spacing between bars of one-inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of Section 8.D.
3. Structural stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement.
4. At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half inches in diameter.
5. Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Section 8.

B. Stormwater management measure guidelines are available in the New Jersey Stormwater Best Management Practices Manual. Other stormwater management measures may be utilized provided the design engineer demonstrates that the proposed measure and its

design will accomplish the required water quantity, groundwater recharge and water quality design and performance standards established by Section 4 of this ordinance.

- C. Manufactured treatment devices may be used to meet the requirements of Section 4 of this ordinance, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.

#### **Section 6B: Non-Structural Stormwater Strategies**

1. **Buffers** - Buffer areas are required along all lot and street lines separating residential uses from arterial and collector streets, separating a nonresidential use from either a residential use or residential zoning district line, and along all street lines where loading and storage areas can be seen from the street. The buffer area shall use native vegetation, which requires less fertilization and watering than non-native species. Buffer areas may be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces. Preservation of natural wood tracts and limiting land disturbance for new construction must be incorporated where practical.
2. **Curbs and Gutters** - Curb cuts or flush curbs with curb stops are encouraged where practical to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas where practical.
3. **Drainage Systems** - An existing ordinance may require that all streets be provided with inlets and pipes where the same are necessary for proper drainage. The use of natural vegetated swales in lieu of inlets and pipes are encouraged where practical.
4. **Driveways and Access Ways** - The use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge should be considered for driveways and access ways where practical. Consideration should be given for subsurface soil conditions. The use of crowned driveways is also encouraged to promote disconnectivity between impervious surfaces and grass areas to promote groundwater recharge.
5. **Natural Features** - Natural features, such as trees, brooks, swamps, hilltops, and views, are to be preserved whenever possible, and that care be taken to preserve selected trees to enhance soil stability and landscaped treatment of the area. In addition, forested areas shall be maintained to ensure that leaf litter and other beneficial aspects of the forest are maintained in addition to the trees.
5. **Nonconforming Uses, Structures or Lots** - The existing ordinance may allow an applicant/owner of an existing use to propose additions or alterations that exceed the permitted building and/or lot coverage percentages. The applicant should mitigate the impact of the additional impervious surfaces unless the stormwater management plan for the development provided for these increases in impervious surfaces. This mitigation effort must address water quality, flooding and groundwater recharge.

6. Off-site and Off-tract Improvements - Any off-site and off-tract stormwater management and drainage improvements must conform to the "Design and Performance Standards" described.
7. Off-street Parking and Loading - Parking lots with more than 10 spaces and all loading areas should allow for flush curb with curb stop, or curbing with curb cuts to encourage developers to allow for the discharge of impervious areas into landscaped areas for stormwater management. The use of natural vegetated swales for the water quality design storm, with overflow for larger storm events into storm sewers should be utilized where practical. A developer may demonstrate that fewer spaces would be required, provided area is set aside for additional spaces if necessary. Pervious paving could be provided overflow parking areas.
8. Performance Standards - This section can provide for pollution source control must be evaluated in order to prohibit materials or wastes from being deposited upon a lot in such form or manner that they can be transferred off the lot, directly or indirectly, by natural forces such as precipitation, evaporation or wind. Materials and wastes that might create a pollutant or a hazard shall be enclosed in appropriate containers.
9. Shade Trees - The existing ordinance may require a minimum of shade trees per lot to be planted in the front yard. In addition to this section, the Borough may have a Tree Preservation Ordinance that restricts and otherwise controls the removal of mature trees throughout the Borough. This ordinance should recognize that the preservation of mature trees and forested areas must be considered in the management of environmental resources, particularly watershed management, air quality, and ambient heating and cooling. A "critical disturbance area" that extends beyond the driveway and building footprint where clearing of trees cannot occur shall be depicted on the plan minimizing land disturbance. Identification of forested areas and the percentage of wooded areas be protected from disturbance shall also be provided.
10. Sidewalks - Sidewalks should be designed to discharge stormwater to neighboring lawns where feasible to disconnect these impervious surfaces or use permeable paving materials where appropriate.
11. Soil Erosion and Sediment Control - The applicant shall comply with the New Jersey Soil Erosion and Sediment Control Standards and should incorporate signs to retain and protect natural vegetation; minimize and retain water runoff to facilitate groundwater recharge; and install diversions, sediment basins, and similar required structures prior to any on-site grading or disturbance.

Further guidance on the implementation of these strategies can be found in the NJDEP Stormwater Best Management Practices Manual, April 2004, as amended.

## **Section 7: Sources for Technical Guidance**

- A. Technical guidance for stormwater management measures can be found in the documents listed at 1 and 2 below, which are available from Maps and Publications,

New Jersey Department of Environmental Protection, 428 East State Street, P.O. Box 420, Trenton, New Jersey, 08625; telephone (609) 777-1038.

1. Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended. Information is provided on stormwater management measures such as: bioretention systems, constructed stormwater wetlands, dry wells, extended detention basins, infiltration structures, manufactured treatment devices, pervious paving, sand filters, vegetative filter strips, and wet ponds.
  2. The New Jersey Department of Environmental Protection Stormwater Management Facilities Maintenance Manual, as amended.
- B. Additional technical guidance for stormwater management measures can be obtained from the following:
1. The "Standards for Soil Erosion and Sediment Control in New Jersey" promulgated by the State Soil Conservation Committee and incorporated into N.J.A.C. 2:90. Copies of these standards may be obtained by contacting the State Soil Conservation Committee or any of the Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey 08625; (609) 292-5540;
  2. The Rutgers Cooperative Extension Service, 732-932-9306; and
  3. The Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey, 08625, (609) 292-5540.

#### **Section 8: Safety Standards for Stormwater Management Basins**

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

The provisions of this section do not preempt more stringent municipal or county safety requirements for new or existing stormwater management basins. Municipal and county stormwater management plans and ordinances may, pursuant to their authority, require existing stormwater management basins to be retrofitted to meet one or more of the safety standards in Sections 8.B.1, 8.B.2, and 8.B.3 for trash racks, overflow grates, and escape provisions at outlet structures.

#### **B. Requirements for Trash Racks, Overflow Grates and Escape Provisions**

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

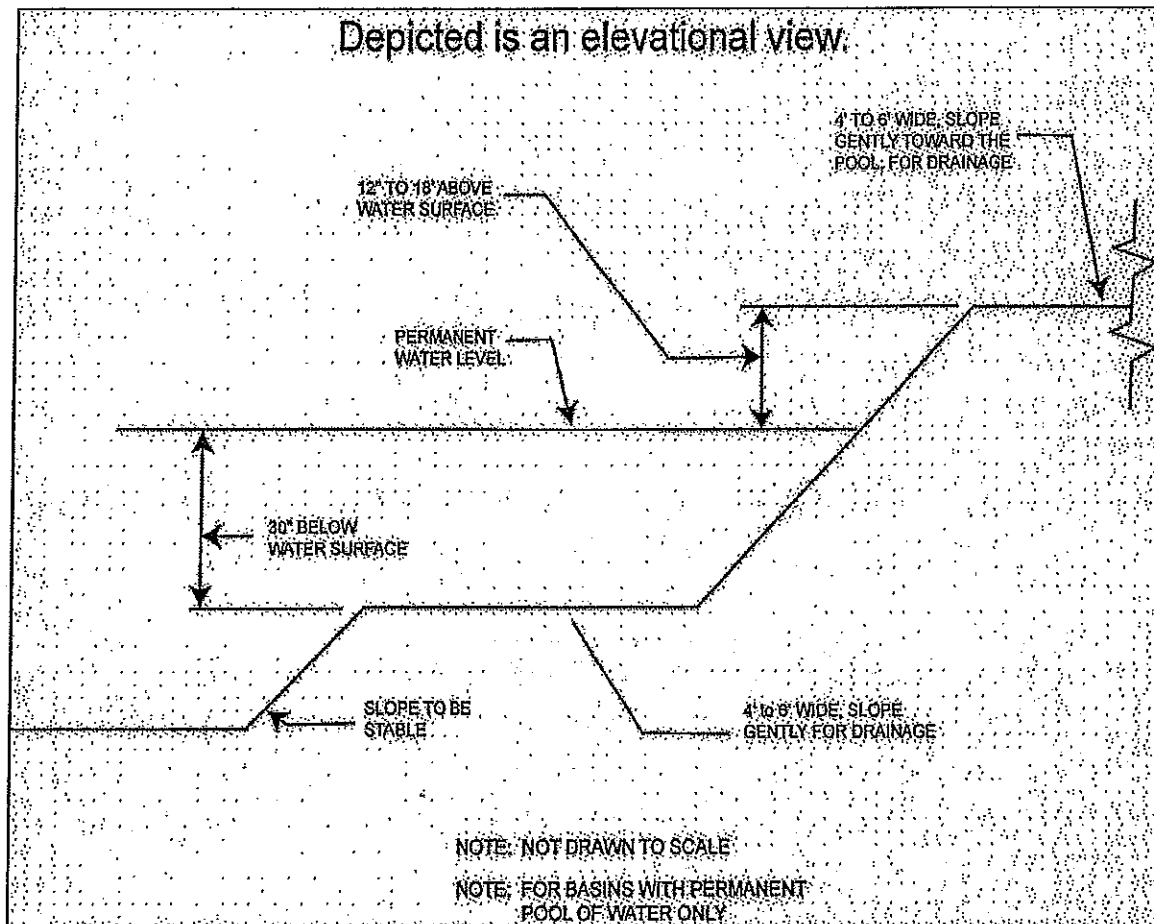
stormwater management basin to ensure proper functioning of the basin outlets in accordance with the following:

- a. The trash rack shall have parallel bars, with no greater than six inch spacing between the bars.
  - b. The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure.
  - c. The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack.
  - d. The trash rack shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs/ft sq.
2. An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:
- a. The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.
  - b. The overflow grate spacing shall be no less than two inches across the smallest dimension.
  - c. The overflow grate shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs./ft sq.
3. For purposes of this paragraph 3, escape provisions means the permanent installation of ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management basins. Stormwater management basins shall include escape provisions as follows:
- a. If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Section 8.C a free-standing outlet structure may be exempted from this requirement.
  - b. Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half feet. Such safety ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall be located approximately two and one-half feet below the permanent water surface, and the second step shall be located one to one and one-half feet above the permanent water surface. See Section 8.D for an illustration of safety ledges in a stormwater management basin.
  - c. In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than 3 horizontal to 1 vertical.

### C. Variance or Exemption from Safety Standards

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

### D. Illustration of Safety Ledges in a New Stormwater Management Basin



## **Section 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 ordinance, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan at Section 9.C below as part of the submission of the applicant's application for subdivision or site plan approval.
2. The applicant shall demonstrate that the project meets the standards set forth in this ordinance.
3. The applicant shall submit [*specify number*] copies of the materials listed in the checklist for site development stormwater plans in accordance with Section 9.C of this ordinance.

### **B. Site Development Stormwater Plan Approval**

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

### **C. Checklist Requirements**

The following information shall be required:

#### **1. Topographic Base Map**

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

#### **2. Environmental Site Analysis**

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

#### **3. Project Description and Site Plan(s)**

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

#### 4. Land Use Planning and Source Control Plan

This plan shall provide a demonstration of how the goals and standards of Sections 3 through 6 are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater recharge, stormwater quality and stormwater quantity problems at the source by land management and source controls whenever possible.

#### 5. Stormwater Management Facilities Map

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

- a. Total area to be paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.
- b. Details of all stormwater management facility designs, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention and emergency spillway provisions with maximum discharge capacity of each spillway.

#### 6. Calculations

- a. Comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in Section 4 of this ordinance.
- b. When the proposed stormwater management control measures (e.g., infiltration basins) depends on the hydrologic properties of soils, then a soils report shall be submitted. The soils report shall be based on onsite boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of 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 Section 10.

#### 8. Waiver from Submission Requirements



The municipal official or board reviewing an application under this ordinance may, in consultation with the municipal engineer, waive submission of any of the requirements in Sections 9.C.1 through 9.C.6 of this ordinance when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

## **Section 10: Maintenance and Repair**

### **A. Applicability**

1. Projects subject to review as in Section 1.C of this ordinance shall comply with the requirements of Sections 10.B and 10.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 include the following:
  - a. Contain specific preventative maintenance tasks and schedules; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement).
  - b. Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual. If the maintenance plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's agreement to assume this responsibility, or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.
3. Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.
4. If the person responsible for maintenance identified under Section 10.B.2 above is not a public agency, the maintenance plan and any future revisions based on Section 10.B.7 below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
5. Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of nonvegetated linings.
6. The person responsible for maintenance identified under Section 10.B.2 above shall maintain a detailed log of all preventative and corrective maintenance for the structural

stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.

7. The person responsible for maintenance identified under Section 10.B.2 above shall evaluate the effectiveness of the maintenance plan at least once per year. Any adjustments to the management plan or deed shall require notification and approval from the applicable board prior to the filing of a revised deed.
  8. The person responsible for maintenance identified under Section 10.B.2 above shall 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 Sections 10.B.6 and 10.B.7 above.
  9. The requirements of Sections 10.B.3 and 10.B.4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.
  10. In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have fourteen (14) days to effect maintenance and repair of the facility in a manner that is approved by the municipal engineer or his designee. 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.
- B. Nothing in this section shall preclude the municipality in which the major development is located from requiring the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53.

#### **Section 11: Penalties**

Any person who erects, constructs, alters, repairs, converts, maintains, or uses any building, structure or land in violation of this ordinance shall be subject to the following penalties:

- a) First offense up to one thousand dollars (\$1,000.00) fine or six (6) months in jail
- b) Second offense or any subsequent offense up to one thousand two hundred fifty dollars (\$1,250.00) fine or six (6) months in jail.

#### **Section 12: Enforcement:**

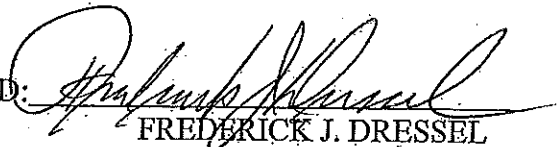
The provisions of this ordinance shall be enforced by the Moonachie Construction Code Official of the Borough of Moonachie.

**SECTION 13.** All ordinances of the Borough of Moonachie to the extent that same are not inconsistent with this Ordinance and/or the Borough Form of Government Law shall remain in full force and effect until modified or repealed pursuant to law. All Ordinances or parts of Ordinances inconsistent herewith are hereby repealed as to such inconsistencies.

**SECTION 14.** If the provisions of any section, subsection, paragraph, subdivision, or clause of this ordinance shall be judged invalid by a court of competent jurisdiction, such order of judgment shall not affect or invalidate the remainder of any section, subsection, paragraph, subdivision, or clause of this ordinance.

**SECTION 15.** This Ordinance shall become effective immediately upon the approval by the county review agency, or sixty (60) days from the receipt of the ordinance by the county review agency if the county review agency should fail to act.

APPROVED:

  
FREDERICK J. DRESSEL  
MAYOR

ATTEST:

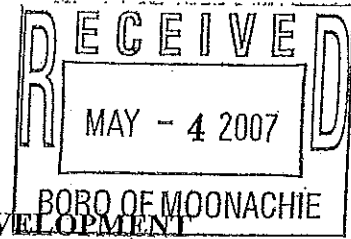


Supriya Sanyal  
Borough Clerk

Introduced: February 23, 2006

Advertised: March 1, 2006

Final Passage: March 23, 2006



**COUNTY OF BERGEN**  
**DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT**

ONE Bergen County Plaza • 4<sup>th</sup> Floor • Hackensack, N.J. 07601-7076

Tel. (201) 336-6446 • Fax (201) 336-6449

**Dennis McNerney**  
*County Executive*

**Farouk Ahmad, P.E.**  
*Department Director*

May 3, 2007

**James Fordham, P.E.**  
**Boswell Engineering**  
**330 Phillips Avenue**  
**PO Box 3152**  
**South Hackensack, NJ 07606-1722**

Dear Mr. Fordham:

The Bergen County Planning Board has approved the **Municipal Stormwater Management Plan and Stormwater Control Ordinance for the Borough of Moonachie** on May 1, 2007 at their public meeting. I have enclosed a copy of the planning board resolution for your records. Should there be any amendments to the plan or ordinance in the future, please note that County Review is required.

Thank you for your cooperation in the review process and if you have any questions, please feel free to contact us at 201-336-6430.

Sincerely Yours,

**Peter Kortright III**  
Director of Master Planning

cc: **Moonachie Planning Board**  
**NJDEP**  
**File Copy**

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Paul  
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**RESOLUTION OF THE BERGEN COUNTY PLANNING BOARD**

**WHEREAS**, in accordance with the New Jersey Department of Environmental Protection (NJDEP) adopted Stormwater Management Rules (N.J.A.C. 7:8) and Municipal Stormwater Regulation Program (N.J.A.C. 7:14); and

**WHEREAS**, the *Borough of Moonachie* has submitted its adopted Municipal Stormwater Management Plan (prepared by *Boswell Engineering*) and Municipal Stormwater Control Ordinance to the County Planning Board for review and approval; and

**WHEREAS**, in accordance with the County Planning Act within the New Jersey Administrative Code (N.J.A.C. 40:27-4), staff has reviewed and is recommending approval of the adopted Municipal Stormwater Management Plan and Municipal Stormwater Control Ordinance for the *Borough of Moonachie* and that it is consistent with the goals and objectives of the County's Stormwater Management Program as well as the NJDEP's Stormwater Management Rules; and

**NOW, THEREFORE, BE IT RESOLVED**, the Bergen County Planning Board approves the Municipal Stormwater Management Plan and Municipal Stormwater Control Ordinance, and finds that this plan and ordinance is in keeping with the County stormwater management planning principals and is generally consistent with the requirements as set forth by the New Jersey Department of Environmental Protection Stormwater Management Rules;

**BE IT FURTHER RESOLVED**, that copies of this Resolution be forwarded to New Jersey Department of Environmental Protection and the *Borough of Moonachie*. This Resolution shall take effect this 1<sup>st</sup> day of May 2007.

**Motion made by:** Joseph Valente

**Motion seconded by:** Peter Colao

# Official Bergen County Municipal Stormwater Management Plan (MSWMP) Review Comments:

Municipality: Borough of Moonachie

Date of Plan: 04/2005, rev. 02/2007

Date Submitted to County: March 2007

Review Completed: April 6, 2007

Review Action Recommended to County:

☒ Approve

☐ Conditionally Approve

☐ Disapprove

	Sufficient	Revisions Recommended	Revisions Required	Not Applicable	Comments
1. General	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
o Introduction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
• General Discussion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
▪ Hydrologic cycle	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
▪ Quantity issues	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
▪ Groundwater recharge issues	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
▪ Water quality issues	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
• Description of Municipality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
▪ Size in square miles	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
▪ Population and trends	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
▪ Waterways	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
▪ Waterway health	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
▪ TMDLs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

▪ Existing stormwater problems	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
○ <i>Municipal Stormwater Plan Goals</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
• 9 Minimum Goals identified	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
• Achievement of 9 Minimum Goals	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>2. Consistency with Other Plans and Regulations</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
○ <i>TMDLs</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
○ <i>Existing Municipal SWMP</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
○ <i>Regional SWMPs</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
○ <i>RSIS</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
○ <i>Coordination with the Bergen SCD</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>3. Required mapping</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
○ <i>Water bodies (USGS and Soil Surveys)</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
○ <i>Groundwater recharge areas</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
○ <i>Well head protection areas</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>4. Recommended stormwater control ordinance(s)</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>5. Design and Performance Standards</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>6. Safety Standards for Stormwater Management Basins</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>7. Long-term O&amp;M of BMPs</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

8. Additional Measures	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
○ <i>Wellhead protection ordinance</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
○ <i>Mitigation Plan</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
○ <i>Stream Corridor Protection Plan</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
9. If more than 640 acres of developable land (due in 2006)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
○ <i>Land Use/Build out analysis</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
○ <i>Master Plan review and evaluation</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
○ <i>Official map review and evaluation</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
○ <i>Development regulations review and evaluation</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	



OFFICE OF THE ADMINISTRATOR  
**BOROUGH OF MOONACHIE**

70 Moonachie Road Moonachie, New Jersey 07074  
Telephone (201) 641-1813 Fax (201) 641-9542

Email: pahansen@moonachie.us

**PAULA A. HANSEN**

Administrator  
Chief Financial Officer



June 14, 2007

Ms. JulieAnn Zoleta  
Environmental Specialist  
Bureau of Nonpoint Pollution Control  
401 East State Street  
P.O. Box 029  
Trenton, NJ 08625-0029

RE: Municipal Stormwater Management Plan

Dear Ms. Zoleta:

Enclosed is a copy of Moonachie's Municipal Stormwater Management Plan which was revised February, 2007.

I believe this is all you need to update our records at this time. If there is anything else you require, please contact me.

Yours truly,



Paul Hansen

CC: Mayor & Council  
Supriya Sanyal

**BOSWELL McCLAVE ENGINEERING**330 Phillips Avenue, South Hackensack, NJ 07606  
(201)641-0770 • Fax (201)641-1831**LETTER OF TRANSMITTAL**

TO Borough of Moonachie  
Borough Hall, 70 Moonachie Road  
Moonachie, NJ 07074  
\_\_\_\_\_  
\_\_\_\_\_

DATE: May 23, 2007	JOB NO: MO-317
ATTENTION: Paul Hansen	
Re: Municipal Stormwater Management Plan	

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via \_\_\_\_\_ the following items:

- ☐ Shop drawings    ☐ Prints    ☐ Plans    ☐ Samples    ☐ Specifications  
☐ Copy of letter    ☐ Change order    ☐ \_\_\_\_\_

COPIES	DATE	NO.	DESCRIPTION
2	Rev 2/07		Municipal Stormwater Management Plan April 2005 Revised February 2007
1	6/9/05		Moonachie Planning Board Resolution - as a reference for the re-approval
1	5/26/05		Public Notice of Hearing - as a reference for the re-approval

THESE ARE TRANSMITTED as checked below:

- ☐ For approval    ☐ Approved as submitted    ☐ Resubmit \_\_\_\_\_ copies for approval  
☒ For your use    ☐ Approved as noted    ☐ Resubmit \_\_\_\_\_ copies for distribution  
☒ As requested    ☐ Returned for corrections    ☐ Return \_\_\_\_\_ corrected prints  
☐ For review and comment    ☐ \_\_\_\_\_  
☐ For Bids Due \_\_\_\_\_ 2007    ☐ PRINTS RETURNED AFTER LOAN TO US

Remarks: The Planning Board first approved the Interim Plan on June 9, 2005. Now that the County of Bergen has approved the current February 2007 revised plan on May 1, 2007, the Borough must adopt that latest plan at a public hearing.

The County approved this latest plan on May 1, 2007 confirming same by its Resolution #07-15.

Copy To Supriya Sanyal, Borough Clerk  
Gail Fitzgerald, Planning Board Chairperson.  
Paul Barbire, Planning Board Attorney

Signed \_\_\_\_\_

Richard J. Fox, P.E., L.S., P.P.

If enclosures are not as noted, kindly notify us at once

**MOONACHIE PLANNING BOARD**  
**RESOLUTION ADOPTING**  
**STORMWATER MANAGEMENT PLAN**

**WHEREAS**, the Planning Board has the statutory duty to review and adopt a Stormwater Management Plan as part of the Moonachie Master Plan; and

**WHEREAS**, the Planning Board was provided with the services of Boswell McClave Engineering ("Boswell") to assist it in the development of the Stormwater Management Plan; and

**WHEREAS**, Boswell presented a report dated February, 2005 containing the elements required by the Municipal Land Use Law, a copy of which said report is attached hereto and made a part hercof as Exhibit A, (the "Boswell Report"); and

**WHEREAS**, the Planning Board has conducted a public hearing on the Boswell Report on June 9, 2005; and

**WHEREAS**, the Planning Board has reviewed the Boswell Report, considered any and all public comment and in addition utilized its own knowledge and experience in dealing with Stormwater Management issues within the Borough of Moonachie; and

**WHEREAS**, based on the foregoing, the Planning Board believes that the Boswell Report meets the relevant statutory requirements and should be adopted as required by N.J.S.A. 40:55D-93 et seq.

**NOW THEREFORE BE IT RESOLVED**, by the Planning Board of the Borough of Moonachie as follows:

1. The Moonachie Planning Board hereby adopts the Boswell Report as the Stormwater Management Plan as required by N.J.S.A. 40:55D-93 et seq.; and
2. A copy of this resolution shall be forwarded to the Moonachie Mayor and Council, the Moonachie Zoning Board of Adjustment, the Bergen County Planning Board, the Hackensack Meadowlands Development Commission and to the Boroughs of Carlstadt, Hasbrouck Heights, Little Ferry, Teterboro, Wood-Ridge and Township of South Hackensack.

Approved:

\_\_\_\_\_  
Gail Fitzgerald, Chairperson

Attest:

\_\_\_\_\_  
Jean Finch, Secretary

PUBLIC NOTICE  
MOONACHIE PLANNING BOARD  
NOTICE OF PUBLIC HEARING ON  
PROPOSED MOONACHIE MASTER PLAN  
AMENDMENT AS TO THE  
MUNICIPAL STORMWATER  
MANAGEMENT PLAN  
MEETING DATE: JUNE 9, 2005  
MUNICIPAL BUILDING  
COUNCIL CHAMBERS  
70 MOONACHIE ROAD  
MOONACHIE, NJ 07074

NOTICE is hereby given that the Planning Board of the Borough of Moonachie will hold a public hearing at its regular meeting on June 9, 2005 at the Borough Municipal Building, Council Chambers, 70 Moonachie Road, Moonachie, New Jersey at 8:00 PM with respect to a Borough of Moonachie Master Plan Amendment regarding the Municipal Storm Water Management Plan (NJDPES #NG0148920). A copy of the proposed Plan on Stormwater Management prepared by Boswell Engineering is on file in the Office of the Borough Clerk and may be inspected during regular business hours (9:00 AM to 4:30 PM weekdays) at the Municipal Building, 70 Moonachie Road, Moonachie, New Jersey 07074. A copy may be requested. Interested parties and members of the public may attend the Planning Board Meeting on June 9, 2005 at 8:00 PM to comment and ask questions on the Municipal Stormwater Management Plan at the Moonachie Municipal Building, Council Chambers, 70 Moonachie Road, Moonachie, New Jersey 07074.

Gail Fitzgerald, Chairperson  
Moonachie Planning Board  
May 26, 2005-Fee: \$45.20(40) 1374985

MO-317