MUNICIPAL STORMWATER MANAGEMENT PLAN FOR BOROUGH OF ROCKAWAY

MORRIS COUNTY, NEW JERSEY

April 2005

PREPARED BY:

SPILLANE ENGINEERING ASSOCIATES
124 MORRIS TURNPIKE
RANDOLPH, NJ 07869

Michael J. Spillane
Professional Engineer & Land Surveyor #17569
Professional Planner #3627

STORMWATER MANGEMENT PLAN

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I. INTRODUCTION

In accordance with the requirements of N.J.A.C. 7:14A-25 Municipal Stormwater Regulations, all municipalities are required to adopt a Municipal Stormwater Management Plan, which outlines the strategy and objectives for the municipality to address stormwater related impacts. This plan prepared for the Borough of Rockaway is intended to satisfy those conditions. The plan contains the required elements as described in N.J.A.C. 7:8, Stormwater Management Rules, and addresses groundwater recharge, stormwater quantity, and stormwater quality impacts. All of the above is controlled by defining the Stormwater Design and Performance Standards for major development defined as projects that disturb one or more acre of land. The requirements specified herein are intended to minimize adverse impacts of stormwater management related to water quality and flood control along with the loss of groundwater recharge which provides base flow in receiving water bodies. The plan will describe long-term operation and maintenance measures for existing and future stormwater management facilities.

A key element for MSWMP for the Borough of Rockaway will be the build-out analysis based on existing zoning and land available for development. Also included is a review and update of the existing stormwater control ordinances, the Borough Master Plan, and other planning documents that allow for project designs that include low impact development techniques.

The final element of the plan will be a mitigation strategy for those instances when a variance and exemption from the design and performance standards is sought. As part of the mitigation section, specific stormwater management measures are identified to mitigate the impacts of development.

II. OBJECTIVES

The Borough of Rockaway Municipal Stormwater Management Plan (MSWMP) has been prepared to meet the following objectives:

1. To minimize the potential for flood damage to life and property.

2. To minimize and effectively mitigate any increase in stormwater runoff from any new development or redevelopment proposals.

3. To minimize or prevent the erosion of soil from any land development or construction activity.

4. To assure the adequacy and hydraulic function of existing and proposed culverts and bridges, and other in-stream flow control or flood control appurtenances.

5. To encourage through planning and design guidelines, the recharge of stormwater runoff to ground waters to the extent as may be practical based upon soil and groundwater conditions.

6. To prevent, to the greatest extent feasible, any increase in non-point source pollution.

7. To maintain the integrity of Borough steam channels for their biological functions as well as for drainage by enhancing water quality and minimizing silt laden runoff.

8. To minimize the presence of pollutants in stormwater runoff from new and existing development in an effort 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.

9. To protect the public through the proper design and operation of stormwater management facilities.

10. To reduce sedimentation of the stream channels and tributaries of the Rockaway River through runoff water quality enhancement.

11. To promote the conservation of open space and natural resources, and prevent degradation of the environment through improper uses and/or intensities of land.

12. To encourage coordination of municipal regulations and requirements with those of Morris County, the State of New Jersey, and Federal Agencies, which plan and/or regulate environmentally sensitive lands within the Borough, such as flood hazard areas, wetlands, and other environmentally sensitive areas.

13. The regulation of stormwater management activities to ensure compliance with current and future Total Maximum Daily Loads of Pollutants (TMDL's) as determined by the NJDEP for receiving water bodies.

14. To promote the use of low impact development and redevelopment techniques to preserve environmental features.

To achieve these goals and objectives, this document outlines specific stormwater design and performance standards for development and redevelopment proposals within the Borough of Rockaway. Additionally, the MSWMP mandates certain stormwater management mitigation strategies to address impacts from existing development.

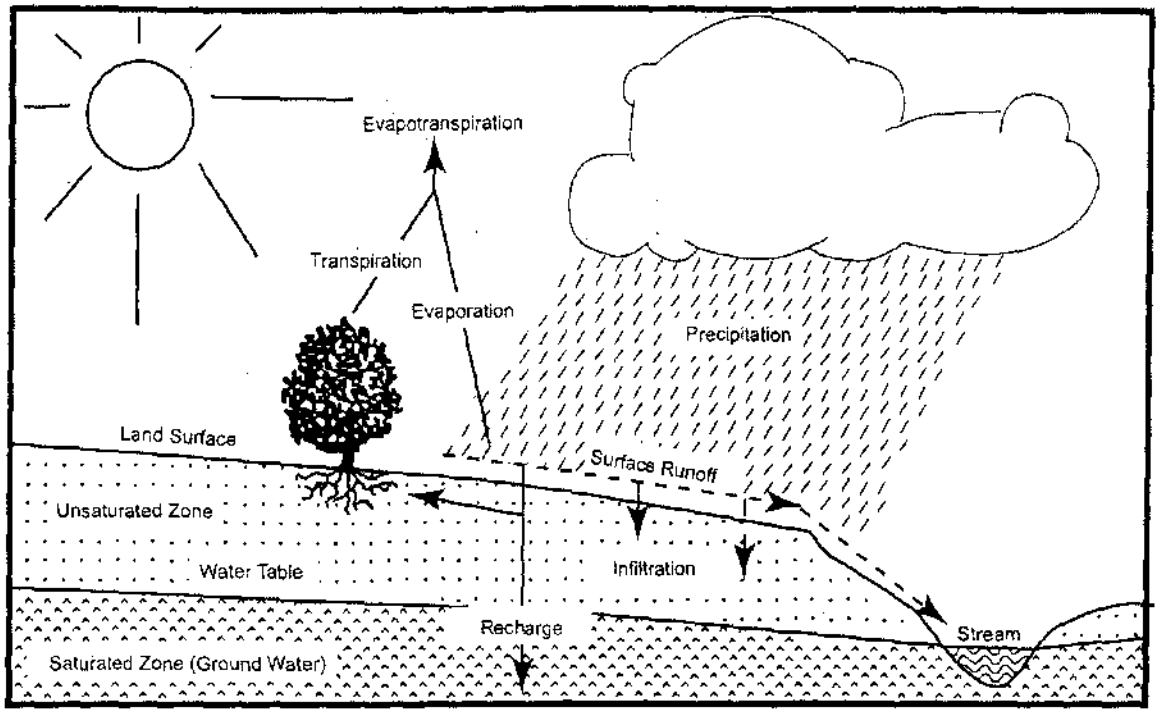
Preventative maintenance and corrective strategies are included in the MSWMP to ensure long-term effectiveness of stormwater management facilities. The plan also outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

III. STORMWATER DISCUSSION

The development of any property from its natural state to a fully developed site can dramatically affect the hydraulic cycle of the site and ultimately the entire watershed. Prior to development, native vegetation can either directly intercept runoff or draw the portion that infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development or alteration of a property's characteristics replaces the natural vegetation with manmade impervious cover or lawns. Those improvements reduce the ability of the soil to absorb the runoff and alter the infiltration characteristics. Construction activities may also impact the soil layers and diminish the soil's ability to absorb stormwater runoff. This increases the volume and rates of stormwater from a site to a surface.

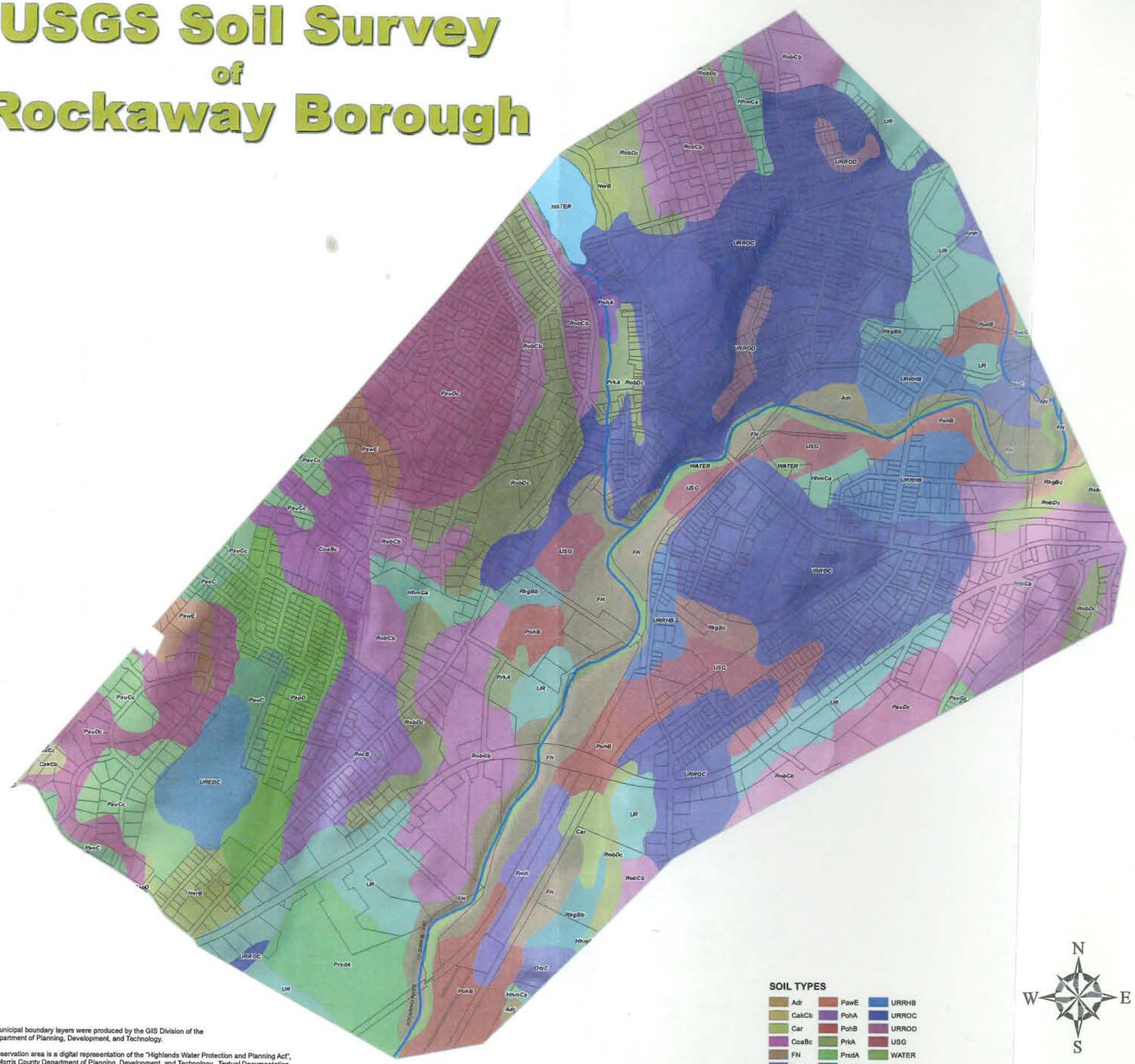
Stormwater management is the application of planning, engineering and construction principals to control quantity and quality of rain induced flows with the goal of minimizing drainage and flood protection costs, improving water quality, and augmenting groundwater supplies. It encompasses three broad activity areas consisting of: 1) general administration, 2) regulations for land use and development, and 3) physical control of stormwater through implementing products involving construction of facilities or use of nonstructural techniques. Uncontrolled development allows for impervious areas connected through various drainage methods to convey runoff more rapidly than natural areas. These increases typically create new and aggravated downstream flooding and soil erosion and ultimately result in sedimentation clogging stream channels. Increase in impervious areas also decreases opportunities for infiltration, which reduces stream base flow and groundwater recharge levels. New impervious surfaces in cleared areas created by development can accumulate a variety of pollutants from the atmosphere, fertilizers, animal waste, and leakage and wear from vehicles. A number of pollutants and nutrients are introduced into the area. The increased pollutant load may also adversely impact water quality and stream characteristics that would prohibit the natural biocycle of streams. The purpose of this MSWMP is to provide the needed stormwater policies for the Borough of Rockaway to utilize in guiding future development in the Borough to ensure that proper regulations and controls are implemented so as to provide the least impact on the environment from any development.

FIGURE 1



Source: New Jersey Geological Survey Report GSR-32.

USGS Soil Survey of Rockaway Borough



Source:

The parcel and municipal boundary layers were produced by the GIS Division of the Morris County Department of Planning, Development, and Technology.

The highlands preservation area is a digital representation of the 'Highlands Water Protection and Planning Act', produced by the Morris County Department of Planning, Development, and Technology. Textual Documentation can be obtained at: bsmith.org/preserving_the_highlands/boundary

The water layers were obtained from the NJDEP website: http://www.nj.gov/dep/gis/lists.html

Soils Information was obtained from the USGS Soil Survey Geography (SSURGO)

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0 0.15 0.3 Miles

SOIL TYPES

Adr	PawE	URRHB
CakCb	PohA	URROC
Car	PohB	URROD
CoaBc	PrkA	USG
FN	PrsdA	WATER
Fmh	RkgBb	
HhmCa	RkgBc	
NerB	RobCb	
OtsC	RobDc	
PaoC	RocB	
PapD	RocC	
PauCc	UR	
PauDc	UREDC	

N W E S

MORRIS COUNTY GIS

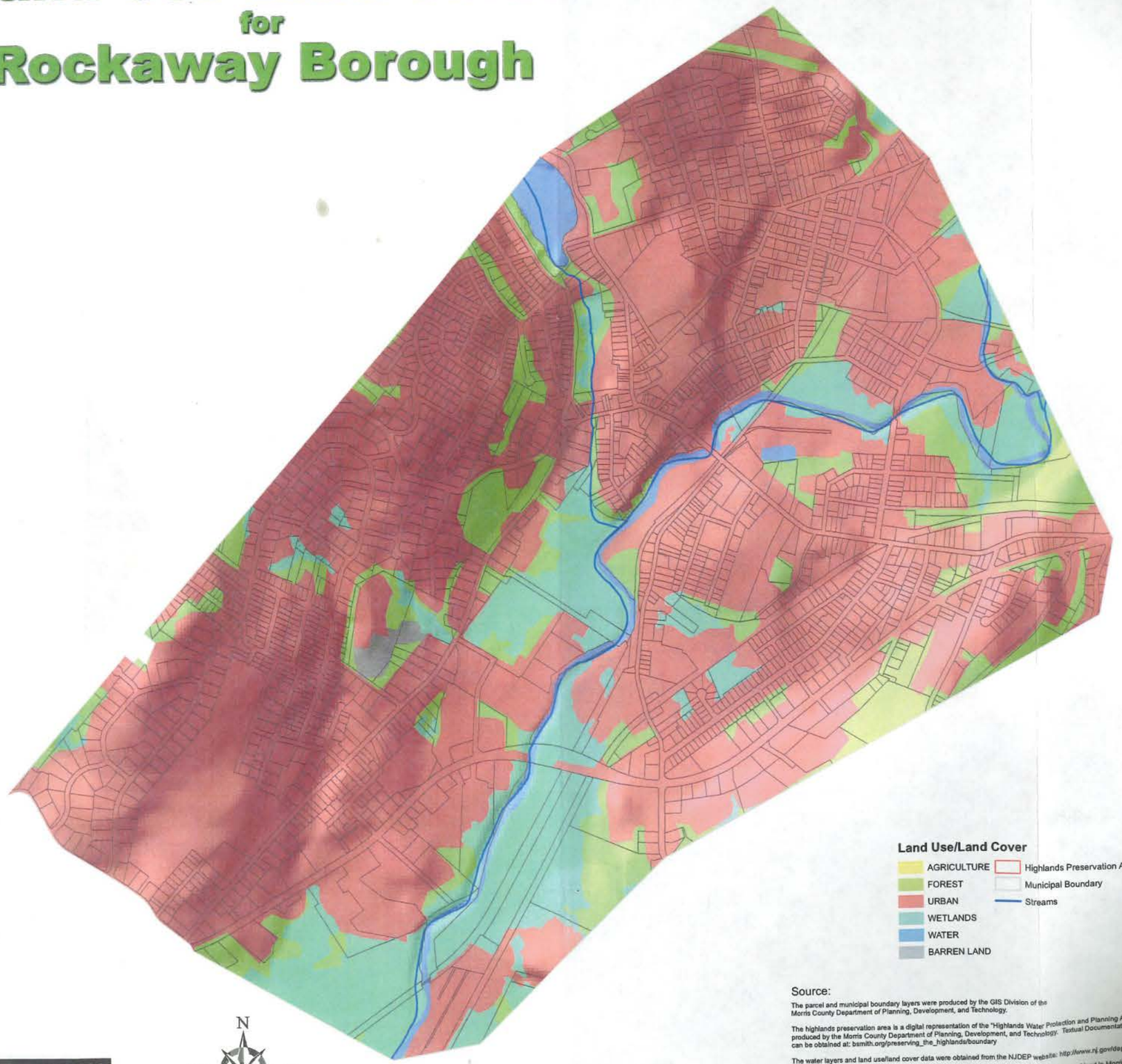
IV. BACKGROUND

The Borough of Rockaway is located in central Morris County and encompasses 2.1 square miles of land area. The Borough is traversed by the Rockaway River and a stream known as Fox Brook. There are substantial flood plains associated with those water bodies as identified in the Borough Master Plan (Master Plan, Borough of Rockaway, Morris County1995, Adrian Humbert Associates). Attached is a copy of the Master Plan Plate No. 3 that outlines the flood plains in the Borough of Rockaway. Spot development has continued within the flood plans all conceived and constructed in accordance with New Jersey Department of Environmental Protection Regulations. The Borough has significant topographic relief with the lowest elevation of approximately 550 feet above sea level to a high point of 850 above sea level.

The soils within the Borough are also identified in the Rockaway Borough Master Plan and Plate No. 1 included herein. As can be seen, there is a considerable variation in the soil classifications throughout the Borough consistent with the topography. The soils tend to be generally not conducive to development because of the various slopes, the depth of the seasonal high water table, and the depth to bedrock. The severity of the slopes is a significant contributor to the drainage discharge from any developed site and requires considerable care and expertise in the design of the stormwater controls that are necessary to realistically and environmentally develop any properties. The population in the Borough of Rockaway has increased from 6,243 persons in 1990 to 6,473 persons in 2000, and the Borough is approximately 90% developed. With the small developable areas remaining it is imperative that sound environmental controls be employed in the development of those properties.

As mentioned above, there are considerable wetlands associated with the streams throughout the watercourses in the Borough. The wetlands provide a habitat for a variety of native vegetation and wildlife, and a goal of this Master Plan is to protect those wetlands and the transition areas around the wetlands to ensure the viability and long term functioning of those wetlands.

Land Use Land Cover
for
Rockaway Borough



Land Use/Land Cover

- AGRICULTURE
- FOREST
- URBAN
- WETLANDS
- WATER
- BARREN LAND
- Highlands Preservation Area
- Municipal Boundary
- Streams

MORRIS COUNTY GIS

N
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0 0.25 0.5 Miles

Source:

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The water layers and land use/land cover data were obtained from the NJDEP website: http://www.nj.gov/dep/gis/lists.html

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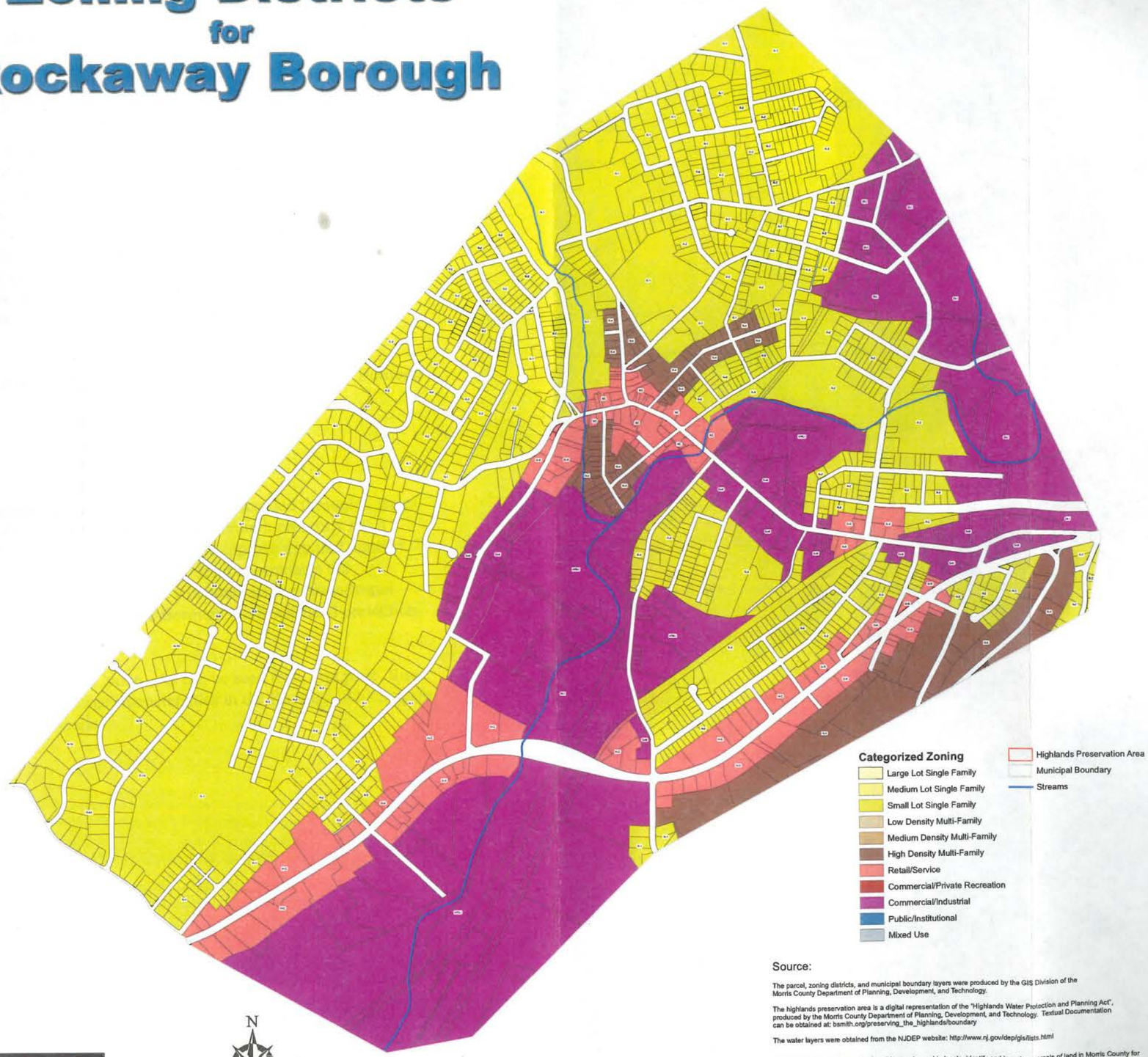
Zoning Districts
for
Rockaway Borough



MORRIS COUNTY GIS

Source:

The parcel, zoning districts, and municipal boundary layers were produced by the GIS Division of the Morris County Department of Planning, Development, and Technology.

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The water layers were obtained from the NJDEP website: http://www.nj.gov/dep/gis/lists.html

V. LAND USE BUILD-OUT ANALYSIS

The Borough land use and land cover is shown on the attached Plate No. 2. Also attached as Plate No. 3 is the Zoning District Map for the Borough.

The Borough of Rockaway utilizes the Morris County Planning Board projections for land use and build-out analysis. According to the County of Morris, seven single-family lots have been developed in the Borough of Rockaway between the years 1997 and 2003. For the year 2010, the County has projected a population of 6,659, which represents an increase of 186 persons. The Metropolitan Planning Agency projected a population growth to 6,910 people in the year 2015. COAH has determined that the Borough of Rockaway has a land credit in that there is no land that would be developable under COAH criteria. As evidenced by Plate 2, the Borough of Rockaway has less than one square mile of vacant or developable land, thus a build-out analysis is not required pursuant to requirements of N.J.A.C. 7:14A-25 Municipal Stormwater Regulations.

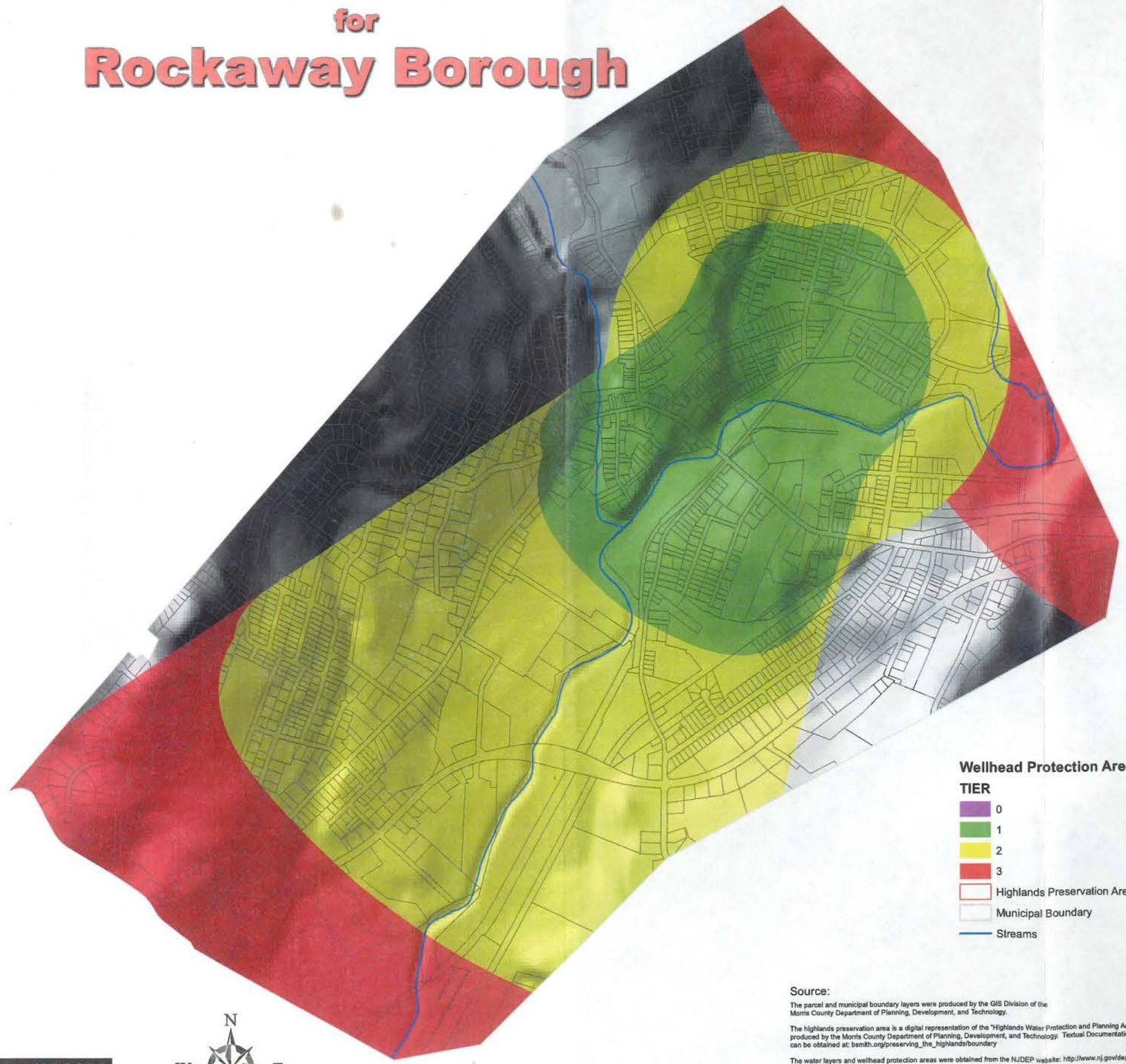
Although a full build-out analysis is not required, the hydrological units for Rockaway Borough are shown on Plate No. 6.

VI. PUBLIC WATER SUPPLY

The Borough operates its own water department/utility. The water is provided through a series of groundwater wells in the bed area of the Rockaway River. The Borough presently has a maximum pumping capacity of 44 million gallons per month and is approaching that number. Given the fact that the Borough's water supply is from groundwater it accentuates the importance of a sound stormwater management program that will continue the groundwater cycle and allow the infiltration and reuse of rainwater. The Borough has a wellhead protection area, which is shown on Plate No. 5.

The groundwater recharge areas are shown as Plate No. 6. As can be seen from that plate, there is a significant variation in the groundwater recharge characteristics in the Borough, which again is consistent with the slope maps and the soil maps.

WellHead Protection Areas
for
Rockaway Borough



MORRIS COUNTY GIS

Source:

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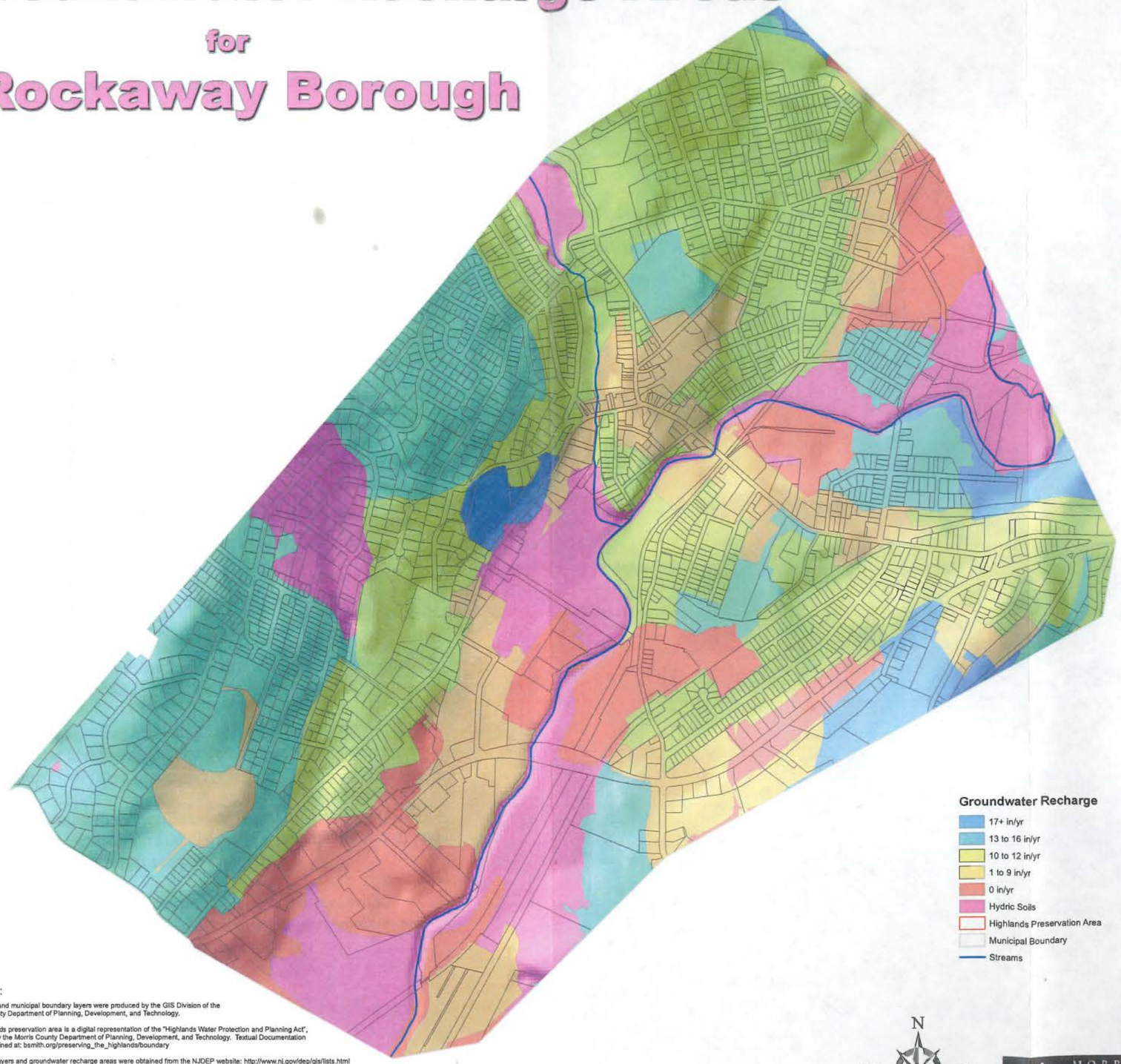
The water layers and wellhead protection areas were obtained from the NJDEP website: http://www.nj.gov/dep/gis/lists.html

Groundwater Recharge Areas
for
Rockaway Borough



Source:

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The water layers and groundwater recharge areas were obtained from the NJDEP website: http://www.nj.gov/dep/gis/lists.html

VII. DESIGN AND PERFORMANCE STANDARDS

Rockaway Borough must adopt design and performance standards for stormwater management measures as required in N.J.A.C. 7:8-5.

The purpose is to minimize the adverse impact of stormwater runoff and water quality and the loss of ground water recharge and receiving water bodies. The design and performance standards will include language for the maintenance of stormwater management measures consistent with stormwater management rules and language for safety standards consistent with DEP safety standards for stormwater management basins. The ordinances will be submitted to the County for review and approval within 12 months of the adoption of the stormwater management plan. The design and performance standards presently adopted by the Borough are included in Chapter 170, Land Use Design and Performance Standards, and Chapter 171, Land Subdivision and Site Plan Review both of the Code of the Borough of Rockaway. The primary citation for stormwater management is within Chapter 170-36, Surface Drainage. The Borough Code also speaks to stream encroachment and other environmental site data. The specifications for design and performance standards in the current ordinance are not sufficient to implement the goals and objectives of the Stormwater Management Plan. A thorough review of the development standards will be necessary and will most probably result in a new section or chapter specifically dealing with municipal stormwater management. Those items that will be considered are:

1. The definition of impervious coverage to include an exclusion for all lakes, ponds, freshwater wetlands, or wetland buffers areas.

2. The definition for preservation of natural features as specified in the freshwater wetlands act of 1987 and as determined by the New Jersey Department of Environmental Protection.

3. Wetlands permits and a Letter of Interpretation from the Department of Environmental Protection will be required with all applications.

4. Complete adherence to flood plain management including utilities, subdivision applications, floodways, and additional conditions will be part of any development application in or adjacent to the municipal flood plain.

5. All applications for development requiring Planning Board or Board of Adjustment action will be required to provide for the collection and disposal of stormwater runoff and proposed drainage facilities as approved by the Municipal Engineer.

6. Applicants will be required to demonstrate that lot grading will be consistent with approved soil erosion and sediment control measures, and stormwater management, and generally in conformance with environmental concerns for the property.

7. Improvements such as curbs, gutters, off-street parking, and storm drainage facilities will all be designed in accordance with Residential Site Improvement Standards and will be certified on the plans.

VIII. STORM DRAINAGE FACILITIES

Flood control and groundwater recharge will be an integral part of the revised Borough Ordinance. Applicants will be encouraged to make every effort to ensure best management practices that include nonstructural improvements and provide control plans developed and based on physical site conditions and the anticipated loading of potential pollutants. The Borough encourages an environmentally sensitive site design and low impact development techniques, which do not inhibit low impervious coverage. The Ordinance will establish standards for structural stormwater management, sources for technical guidance, safety standards and provide a checklist of requirements and terms used.

During construction, sites will be carefully monitored by both Borough personnel and members of the Morris County Soil Conservation Service. In addition, prior to major development approval, the Borough will require long-term maintenance plans for all stormwater management facilities proposed until further required. The posting of escrow money and maintenance bonds were appropriate to ensure long-term maintenance and proper function of all facilities constructed.

The Borough will also ensure the continued long-term maintenance of stormwater management facilities with the requirement of filing annual reports by all responsible parties.

IX. PLAN CONSISTENCY

The Borough of Rockaway is in Morris County and is included in the Morris County Soil Conservation District. The Borough is included in the Morris County Soil Conservation District Regional Stormwater Management Plan and Planning Area and the Borough is included in the Morris County Stormwater Management Technical Guide. The Borough of Rockaway Stormwater Management Plan and subsequent ordinances will require all development plans to comply with the New Jersey Soil Erosion and Sediment Control Standards during construction as well as the Morris County Stormwater Management Technical Guide. The Borough's Municipal Stormwater Management Plan is consistent with the Borough Master Plan dated 1995 and reexamined in 2002. The plan is also consistent with the Residential Site Improvement Standards and the Borough will continue to utilize the most current update of the Residential Site Improvement Standards in the stormwater review of residential areas. The Municipal Stormwater Management Plan and Stormwater Ordinance will be updated to be consistent with future Residential Site Improvement Standards.

X. MITIGATION PLANS

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

Mitigation Project Criteria:

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

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

        Water Quality

        i) Desilting of existing waterways or storm sewers.

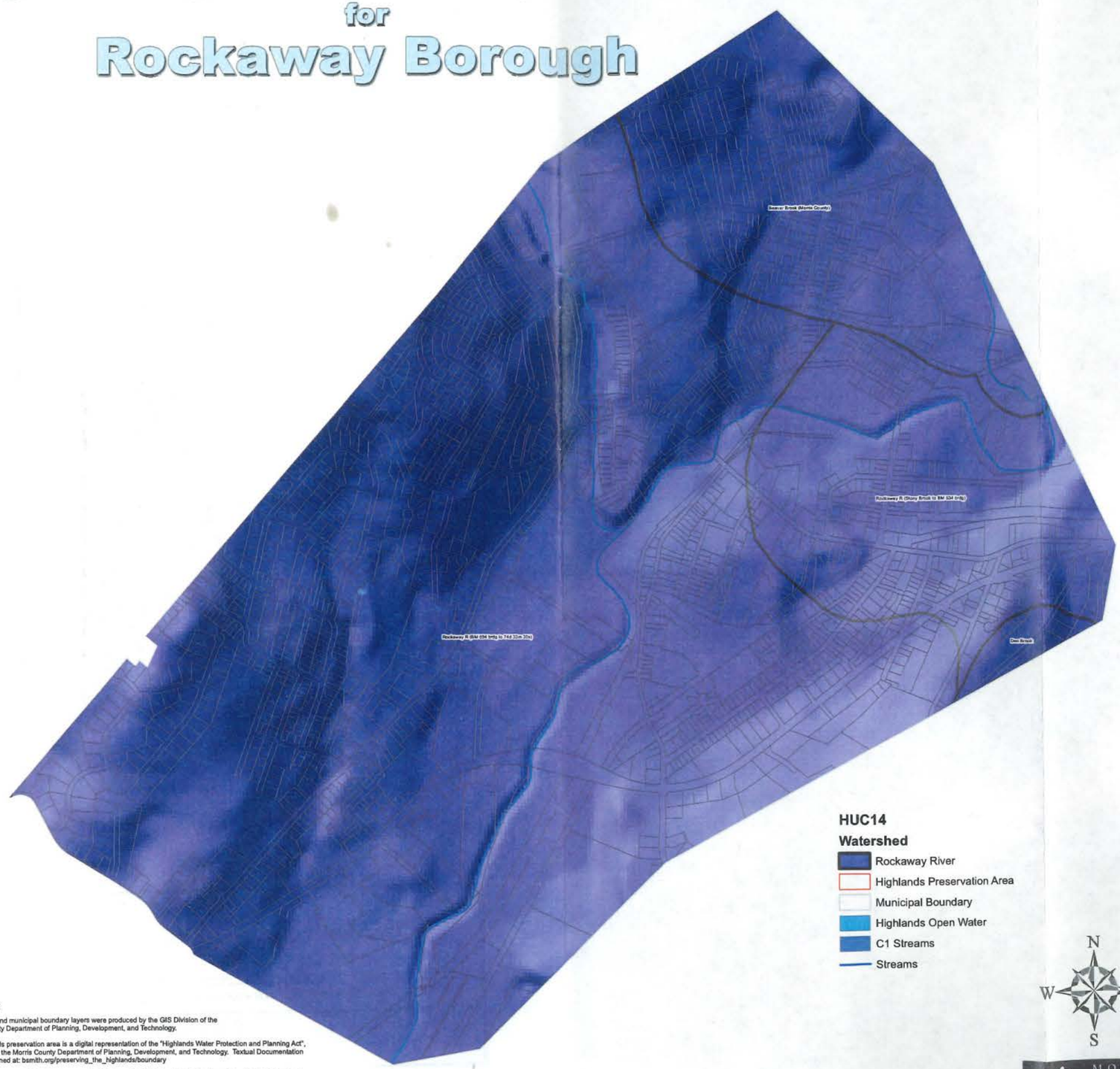
2. If a suitable site cannot be located in the same drainage area as the proposed development, as discussed in Option 1, the mitigation project may provide mitigation that is not equivalent to the impacts for which the variance or exemption is sought, but that addresses the same issue. For example, if a variance is given because the 80% TSS requirement is not met, the selected project may address water quality impacts due to a fecal impairment. Listed below are specific projects that can be used to address the mitigation option.

    Water Quality

    i) Desilting of existing waterways or storm sewers.

The municipality may allow for a developer to provide funding or partial funding to the municipality for an environmental enhancement project that has been identified in a Municipal Stormwater Management Plan, or towards the development of a Regional Stormwater Management Plan. The funding must be equal to or greater than the cost to implement the mitigation outlined above, including costs associated with purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure.

Hydrological Units (HUC14s)
for
Rockaway Borough



HUC14
Watershed
- Rockaway River
- Highlands Preservation Area
- Municipal Boundary
- Highlands Open Water
- C1 Streams
- Streams

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MORRIS COUNTY GIS

Source:

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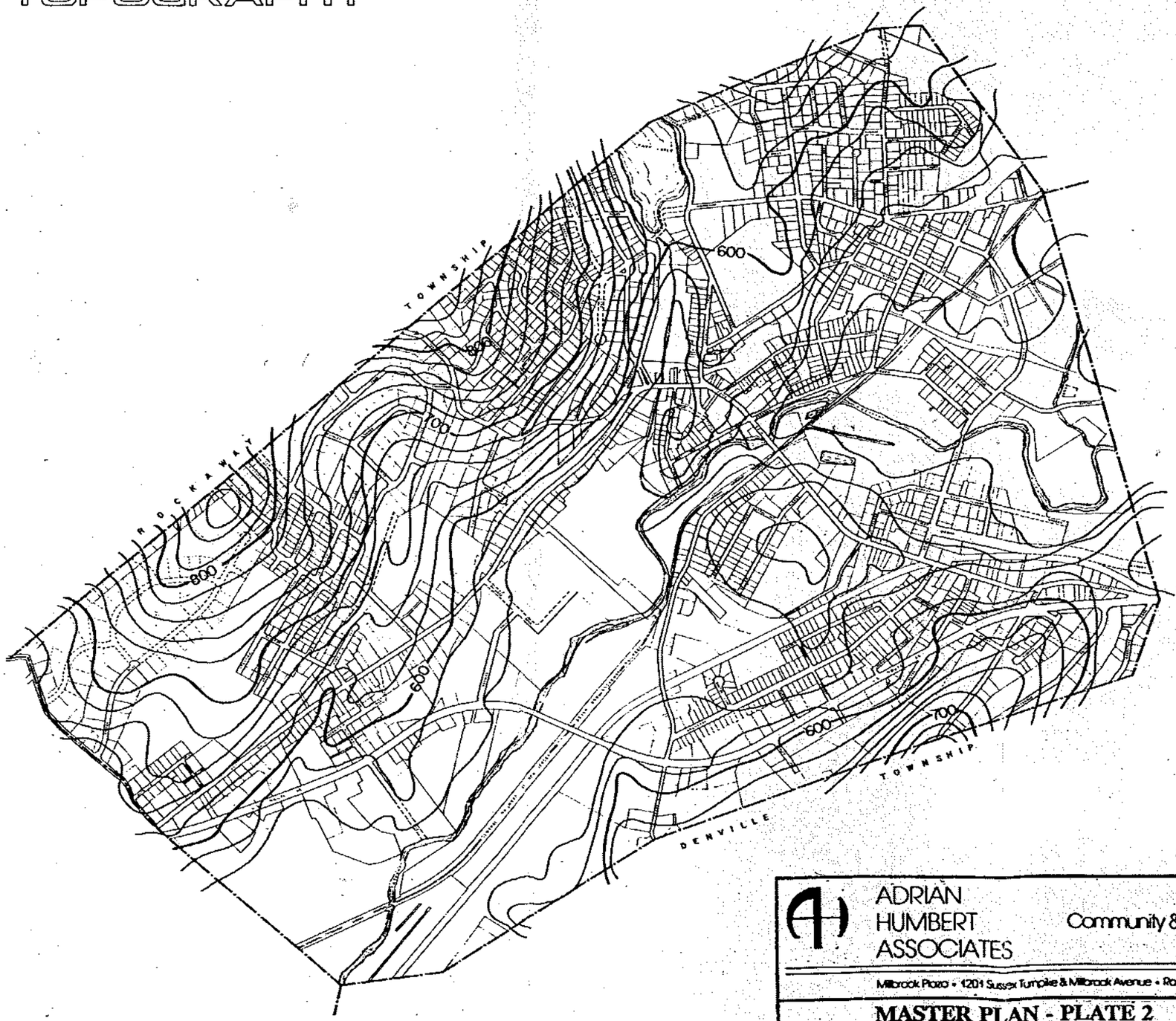
TOPOGRAPHY



TOPO BASED UPON U.S.G.S. - CONTOUR INTERVAL IS 20 FEET
BASE MAP PREPARED ON AUGUST 22, 1977 BASED ON TAX MAPS DATED JULY 25, 1976

original map by Robert Catlin and Associates

ADRIAN HUMBERT ASSOCIATES
Community & Land Planners

Millbrook Plaza • 1201 Sussex Turnpike & Millbrook Avenue • Randolph, New Jersey 07869 • (201) 895-7366

MASTER PLAN - PLATE 2
BOROUGH OF ROCKAWAY

REFERENCES

1) "Rockaway Borough, Morris County, New Jersey Master Plan Report 1995" prepared by Adrian P. Humbert, AICP/PP

2) "Morris County Stormwater Management Technical Guide, Final Draft, October 1998" prepared by Goodkind and O'Dea, Inc.

3) "Stormwater Management Adopted New Rules, N.J.A.C. 7:8" prepared by New Jersey Department of Environmental Protection