

# **TOWN OF SECAUCUS**

## **STORMWATER MANAGEMENT PLAN**

PREPARED FOR:  
TOWN OF SECAUCUS  
MUNICIPAL BUILDING  
1203 PATERSON PLANK ROAD  
SECAUCUS, HUDSON COUNTY, NEW JERSEY

PREPARED BY:  
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**SECTION 1.0**

## 1.0 INTRODUCTION

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Town of Secaucus (Town) to address stormwater-related impacts. The creation of this plan is required by the *Municipal Stormwater Regulations (N.J.A.C. 7:14A-25)* and contains all of the required elements described in the *Stormwater Management Rules (Rules, N.J.A.C. 7:8)*. The plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major development, as defined within the *Rules*. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides baseflow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

The Town of Secaucus has a combined total of significantly less than one square mile of vacant or agricultural land. Therefore, according to N.J.A.C. 7:8-4.2(c)10, a “build-out” analysis is not required. However, the plan addresses the review and update of existing ordinances, the Town *Master Plan*, and other planning documents to provide guidance for future development to include low impact development techniques. The final component of this plan includes a mitigation plan to allow for variances or exemptions from the requirements. As part of the mitigation plan of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

According to the *Master Plan*, 88% of the Town is located within the jurisdiction of the New Jersey Meadowlands Commission. Only 12% of the Town is under local control. This Plan only addresses the area of the Town outside of the Meadowlands district.

## SECTION 2.0

## 2.0 GOALS

The goals of this MSWMP are to:

- reduce flood damage, including damage to life and property;
- minimize, to the extent practical, any increase in stormwater runoff from any new development;
- reduce soil erosion from any development or construction project;
- assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- maintain groundwater recharge;
- prevent, to the greatest extent feasible, an increase in nonpoint pollution;
- maintain the integrity of stream channels for their biological functions, as well as for drainage;
- minimize pollutants in stormwater runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water; and
- protect public safety through the proper design and operation of stormwater basins.

To achieve these goals, this plan outlines specific stormwater design and performance standards for new development. Additionally, the plan proposes stormwater management controls to address impacts from existing 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.

**SECTION 3.0**

### 3.0 STORMWATER DISCUSSION

#### 3.1 HYDROLOGIC CYCLE

The hydrologic cycle or water cycle (Figure 1) is the continuous circulation of water between the ocean, atmosphere and land. The driving force of this natural cycle is the sun. Water, stored in oceans, depressions, streams, rivers, waterbodies, vegetation and even land surface, continuously evaporates due to solar energy. This water vapor then condenses in the atmosphere to form clouds and fog. After water condenses, it precipitates, usually in the form of rain or snow, onto land surfaces and waterbodies. Precipitation falling on land surfaces is often intercepted by vegetation. Plants and trees transpire water vapor back into the atmosphere, as well as aid in the infiltration of water into the soil. The vaporization of water through transpiration and evaporation is called evapotranspiration. Infiltrated water percolates through the soil as groundwater, while surface water flows overland. Groundwater and surface water flow to major waterbodies and eventually flows to the Earth's seas and oceans. This constant process of evapotranspiration, condensation, precipitation, and infiltration comprises the hydrologic cycle.

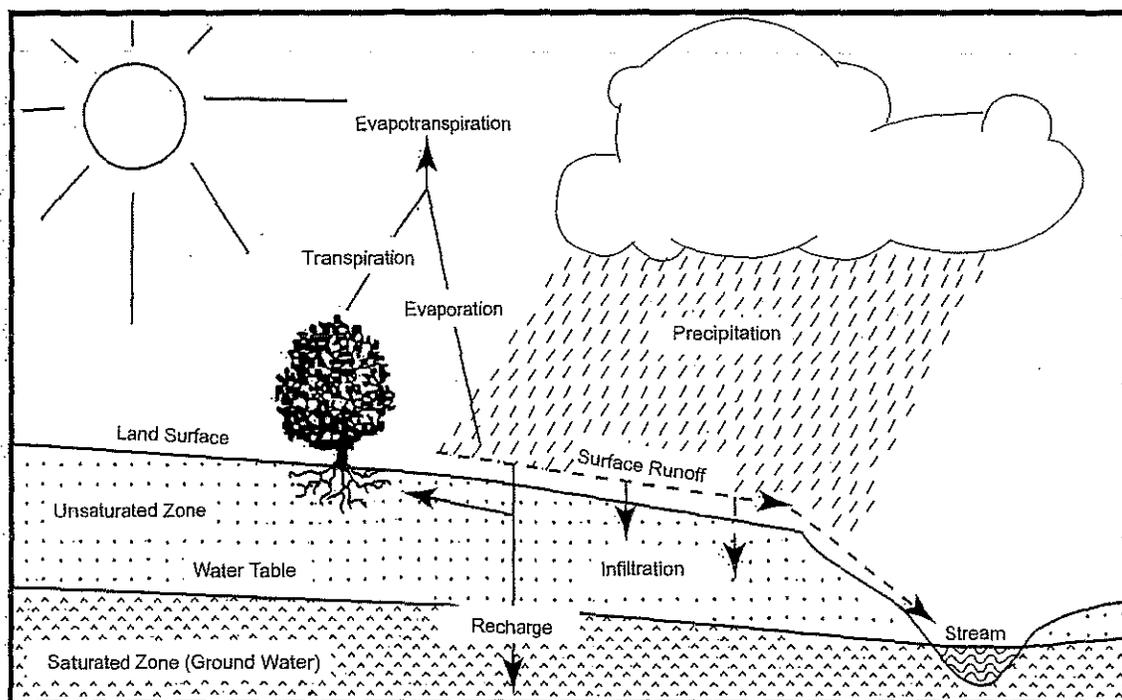


Figure 1: Groundwater Recharge in the Hydrologic Cycle

Source: New Jersey Geological Survey Report GSR-32

### **3.2 STORMWATER IMPACTS**

Land development can dramatically alter the hydrologic cycle 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.

Water quantity impacts combined with land development often adversely impacts stormwater quality. Impervious surfaces and cleared areas created by development collect pollutants from the atmosphere, fertilizers and pesticides, animal wastes, as well as pollutants from motor vehicle usage. Pollutants such as metals, suspended solids, hydrocarbons, pathogens, and nutrients collect and concentrate on impervious surfaces. During storm events, these pollutants are washed directly into municipal sewer systems.

In addition to chemical and biological pollution, thermal pollution can occur when water travels over heated impervious surfaces or collects in stormwater impoundments that are not shielded from the sun. Thermal pollution can affect aquatic habitats, adversely impacting cold water fish species such as trout. Removal of shade trees and stabilizing vegetation from stream banks also contributes to thermal pollution.

Proper stormwater management will help mitigate the negative impact of land development and its effect on stormwater. This MSWMP outlines the Town's plan to improve stormwater quality, decrease stormwater quantity, and increase groundwater recharge. By managing stormwater, the Town will improve the quality of aquatic ecosystems and restore some of the natural balance to the environment.

## SECTION 4.0

## **4.0 BACKGROUND**

### **4.1 TOWN CHARACTERISTICS**

The Town of Secaucus comprises a 5.9 square mile area in Hudson County, New Jersey. The Town is a residential and industrial municipality located within the jurisdiction of New Jersey Meadowlands Commission. The Town is located on the east bank of the Hackensack River between Penhorn and Cromakill Creeks. The majority of the Town has an elevation of less than or equal to 10 feet above mean sea level (MSL). The eastern edge of the Town has elevations up to 50 feet above MSL and Laurel Hill in the southwest corner of the Town has an elevation of 150 feet above MSL.

Figure 2, Town and its Waterways, illustrates the waterways in the Town. Figure 3, USGS Topographic Map, depicts the Town boundary on USGS quadrangle maps.

#### **4.1.1 Population**

According to the *1999 Reexamination Report of the Master Plan (Master Plan)* and U.S. Census Bureau data, the population of the Town was 13,719 persons in 1980, 14,061 persons in 1990 and 15,931 persons in 2000. As demonstrated by the statistics, the Town experienced a considerable growth from 1990 to 2000.

#### **4.1.2 Land Use**

According to the *Master Plan*, 88% of the Town is located within the jurisdiction of the New Jersey Meadowlands Commission. Only 12% of the Town is under local control.

According to the *Master Plan*, the Town has approximately 800 acres (greater than one square mile) of vacant land. However, it should be noted that large portion of the 800 acres has poor access and/or significant environmental restraints. Therefore, it remains that the Town has less than one square mile of developable land, and thus, a build-out analysis is not required.

#### **4.1.3 State Development and Redevelopment Plan**

The purpose of the *State Development and Redevelopment Plan (State Plan)* is to coordinate planning activities and establish State-wide planning objectives in the areas of land use,

housing, economic development, transportation, natural resource conservation, agriculture and farmland retention, recreation, urban and suburban redevelopment, historic preservation, public facilities and services, and intergovernmental coordination. The *State Plan* designates planning areas that share common conditions with regard to development and environmental features:

- Areas for Growth: Metropolitan Planning Areas (PA-1), Suburban Planning Areas (PA-2) and Designated Centers in any planning area.
- Areas for Limited Growth: Fringe Planning Areas (PA-3), Rural Planning Areas (PA-4), and Environmentally Sensitive Planning Areas (PA-5). In these planning areas, planning should promote a balance of conservation and limited growth—environmental constraints affect development and preservation is encouraged in large contiguous tracts.
- Areas for Conservation: Fringe Planning Area (PA-3), Rural Planning Areas (PA-4), and Environmentally Sensitive Planning Areas (PA-5).

The small area of the Town not included in the Meadowlands District is located in the Metropolitan Planning Area (PA-1).

#### **4.2 WATERWAYS**

The following waterways are located in or immediately adjacent to the Town:

- Hackensack River and its tributaries
- Mill Creek
- Cromakill Creek and its tributaries
- Penhorn Creek
- Sack Creek
- Fish Creek
- Division Creek

None of the waterways in the Town are categorized as Category 1 streams by the New Jersey Department of Environmental Protection (NJDEP).

There are several listings for the Hackensack River on the *Integrated List*; however, only one listing is within five (5) miles of the Town:

- Hackensack River – Tidal at Secaucus is listed on Sublist 3 for fecal coliform.

#### **4.4 WATER QUANTITY**

In addition to water quality problems, the Town has exhibited severe water quantity problems including flooding. Various flood studies indicate that flood hazard areas comprise over 30% of the Town. Specific flood areas, detailed below, were identified by Town officials and in the following reports: 1983 Stormwater Management Study prepared by Mayo, Lynch and Associates; 1999 Golden Avenue Stormwater Pump Station Drainage Investigations prepared by Goodkind and O'Dea; and the 2000 Flood Mitigation Plan prepared by the Town of Secaucus with assistance from Goodkind and O'Dea.

It should be noted that the following descriptions pertain to flooding issues throughout the entire Town, not just within the locally-controlled area.

##### **Plaza Center Area**

During periods of heavy rain and high tides, flooding occurs in the area of Plaza Center. The flooding occurs because all existing storm sewers discharge to the head of Mill Creek through a set of tide gates, which are closed during high tides, leaving no outlet for the flows from these storm sewers.

The Route 3 Service Road and portions of Route 3, both County roads, become impassable during periods of heavy rain and high tides. Route 3 and the Plaza Center area drain to a sensitive, protected wetland. Without proper stormwater detention in this area, the wetland could be jeopardized by automotive/roadway runoff and/or hazardous roadway spills.

##### **Acorn and Farm Road**

Flooding occurs in the area of Acorn and Farm Roads. Underground storage tanks and pumps were installed to pump stormwater around the existing tide gates directly into the Hackensack

River. However, these pumps are of insufficient capacity and can only accommodate rainfalls of moderate intensity and brief duration.

#### Wood Avenue

Due to its close proximity to the Hackensack River, the intersection of Wood Avenue and the Grace Street Ramp experiences persistent, heavy flooding. At times the area is impassable.

#### Paterson Plank Road

The existing 18- and 24-inch storm sewers are in poor structural condition on Paterson Plank Road from the Hackensack River to Huber Street.

The eastern end of Paterson Plank Road experiences heavy flooding and occasional road closures due to insufficient drainage.

#### Radio Avenue

The steep slope from Kroll Terrace to Radio Avenue results in water accumulation on Radio Avenue faster than the existing system in Radio Avenue can drain the roadway.

#### Meadowlands Parkway

All of the outfalls along Meadowlands Parkway, 10<sup>th</sup> Street, 9<sup>th</sup> Street and Mansfield Avenue have settled, causing flooding on these streets during heavy rainfall and high tide events. This flooding affects residential as well as industrial areas, including the Panasonic and Hess facilities. Most significantly, the access to the Meadowlands General Hospital, located in this area, may be jeopardized by flooding.

#### Penhorn Creek

- The capacity of the pump station is insufficient. This pump station is a county facility with a secondary pump station at Secaucus Road and Penhorn Avenue.
- Sections of the Penhorn Creek are diverted by culverts, which are clogged with debris.
- During heavy rainfall events, Secaucus Road and Penhorn Avenue experience flooding and frequent road closings, which have forced businesses on Penhorn Avenue to close

**SECTION 5.0**

## **5.0 DESIGN AND PERFORMANCE STANDARDS**

The Town will adopt 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 the language for maintenance of stormwater management measures consistent with the *Rules* at *N.J.A.C. 7:8-5.8 Maintenance Requirements*, and language for safety standards consistent with *N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins*.

During construction, Town inspectors will perform temporary inspections of the construction of the project to ensure that the stormwater management measures are constructed and function as designed.

The Stormwater Control Ordinance, provided in Appendix 1, should be inserted into this section in its entirety.

**SECTION 6.0**

## **6.0 PLAN CONSISTENCY**

A significant portion of the Town is located within the jurisdiction of the New Jersey Meadowlands Commission, which exercises planning and zoning powers within the Town. According to the NJDEP Bureau of Non-Point Pollution Control, the Meadowlands Commission is preparing a Regional Stormwater Management Plan. Despite several attempts to confirm whether the Meadowlands Commission is preparing such a plan, no response has been received to date. If and when the Regional Stormwater Management Plan is completed, this MSWMP would need to be updated to be consistent.

It appears that no TMDLs have been developed for waters within the Town; if any TMDLs are developed in the future, this MSWMP will be updated to be consistent.

The MSWMP is consistent with the *Residential Site Improvement Standards (RSIS)* at N.J.A.C. 5:21. The municipality will utilize the most current update of the *RSIS* in the stormwater management review of residential areas. This MSWMP will be updated to be consistent with any future updates to the *RSIS*.

**SECTION 7.0**

## **7.0 NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES**

The Town has reviewed the *Master Plan* and Development Regulations, and has provided a list of the sections in the Town ordinances that are to be modified to incorporate nonstructural stormwater management strategies. These are the ordinances identified for revision. Once the ordinance texts are completed, they will be submitted to the county review agency for review and approval. A copy will be sent to the Department of Environmental Protection at the time of submission.

Chapters 19 (Land Use Procedures), 76A (Flood Damage Prevention), 109 (Tree Conservation), 114 (Soil Removal), 119 (Subdivision of Land), 127A (Residential Parking), and 135 (Zoning) of the Town Code were reviewed with regard to incorporating nonstructural stormwater management strategies.

### **7.1 CHAPTER 76A – FLOOD DAMAGE PREVENTION**

Section 76A-6 states that “no structure or land shall hereafter be constructed, located, extended, converted or altered without full compliance with the terms of this chapter and other applicable regulations.” This statement would include the NJDEP *Flood Hazard Area Control Act Rules* (N.J.A.C. 7:13), however, these ordinances are not wholly consistent with *N.J.A.C. 7:13*. Two examples of this inconsistency are found in Section 76A-12D and 76A-12E. The current text of 76A-12D states:

- 1.) Notify adjacent communities and the state coordinating agency prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration, and,
- 2.) Require that maintenance is provided within the altered or relocated portion of the watercourse so that the flood-carrying capacity is not diminished.

This ordinance should be amended to state: “Alteration of watercourses is prohibited except where necessary to control existing flooding and or erosion which threatens life or property or in cases in which the New Jersey Department of Environmental Protection (NJDEP) determines that the effects of channelization are offset by the resulting restoration or improvement of the

natural characteristics of the nearby environment. Any alteration to a watercourse requires an NJDEP-issued permit.”

Additionally, this section should be amended to state: “The NJDEP Flood Hazard Area Control Act Rules (N.J.A.C. 7:13) contains detailed regulations regarding development in and maintenance of the flood plain and the watercourses that create them. All flood plain and watercourse activities must comply with the NJDEP regulations.”

The current text of Section 76A-12E states that the local administrator shall make interpretations where needed as to the exact location of the boundaries of the areas of special flood hazards, for example, where there appears to be a conflict between a mapped boundary and actual field conditions.

This section is inconsistent with State regulations. This section should be amended to state: “In areas where there appears to be a conflict between a mapped boundary and actual field conditions, the flood elevation shall be established by a New Jersey Licensed Land Surveyor based on the Flood Insurance Rate Map (FIRM) flood elevations.”

## **7.2 CHAPTER 109 – TREE CONSERVATION**

Chapter 109 addresses the planting, maintenance and removal of trees and shrubs. This section should be amended to set out a “critical footprint area” that extends 20 feet beyond the driveway and building footprint where clearing of trees cannot occur without proper justification. This complies with minimizing land disturbance, which is a nonstructural stormwater management strategy.

## **7.3 CHAPTER 119 – SUBDIVISION OF LAND**

### **Section 119-10: Preliminary Plat**

This section requires that watercourses and natural features, such as wooded areas and rock formations must be depicted on the application plans. This section should be amended to add steep slopes, historic sites, wetlands and floodplains.

**Section 119-19: Public Use and Service Areas**

This section requires that natural features, such as trees, brooks, hilltops and views be preserved whenever possible. This section should be amended to expand trees to forested areas, to ensure that leaf litter and other beneficial aspects of the forest are maintained in addition to the trees.

**7.4 CHAPTER 135 – ZONING**

The Town has 3 types of residential districts. Each of the districts has a maximum lot coverage allocation, ranging from 30 percent in the Low Density Residential Zone (which is under Hackensack Meadowlands Development Commission jurisdiction) to 40 percent in Residential Zone B. The Town has 2 types of non-residential districts, commercial and light industrial. The light industrial zone allows up to 50% lot coverage. Language should be added to this chapter to create a maximum allowable lot coverage percentage for the commercial zone.

Additionally, the Code should be revised to state that applicants must satisfy the percent impervious requirements as well as comply with the *Design and Performance Standards for Stormwater Management Measures (N.J.A.C. 7:8-5)*.

**Section 135-7.1D: Low Density Residential Zone Buffer Requirements**

Section 135-7.1D requires that there shall be a 50 foot wide buffer strip of wetland between any development and the Hackensack River or any of its tributaries to insure proper maintenance and edge effect at such border. Buffer zones shall also be required to be placed in areas where a commercial or industrial use abuts a residential zone. The buffer zone shall be kept in its natural state where wooded. The use of native vegetation, which requires less fertilization and watering than non-native species, should be utilized to the maximum extent practicable before utilizing walls or berms. Additionally, language should be included to allow buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces.

Section 135-7.2: Residential Driveways; Locations; Open Space Requirements; Curb Cuts, Non-Conforming Situations

Section 135-7.2A(2) states "Notwithstanding any other provision to the contrary, a person shall be permitted to expand the width of the driveway, toward the closer side yard property line, and not in the other direction, so as to extend in front of the house or residence, for the purpose of achieving additional space." This section should be amended to permit the width of driveways to be 9 feet for one lane and 18 feet for two lanes and to allow the use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge, where practical.

**7.5 NEW ORDINANCES**

Minimization of Turf Grass Lawn Areas

In order to minimize turf grass lawn areas, a new ordinance should be established to discourage enlargement of existing turf lawn areas without proper justification.

Unconnected Impervious Areas

Disconnection of impervious areas can occur in both low density development and high density commercial development, provided sufficient vegetated area is available to accept dispersed stormwater flows. Areas for disconnection include parking lot or cul-de-sac islands, lawn areas and other vegetated areas.

Applicants should be required to disconnect impervious surfaces to promote pollutant removal and groundwater recharge.

Vegetated Open Channels

The use of vegetated channels, rather than the standard concrete curb and gutter configuration, can decrease flow velocity, and allow for stormwater filtration and re-infiltration.

Section 5.3(b)8 of the *Rules* indicates that nonstructural stormwater management strategies incorporated into site design shall provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas. The Town has no existing ordinances regarding the use of vegetated open channels. Therefore, a new ordinance should be adopted

to encourage the use of vegetated open channel conveyance instead of the standard curb and gutter design where practical. One design option is for vegetated channels that convey smaller storm events, and provide an overflow into a storm sewer for larger storm events.

*Soil Erosion and Sediment Control*

Chapter 76A of the Town's Ordinance should require all new development and redevelopment plans to comply with New Jersey's *Soil Erosion and Sediment Control Standards*. During construction, any issues associated with soil erosion and sediment control measures witnessed by Town inspectors should be reported to the local Soil Conservation District.

**SECTION 8.0**

## **8.0 LAND USE / BUILD OUT ANALYSIS**

The Town of Secaucus has a combined total of significantly less than one square mile of vacant or agricultural land. Therefore, a “build-out” analysis is not required.

Figure 6 illustrates the existing land use in the Town based on 1995/97 GIS information from NJDEP.

The Zoning Map currently utilized by the New Jersey Meadowlands Commission is shown in Figure 8.

Wetlands and floodplains occupy a significant portion of the Town. These lands are constrained by regulatory development restrictions. Figure 9 illustrates the constrained lands within the Town.

**SECTION 9.0**

## **9.0 MITIGATION PLAN**

This mitigation plan is provided for a proposed development or redevelopment projects that seek a variance or exemption from the Town Municipal Stormwater Management Plan or the *Rules*. Approval of the option to utilize a mitigation plan and choice of mitigation plan shall be under the sole discretion of the Town agency providing review, i.e. Board of Adjustment, Planning Board, Town Council and the Town Engineer.

Any relief from this MSWMP or the *Rules* via a mitigation plan option shall utilize an option to provide equal or greater, quantifiable benefit than the specific relief being sought. For example, if a relief for stormwater quality is sought for a particular project, the necessary amount of stormwater quality improvements shall be accomplished via the mitigation plan. Calculations shall be provided indicating the parameter of relief being sought along with equal or greater benefit via the mitigation plan option. These calculations shall be reviewed and approved by the Town Engineer prior to being reviewed by the appropriate reviewing authority.

In general, the mitigation project must be implemented in the same drainage area as the proposed development. The applicant must ensure the long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater BMP Manual. It is preferred that mitigation options be chosen within the locally-controlled portion of the Town.

If a suitable site cannot be located in the same drainage area as the proposed development, a mitigation project may be selected that is not within the same drainage area but does provide an equal relief.

As a third option, in the case of mitigation plan options that do not address the variance or relief sought, the applicant may create a new mitigation option or provide a cash contribution to the Town of Secaucus which will be used by the Town for Town-wide drainage improvements and stormwater management improvement planning. The amount of the contribution shall be based on the relief being sought, the applicant's opinion on the cost impacts to meet this Plan and the *Rules*, and the discretion of the Town agency providing review, i.e. Board of Adjustment, Planning Board, Town Council and the Town Engineer.

The applicant can select one of the following projects listed to compensate for the deficit from the performance standards resulting from the proposed project. The applicant will also be responsible for any State, Federal, County or local approvals required to implement the mitigation project. More detailed information on the projects can be obtained from the Town Engineer.

A current list of mitigation options is maintained by the Town Engineer.

#### Plaza Center Area

- Installation of new tide gate/pump station at the foot of Gail Place.
- Extension and connection of the existing Plaza storm sewer discharge line to the new pump station.
- Clean/replace undersized Plaza storm sewers.
- Install a detention basin to protect the wetland in case of a spill of hazardous materials on Route 3.
- Design and construct dike area at headwaters of Mill Creek and pump station to alleviate flooding of the Central Business District. This dike would also serve to detain any hazardous materials resulting from a roadway spill.

#### Acorn and Farm Road

- Construct a new storm water pumping station, refurbish the existing tide gates, and/or increase the capacity of the storm sewers in the area.

#### Wood Avenue

- Increase the capacity of the existing storm sewers in the area of Wood Avenue and Grace Street.
- Construct a combination tide gate/pumping station where the system discharges to the Hackensack River

#### Schoppman Drive

- Construct a stormwater line along the entire length of Schoppman Drive and connect the line to the Born Street Pump Station.

#### Paterson Plank Road

- Replace the failed vitrified, tile lines in Paterson Plank Road between the Hackensack River and Huber Street.
- Investigate the need for a pump station and tide gate at the eastern end of Paterson Plank Road.

#### Mill Ridge Road

- Connect all existing stormwater drains on Mill Ridge Road and the intersection of Mill Ridge Road and Koelle Boulevard to the high school pump station.

#### Radio Avenue

- Abandon the ditch behind the homes on Valley Court, redirecting the flow from Fairview Avenue and Arn Terrace to Gail Place, increasing the capacity of the line in Gail Place and discharging this flow to the proposed tide gate/pump station on Mill Creek at the foot of Gail Place.
- Install a new drainage system on Kroll Terrace and Pike View Terrace.

#### Meadowlands Parkway

- Perform a study of the entire area along Meadowlands Parkway, 10<sup>th</sup> Street, 9<sup>th</sup> Street and Mansfield Avenue.
- Design and construct flood protection along Sack Creek in the vicinity of the Harmon Cove Towers, to prevent flooding of parking garages in this area during rains and high tide events.

#### Penhorn Creek

- Perform debris removal for all culverts along Penhorn Creek.
- Drainage improvements at the intersection of Secaucus Road and the Turnpike overpass.

### Sack Creek

- Perform maintenance including silt removal within the main channel waterway from Golden Avenue to its outlet at the Hackensack River, including interior silt removal for all culverts.
- Remove silt from the Sack Creek tributary channel.

### Facilities Improvements

- Replace or eliminate Metro Way culverts
- Replace Secaucus Road culvert
- Replace the smaller culverts at Gilbert Drive and Lincoln Avenue
- Improve the conveyance and capacity of the main stem Sack Creek channel (Secaucus Road to Sinvalco Road)
- Construct a new stormwater pump station, dam and tide gates along the lower reaches of the main stem of Sack Creek (Note: tide gates currently under construction)

### Golden Ave local drainage improvements

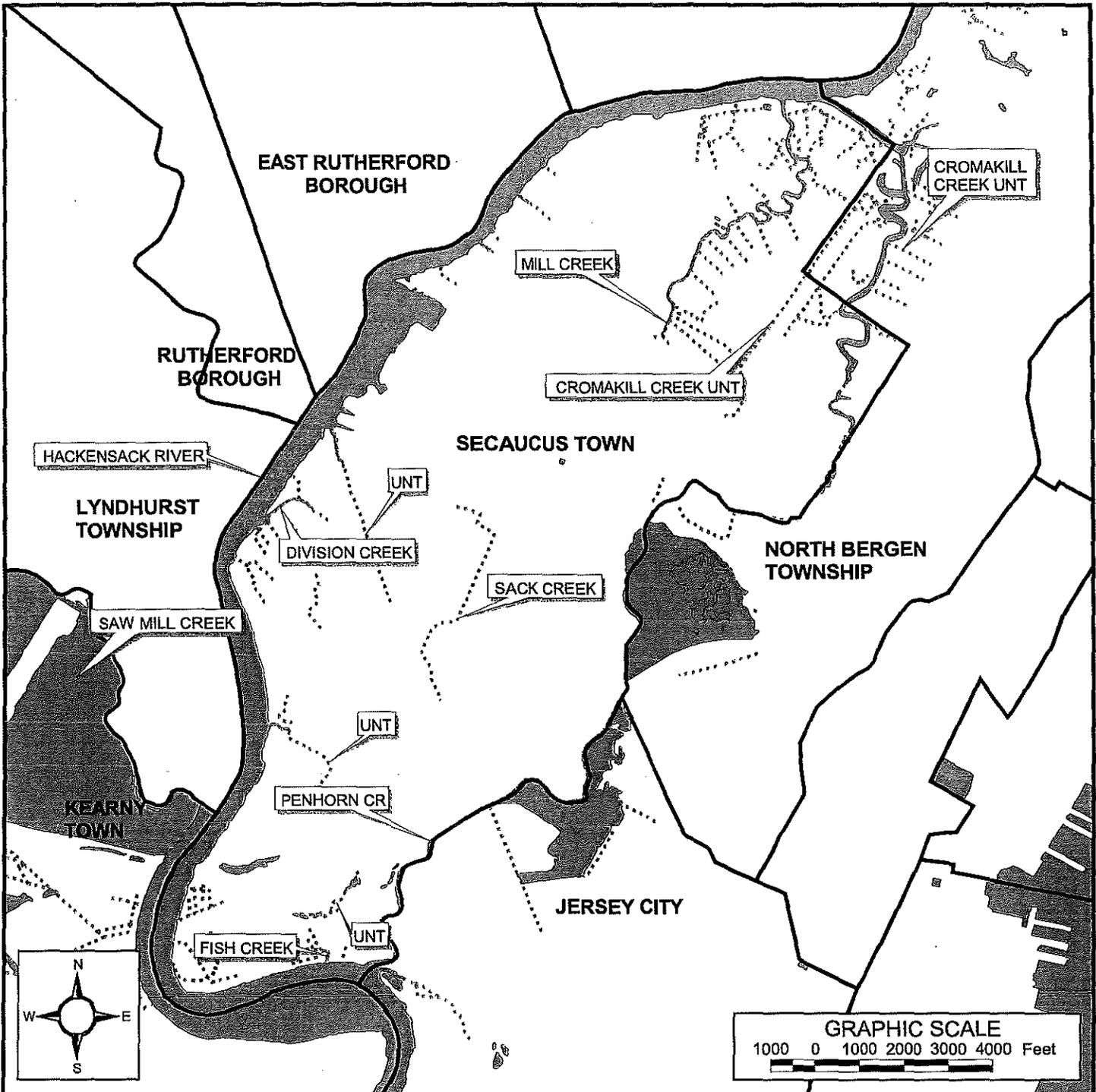
- Raise the existing drainage berms slightly to provide an increased dividing point between Sack Creek and residential properties
- Install adequate, functional flap valves or check valves on all local drainage outlets to minimize backwater impacts

### General

- Provide public education on flooding issues, flood insurance, emergency evacuation, and residential and commercial planning to reduce flood hazards and losses.
- Implement enhancements to the current flood warning program.
- Implement sanitary sewer rehabilitation measures to reduce surcharging impacts.
- Construct smaller localized drainage measures to improve upon isolated drainage problems (curb replacements, drain inlet construction, small regrading projects).
- Reduce property losses through elevation or acquisition of severely flood-impacted properties.
- Enhance current maintenance program for drainage ditches, waterways and systems to remove silt and debris.

- Continue the current open space initiative programs to enhance and fund the acquisition of new wetland and/or open space areas.

## FIGURES



## TOWN & ITS WATERWAYS

Legend:

 MUNICIPAL BOUNDARY

 STREAMS

 LAKES

UNT: UN-NAMED TRIBUTARY

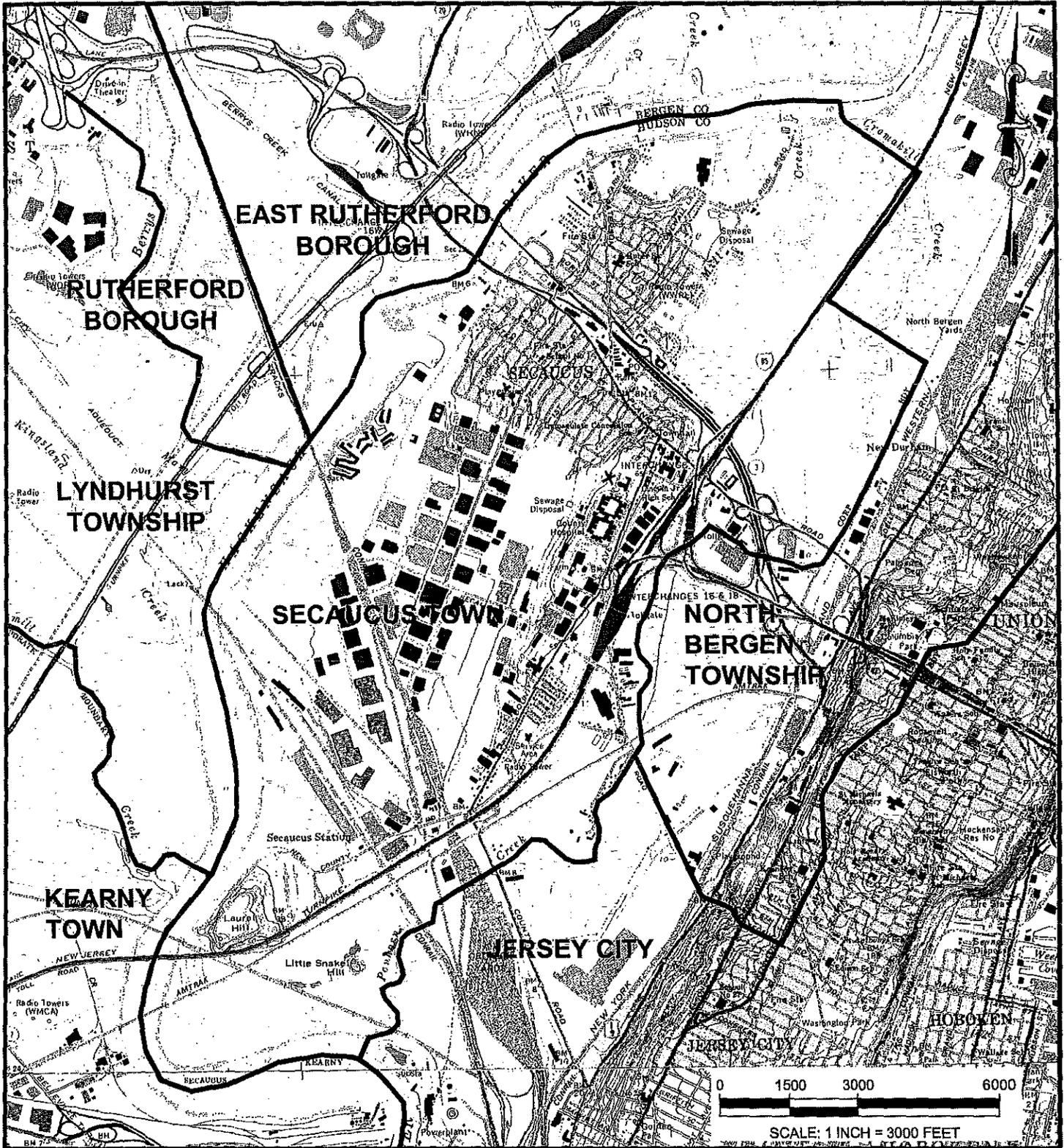
SOURCE:  
NJDEP digital GIS data.

TOWN OF SECAUCUS  
1203 PATERSON PLANK ROAD  
HUDSON COUNTY, NEW JERSEY



65 Jackson Drive, Cranford, New Jersey 07016  
(908) 497-8900 \* Fax: (908) 497-8945 \* www.pmkgroup.com  
CERTIFICATE OF AUTHORIZATION #24GA28028000

Drawn By: TS	Date: 4/19/05
Checked By: DS	Scale: As Noted
Project No. 046500-03	Figure 2



SOURCE: U.S.G.S. 7.5 MINUTE SERIES  
 WEEHAWKEN & JERSEY CITY  
 QUADRANGLES (1967 REV. 1981)  
 NEW JERSEY-NEW YORK

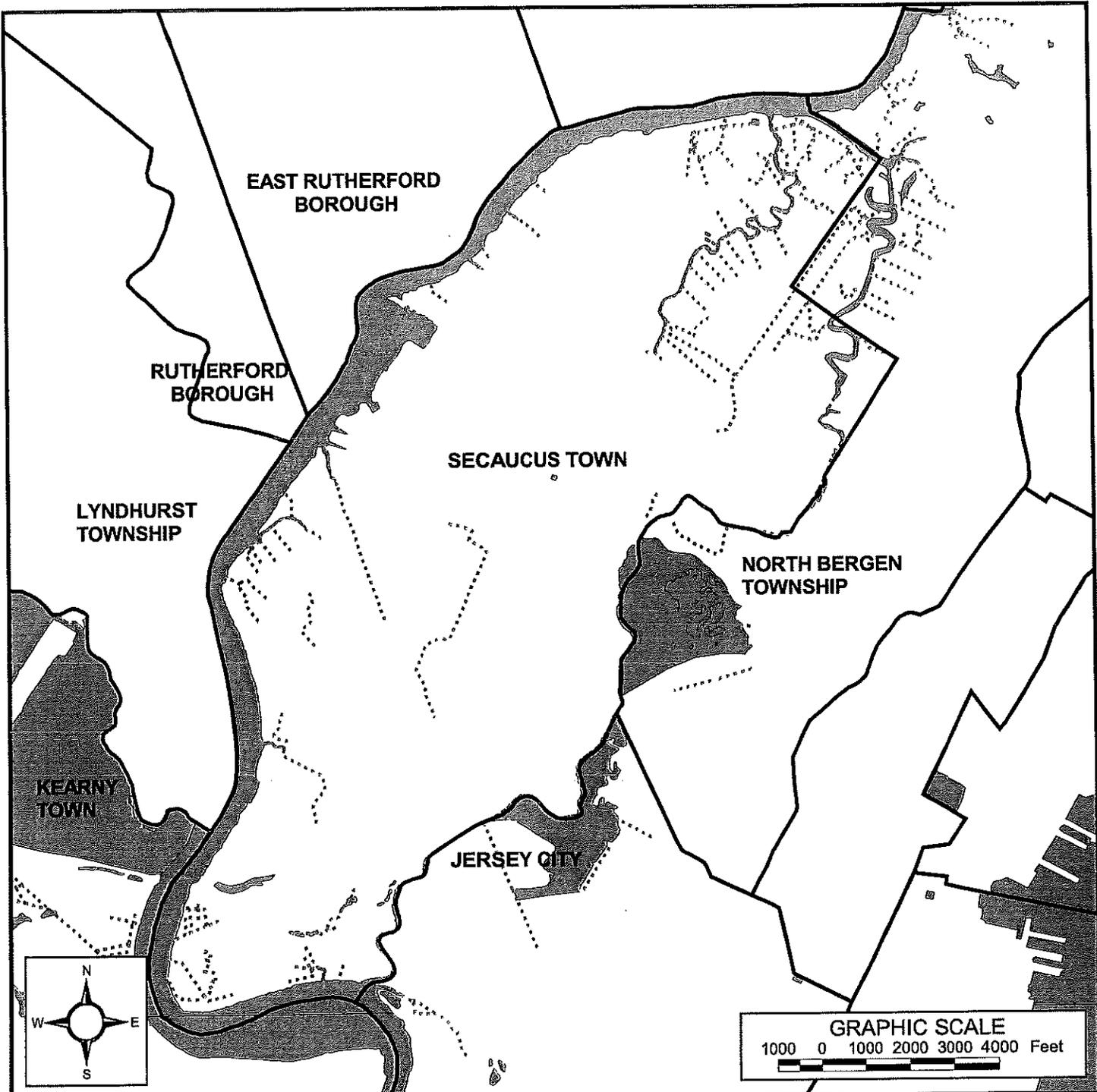
## USGS TOPOGRAPHIC MAP

TOWN OF SECAUCUS  
 1203 PATERSON PLANK ROAD  
 HUDSON COUNTY, NEW JERSEY



65 Jackson Drive, Cranford, New Jersey 07016  
 (908) 497-8900 \* Fax: (908) 497-9134 \* www.PMKgroup.com  
 CERTIFICATE OF AUTHORIZATION #24GA28028000

DRAWN BY:	TS	DATE:	4/19/05
CHECKED BY:	DS	SCALE:	1"=3000'
PROJECT NO.:	046500-03		PLATE NO.
			3



**GROUNDWATER RECHARGE AREAS**

Legend:

-  MUNICIPAL BOUNDARY
-  STREAMS
-  LAKES

**THERE ARE NO MAPPED  
GROUNDWATER RECHARGE AREAS  
IN THE TOWN OF SECAUCUS**

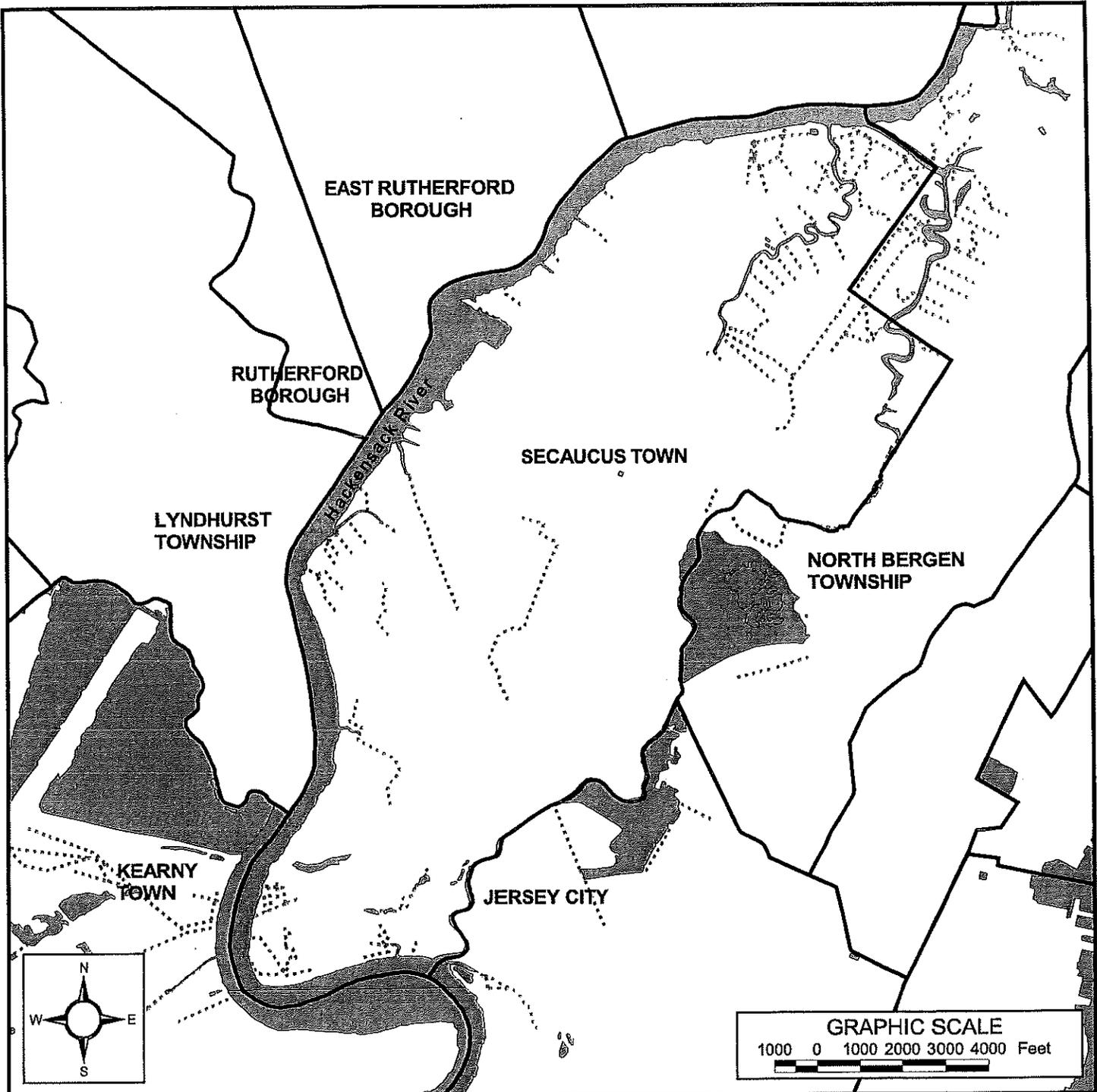
**SOURCE:**  
NJDEP digital GIS data.

**TOWN OF SECAUCUS  
1203 PATERSON PLANK ROAD  
HUDSON COUNTY, NEW JERSEY**



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CERTIFICATE OF AUTHORIZATION #24GA28028000

Drawn By: TS	Date: 4/19/05
Checked By: DS	Scale: As Noted
Project No. 046500-03	Figure 4



**WELLHEAD PROTECTION AREAS**

Legend:

-  MUNICIPAL BOUNDARY
-  STREAMS
-  LAKES

**THERE ARE NO MAPPED WELLS OR WELLHEAD PROTECTION AREAS IN THE TOWN OF SECAUCUS**

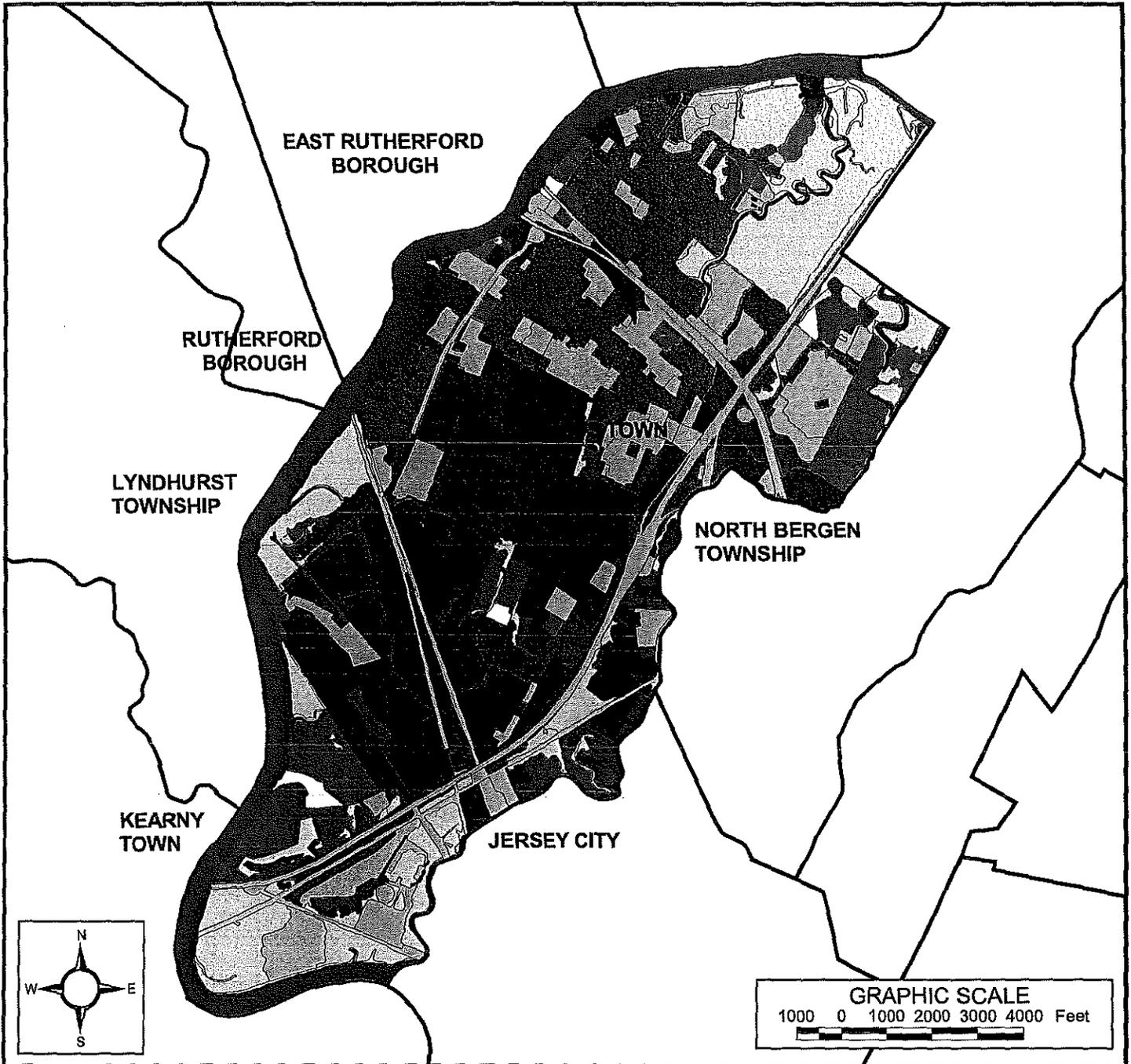
**SOURCE:**  
NJDEP digital GIS data.

**TOWN OF SECAUCUS**  
1203 PATERSON PLANK ROAD  
HUDSON COUNTY, NEW JERSEY



65 Jackson Drive, Cranford, New Jersey 07016  
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CERTIFICATE OF AUTHORIZATION #24GA28028000

Drawn By: TS	Date: 4/19/05
Checked By: DS	Scale: As Noted
Project No. 046500-03	Figure 5



**EXISTING LAND USE MAP**

**Legend:**

- MUNICIPAL BOUNDARY
- ALTERED LANDS
- ATHLETIC FIELDS (SCHOOLS)
- COMMERCIAL/SERVICES
- FORESTED AREAS
- EXTRACTIVE MINING
- INDUSTRIAL
- MIXED RESIDENTIAL
- OTHER URBAN OR BUILT-UP LAND
- RECREATIONAL LAND
- RESIDENTIAL, HIGH DENSITY, MULTIPLE DWELLING
- RESIDENTIAL, SINGLE UNIT, MEDIUM DENSITY
- TRANSITIONAL AREAS
- TRANSPORTATION/COMMUNICATIONS/UTILITIES
- WATERBODIES
- WETLAND AREAS

**SOURCE:**  
NJDEP digital GIS data.

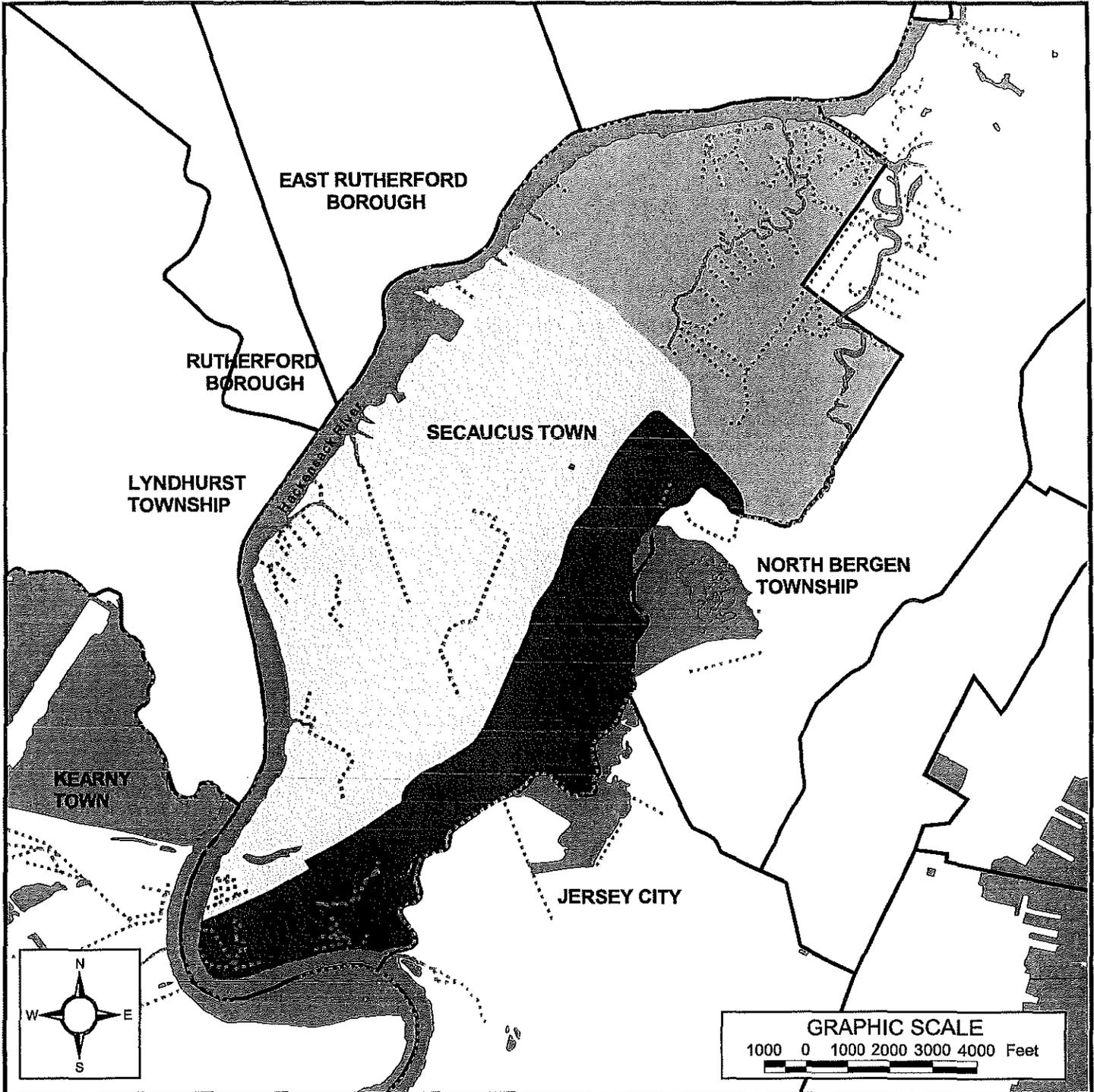
**TOWN OF SECAUCUS**  
1203 PATERSON PLANK ROAD  
HUDSON COUNTY, NEW JERSEY



**PMK Group**  
CONSULTING & ENVIRONMENTAL ENGINEERS

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CERTIFICATE OF AUTHORIZATION #24GA28028000

Drawn By: TS	Date: 4/19/05
Checked By: DS	Scale: As Noted
Project No. 046500-03	Figure 6



**HYDROLOGIC UNITS (HUC-14s)**

**Legend:**

MUNICIPAL BOUNDARY

LAKES

STREAMS

02030103180080- HACKENSACK RIVER  
(RT 3 TO BELLMANS CREEK)

02030103180090- HACKENSACK RIVER  
(AMTRAK BRIDGE TO RT 3)

02030103180100- HACKENSACK RIVER  
(BELOW AMTRAK BRIDGE)

**SOURCE:**  
NJDEP digital GIS data.

**TOWN OF SECAUCUS**  
1203 PATERSON PLANK ROAD  
HUDSON COUNTY, NEW JERSEY

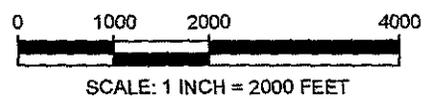


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CERTIFICATE OF AUTHORIZATION #24GA28028000

Drawn By: TS	Date: 4/19/05
Checked By: DS	Scale: As Noted
Project No. 046500-03	Figure 7



- AVIATION FACILITIES (AF)
- COMMERCIAL PARK (CP)
- ENVIRONMENTAL CONSERVATION (EC)
- HEAVY INDUSTRIAL (HI)
- HIGHWAY COMMERCIAL (HC)
- INTERMODAL A (IA)
- INTERMODAL B (IB)
- LIGHT INDUSTRIAL A (LI-A)
- LIGHT INDUSTRIAL B (LI-B)
- LOW DENSITY RESIDENTIAL (LDR)



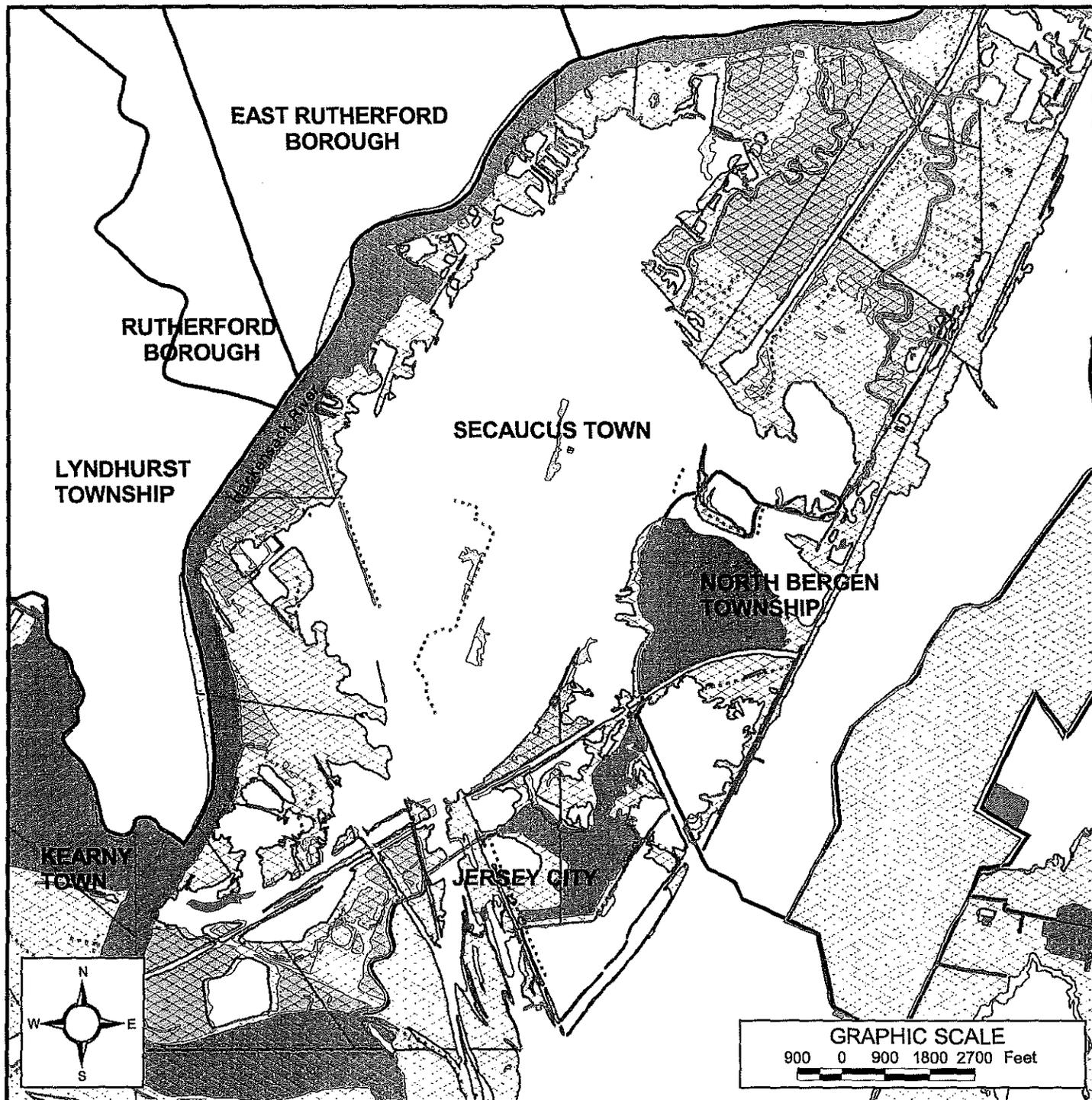
SOURCE: NEW JERSEY MEADOWLANDS COMMISSION  
 PROPOSED OCTOBER 6, 2003, REVISED & ADOPTED  
 FEBRUARY 17, 2004

## ZONING MAP

TOWN OF SECAUCUS  
 1203 PATERSON PLANK ROAD  
 HUDSON COUNTY, NEW JERSEY

**PMK Group**  
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 CERTIFICATE OF AUTHORIZATION #24GA28028000

DRAWN BY: TS	DATE: 4/19/05
CHECKED BY: DS	SCALE: AS NOTED
PROJECT NO: 046500-03	PLATE NO: 8



### CONSTRAINED LAND MAP

Legend:

- MUNICIPAL BOUNDARY
- LAKES
- STREAMS
- ARTIFICIAL LAKES
- WETLAND AREAS
- SALINE MARSHES
- 100 YEAR FLOOD PLAIN
- 500 YEAR FLOOD PLAIN

SOURCE:  
NJDEP digital GIS data.

TOWN OF SECAUCUS  
1203 PATERSON PLANK ROAD  
HUDSON COUNTY, NEW JERSEY



65 Jackson Drive, Cranford, New Jersey 07016  
(908) 497-8900 \* Fax: (908) 497-8945 \* www.pmkgroup.com  
CERTIFICATE OF AUTHORIZATION #24GA28028600

Drawn By: TS	Date: 4/19/05
Checked By: DS	Scale: As Noted
Project No. 046500-03	Figure 9

**APPENDIX 1**  
**STORMWATER CONTROL ORDINANCE**

## APPENDIX 1: Stormwater Control Ordinance

### 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 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 preempted 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 by the Town of Secaucus.
- 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 Town of Secaucus, 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 muhlenbergi* (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 be dedicated to a government agency, subjected to a conservation restriction filed with the appropriate County Clerk's office, or subject 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 downgradient 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.

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

Best Management Practice	TSS Percent Removal Rate
Bioretention Systems	90
Constructed Stormwater Wetland	90
Infiltration Structure	40-60
Extended Detention Basin	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 6: 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 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.  
Note to the Applicant: The provisions of this section are not intended to 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:

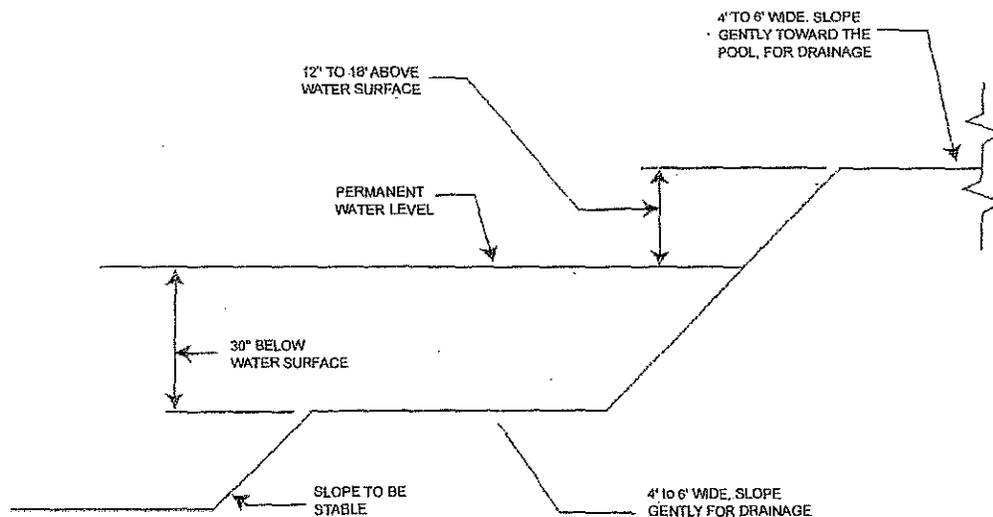
- a. If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Section 8.C a free-standing outlet structure may be exempted from this requirement.
- b. Safety ledges shall be 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

Depicted is an elevational view.



NOTE: NOT DRAWN TO SCALE

NOTE: FOR BASINS WITH PERMANENT POOL OF WATER ONLY

## 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 Town 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 contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual. If the maintenance plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of

such person's agreement to assume this responsibility, or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.

3. Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.
4. If the person responsible for maintenance identified under Section 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 and adjust the plan and the deed as needed.
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.
11. A two year maintenance guarantee in accordance with N.J.S.A. 40:55D-53 shall be posted for the maintenance of the stormwater facilities.

12. Guidelines for developing a maintenance and inspection program are provided in the New Jersey Stormwater Best Management Practices Manual and the NJDEP Ocean County Demonstration Study, Stormwater Management Facilities Maintenance Manual, dated June 1989 available from the NJDEP, Watershed Management Program.)

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:

~~Municipality to specify:~~

### **Section 12: Effective Date**

This ordinance shall take effect 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.

### **Section 13: Severability**

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.