MUNICIPAL STORMWATER MANAGEMENT PLAN
MASTER PLAN ELEMENT

BOROUGH OF RED BANK
MONMOUTH COUNTY, NEW JERSEY

Amended: April 30, 2007

Adopted: March 21, 2005

Final Draft dated: March 10, 2005

PREPARED FOR

RED BANK BOROUGH PLANNING BOARD

PREPARED BY:

RICHARD A. KOSENSKI, P.E., P.P.
BOROUGH OF RED BANK ENGINEER
Licensed Professional Engineer No. 24 GE 02239300
Licensed Professional Planner No. 33 LI 00255300

TM ASSOCIATES

11 Tindall Road
Middletown, New Jersey 07748
(732) 671-6400

March 2005

The original of this document has been signed and sealed in accordance with N.J.S.A. 45:14A-1 et. seq.

BOROUGH OF RED BANK PLANNING BOARD
RESOLUTION ADOPTING MUNICIPAL STORMWATER MANAGEMENT PLAN
MASTER PLAN ELEMENT

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

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

WHEREAS, pursuant to ***N.J.A.C. 7:8-4.3(a)***, a municipality shall adopt a Municipal Stormwater Management Plan as an integral part of its Master Plan; and

WHEREAS, pursuant to ***N.J.A.C. 7:8-1.1 et. Seq***., the Planning Board has prepared a Municipal Stormwater Management Plan - Master Plan Element in order to comply with the requirements set forth in the New Jersey Administrative Code for Municipal Stormwater Management Planning; and

WHEREAS, pursuant to the requirements of the Municipal Land Use Law ***N.J.S.A. 40:44D-1 et. seq.,*** and specifically ***N.J.S.A. 40:55D-28*** and ***N.J.S.A. 40:55D-13***, the Planning Board conducted a public hearing on the 21st day of May, 2007, due notice of said meeting having been given in accordance with New Jersey Statutes, the Open Public Meets Act and the Municipal Land Use Law and a quorum of the Planning Board being present, the Planning Board reviewed and considered the proposed Municipal Stormwater Management Plan - Master Plan Element along with any public comment thereon and the Planning Board having determined that the Municipal Stormwater Management Plan - Master Plan Element is in compliance with the requirements of the Municipal Land Use Law and the requirements for Stormwater Management pursuant to the

applicable sections of the New Jersey Administrative Code.

NOW THEREFORE BE IT RESOLVED, by the Planning Board of the Borough of Red Bank on this 4th day of June, 2007 that the Amended Municipal Stormwater Management Plan - Master Plan Element prepared by Richard Kosenski, P.E., P.P., Red Bank Borough Engineer, dated April 30, 2007 is hereby adopted.

The foregoing was moved by , seconded by

and on Roll Call, the following vote was recorded:

Affirmative:

Negative:

Abstentions:

I, Donna Smith Barr, Secretary to the Planning Board of the Borough of Red Bank do hereby certify that the foregoing is a true copy of a Resolution adopted by the Planning Board of the Borough of Red Bank at the regular meeting held on June 4, 2007.

Donna Smith Barr, Secretary
Planning Board, Borough of Red Bank

Members of the 2007 Planning Board

John Cash, Sr., Chairman

Dr. Guy Maratta, Vice-Chair

Pasquale Menna, Mayor

Sharon Lee, Councilwoman

Stanley J. Sickels, Borough Administrator

Leonard Calabro

Louis DiMento

John Goode

Daniel Mancuso

Edward Zipprich, Alternate #1

Christine McKenna, Alternate #2

Donna Smith Barr, Board Secretary

Michael Leckstein, Esq., Board Attorney

T&M Associates, Board Engineer

TABLE OF CONTENTS

List of Tables

List of Figures

INTRODUCTION

As a result of the publication of the United States Environmental Protection Agency (USEPA) Phase II rules in December 1999, the New Jersey Department of Environmental Protection (NJDEP) promulgated new stormwater regulations to address non-point source pollution entering surface and ground waters of the State of New Jersey. Under these regulations, municipalities where issued a New Jersey Pollutant Discharge Elimination System (NJPDES) Permit that established various statewide basic requirements. One of these requirements is the development and adoption of an amendment to their overall Master Plan to address stormwater pollution associated with major development.

As required by the Municipal Stormwater Regulations (N.J.A.C. 7:14A-25), the Borough of Red Bank has developed this Municipal Stormwater Management Plan (MSWMP) to outline its approach to address the impacts from stormwater issues associated with future development, redevelopment, and land use changes. The MSWMP provides a Borough-wide approach to stormwater management planning. It is designed to identify existing flooding and/or runoff problems for future correction. The MSWMP addresses groundwater recharge, stormwater quantity, and stormwater quality impacts through the incorporation of stormwater design and performance standards for new development and redevelopment projects that disturb one or more acres of land or adds one-quarter or more acres of impervious coverage. The implementation of design and performance standards will minimize negative or adverse impacts of stormwater runoff such as decreased water quality, increased water quantity and reduction of groundwater recharge which provide base flow to receiving bodies of water.

In addition to minimizing these impacts, the Borough MSWMP provides for long term operation and maintenance measures for existing and proposed stormwater management facilities. This MSWMP also outlines recommendations for revisions to Borough ordinances in order to maximize the implementation of stormwater management strategies and include mitigation strategies to allow the Borough to grant variances or exemptions from the design and performance standards set forth in this document.

GOALS AND OBJECTIVES

The goals of this MSWMP are:

1. Reduce flood damage, including damage to life and property;
2. Minimize, to the extent practical, any increase in stormwater runoff from any new development;
3. Reduce soil erosion from any development or construction project;
4. Encourage the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
5. Maintain groundwater recharge;
6. Prevent, to the greatest extent feasible, an increase in non-point source pollution;
7. Maintain the integrity of stream channels for their biological function, as well as for drainage;
8. 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, commercial, and other uses of water;
9. Protect public safety through the proper design and operation of stormwater basins.

In addition to the State mandated goals described above, the Borough master Plan documents also encourages the following goals and objectives:

10. Encourage the use of indigenous vegetation in landscape design;
11. Increase public awareness of stormwater management through public education;
12. Maintain and improve access to coastal and waterfront areas of recreational, aesthetic, cultural, or ecological value provided that such access does not degrade the function and value of the natural resources. This includes maintaining and protecting the shellfish beds in the Navesink River.

To achieve these goals, this MSWMP outlines specific stormwater design and performance

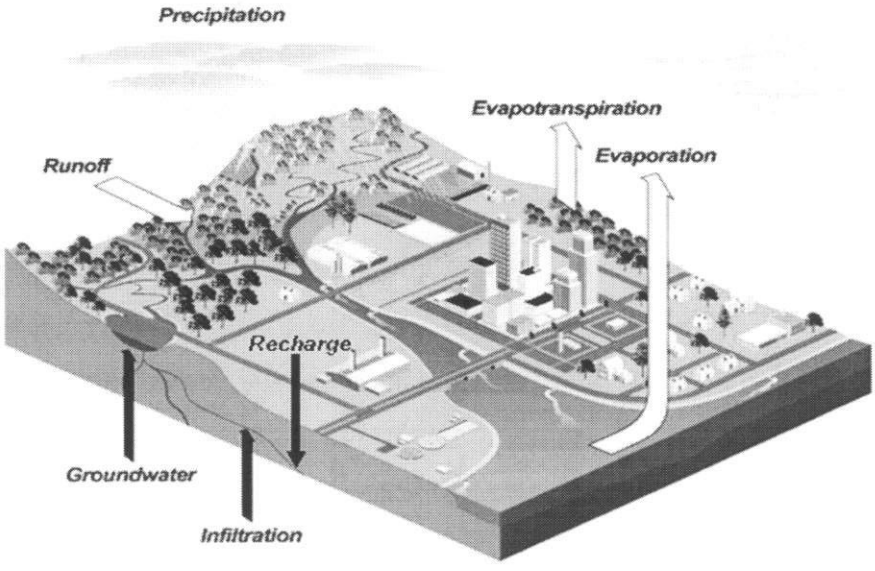
standards for new development and proposes stormwater management controls to address impacts from existing development. Preventive and corrective maintenance strategies are also included to maintain the long-term effectiveness of stormwater management facilities. This MSWMP also outlines safety standards for stormwater infrastructure. Additionally, the Borough has established a stormwater management program through the implementation of a Stormwater Pollution Prevention Plan (SPPP). This document incorporates existing and new programs to improve stormwater management from existing sources, promote public education, improve solids and floatables control, and maintain stormwater facility maintenance of existing infrastructures.

STORMWATER DISCUSSION

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 evapo-transpiration. 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 evapo-transpiration, condensation, precipitation, and infiltration comprises the hydrologic cycle.

Figure 1: Hydrologic Cycle



Kern River Connections http://www.creativille.org/kernriver/watershed.htm

IMPACTS OF STORMWATER

Prior to any land development, native vegetation often intercepts precipitation directly or absorbs infiltrated runoff into their roots. Development often replaces native vegetation with lawns or impervious cover, such as pavement or structures, thereby reducing the amount of evapo-transpiration and infiltration. Regrading and clearing of lots disturbs the natural topography of rises and depressions that can naturally capture rainwater and allow for infiltration and evaporation. Construction activities often compact soil, thereby decreasing its permeability or ability to infiltrate stormwater. Development activities also generally increase the volume of stormwater runoff from a given site.

Connected impervious surfaces and storm sewers (such as roof gutters emptying into paved parking lots that drain into a storm sewer) allow the runoff to be transported downstream more rapidly than natural areas. This shortens travel time and increases the rainfall- runoff response of the drainage area, causing downstream waterways to peak higher and quicker than natural areas, a situation that can cause or exacerbate downstream flooding, erosion, and sedimentation in stream channels. Furthermore, connected impervious surfaces do not allow pollutants to be filtered, or for infiltration and ground water recharge to occur prior to reaching the receiving waters. Increased volume combined with reduced base flows, results in a greater fluctuation between normal and storm flows allowing for greater channel erosion. Additionally, reduced base flows, increased fluctuation, and soil erosion can affect the downstream hydrology, impacting the ecological integrity.

Water quantity impacts combined with land development often adversely impact stormwater quality. Impervious surfaces collect pollutants from the atmosphere, animal wastes, fertilizers and pesticides, as well as pollutants from motor vehicle usage. Pollutants such as hydrocarbons, metals, suspended solids, pathogens, and organic and nitrogen counting compounds, collect and concentrate on impervious surfaces. During storm events, these pollutants are washed directly into municipal storm sewer systems. In addition to chemical and biological pollution, thermal pollution can occur from water collected or stored on impervious surfaces or heated in stormwater impoundments. Thermal pollution can affect aquatic habitats, adversely impacting cold water fish. Removal of shade trees and stabilizing vegetation from stream banks also

contributes to thermal pollution.

As towns and cities develop from rural agricultural communities, the landscape is altered in dramatic ways. Localized impacts to the hydrologic cycle will ultimately impact the hydrologic cycle of the entire watershed encompassing that development site.

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

BACKGROUND

The Borough of Red Bank is an urbanized residential community that encompasses about 2.2 square miles of Monmouth County, New Jersey. Included within that total area of 2.2 square miles are approximately 1.8 square miles of land area. The Borough is bounded by the Navesink River/Swimming River to the north and west, and the Boroughs of Tinton Falls and Shrewsbury to the south. The eastern boundary is shared with the Boroughs of Little Silver and Fair Haven. The topography of the Borough is relatively flat rising from sea level at its northern and western boundaries to an elevation of 60 feet along its easterly boundary. Figure 2 delineates the Borough boundary on United States Geological Survey (USGS) quadrangle maps.

DEMOGRAPHICS

Table 1 shows the Borough's historic population trend in comparison to Monmouth County and the State of New Jersey. As shown in Table 1, the population of Red Bank has fluctuated over the past 30 years, from 12,847 in 1970, to 12,031 in 1980, and decreasing again to 10,636 in 1990. However, the recent U.S. Census data indicated that the population in the year 2000 increased to approximately 11,844.

Table 1: Historical Population Growth 1950 – 2000

Year	*Borough of Red Bank*		*Monmouth County*		*New Jersey*	
	Total Population	*Average Annual Growth Rate Over the Prior 10-year Period*	*Total Population*	*Average Annual Growth Rate Over the Prior 10-year Period*	*Total Population*	*Average Annual Growth Rate Over the Prior 10-year Period*
1950	12,743	--	225,327	--	4,835,329	--
1960	12,482	-2.0	334,901	4.8%	6,066,782	2.6
1970	12,847	2.9	461,849	3.8%	7,171,112	1.8%
1980	12,031	- 6.4%	503,173	0.9%	7,364,823	0.3%
1990	10,636	- 11.6%	553,124	1.0%	7,730,118	0.5%
2000	11,844	11.3%	615,305	11.2%	8,414,350	0.9%

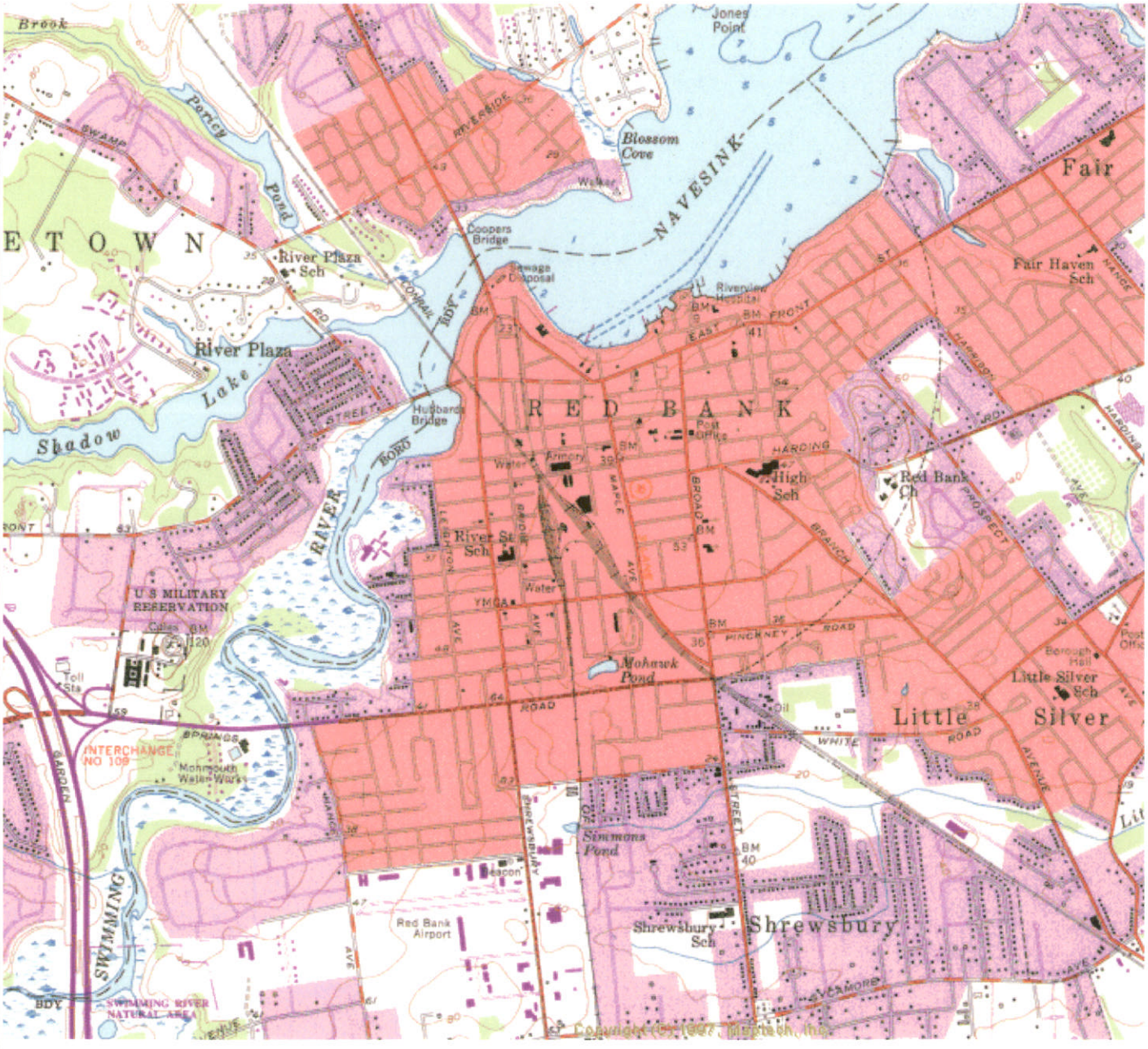
Source: 1990, 2000 US Census, www.monmouthplanning.com

Figure 2: Topographic Map
Borough of Red Bank
Monmouth County, New Jersey

N

0 1000 2000

Source: U.S.G.S. Long Branch, NJ
Quadrangle Maps (1981)



Development housing units increased from 5,157 in 1970 to 5, 450 housing units in 2000.

Table 2: General Housing Characteristics

	1990		2000		Change
	Number	Percent	Number	Percent	Number
Occupancy Status					
Total Housing Units	5,112	100	5,450	100	428
Occupied Housing Units	4,683	91.6	5,201	95.4	518
Vacant Housing Units	429	8.4	249	4.6	-180
Tenure					
Occupied Housing Units	4,683	100	5,201	100	518
Owner-Occupied Housing Units	2,224	48	2,478	47.6	254
Renter-Occupied Housing Units	2,459	52	2,723	52.4	264
Vacancy Status					
Vacant Housing Units	429	100	249	100	-180
Population	10,636	100	11,844	100	1208
Households	4,683	100	5,201	100	518
Family Household	2,423	51.7	2,504	48.1	81
1 Person Household	1,906	40.7	2,233	42.9	327
Persons/ Household	2.2	-	2.3	-	0

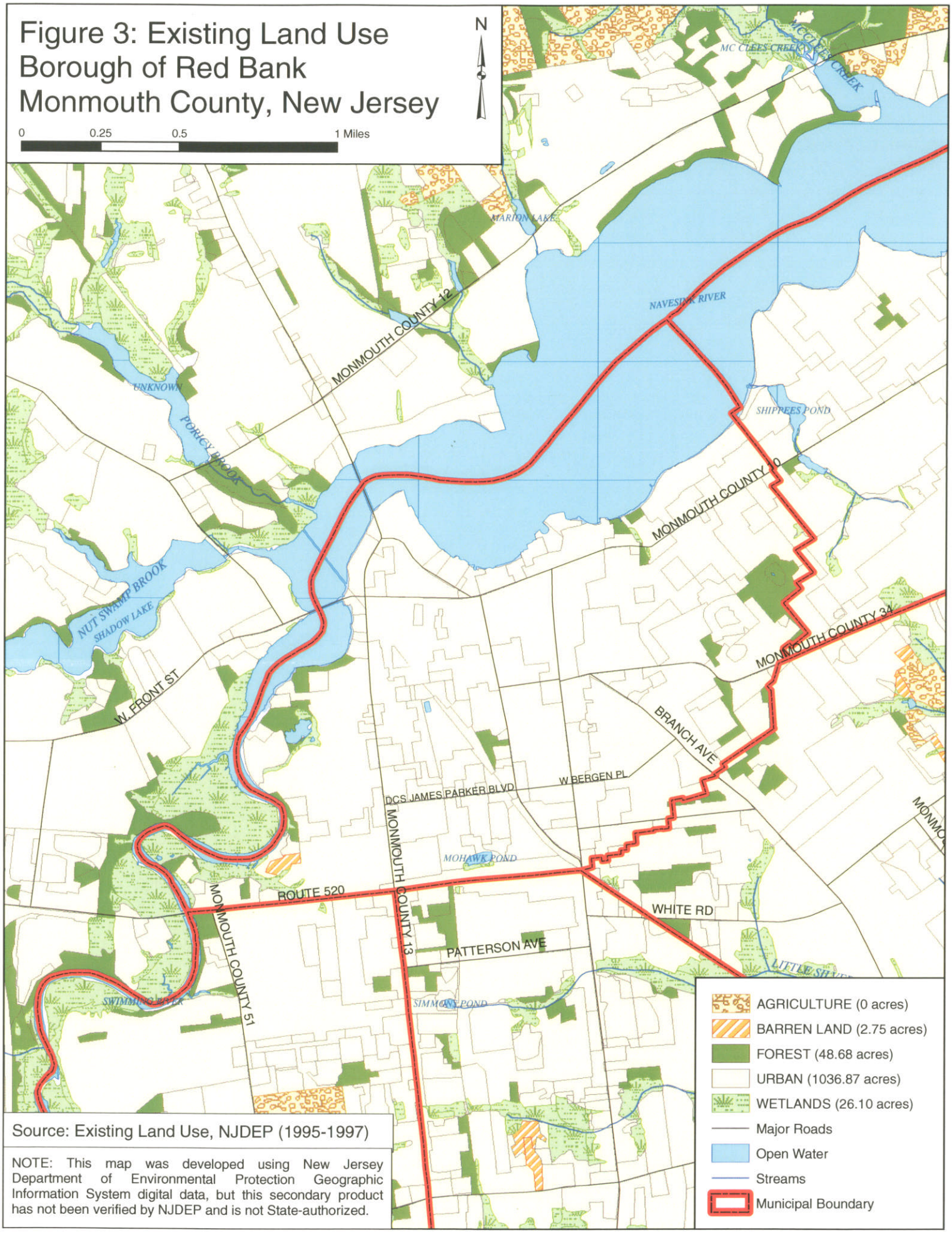
Source: 1990, 2000 US Census, www.monmouthplanning.com

The Borough's existing land use is shown on Figure 3. As shown, the majority of the Borough is designated as "urban," though there are some mapped areas of 'forested," "barren," and "wetlands." These non-"urban" mapped areas include very little land available for development. The *1995 Master Plan* also calls for the Borough to allow residential use in virtually any unconstrained area within the Borough, so that it may be possible to develop additional areas in the Borough. The Borough's Zoning Map is shown as Figure 4. Areas of constrained lands, in which development may be restricted, includes areas within the 100-year flood plain of the river, areas of open water, and freshwater wetlands. These areas are delineated on Figure 5.

The land use in Red Bank is predominantly urban with very few, if any, vacant tracts of land available for development. There is no official redevelopment plan; however, several existing developed parcels are being redeveloped in the center of town. In general, these projects reduce the amount impervious cover from what existed previously. In many cases impervious cover that was previously parking lot surface is being replaced with roof top impervious cover which results in an improvement to the runoff quality from the site over that which existed.

The Borough maintains its commitment to conserving the historic districts and preserving the character of the streets, buildings and neighborhoods, while improving the vitality of Red Bank. In keeping with the goal of preserving the character of Red Bank, the Borough Shade Tree Commission was established. The Commission is responsible for planting trees where needed, as well as replacing trees that are taken or blown down. Planting trees aids in infiltrating runoff as well as adding to the visual aesthetic of the Borough.

Figure 3: Existing Land Use
Borough of Red Bank
Monmouth County, New Jersey



Source: Existing Land Use, NJDEP (1995-1997)

NOTE: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

ZONE DISTRICTS

RESIDENTIAL

RA	RESIDENTIAL "A"
RB	RESIDENTIAL "B"
R-B1	RESIDENTIAL "B1"
R-B2	RESIDENTIAL "B2"
RD	RESIDENTIAL "D"

BUSINESS / COMMERCIAL

NB	NEIGHBORHOOD BUSINESS
BR-1	BUSINESS / RESIDENTIAL - 1
BR-2	BUSINESS / RESIDENTIAL - 2
HB	HIGHWAY BUSINESS
CCD-1	CENTRAL COMMERCIAL DISTRICT - 1
CCD-2	CENTRAL COMMERCIAL DISTRICT - 2

MIXED USE

PO	PROFESSIONAL OFFICE
WD	WATERFRONT DEVELOPMENT

MEDICAL SERVICES

MS	MEDICAL SERVICES

INDUSTRIAL

LI	LIGHT INDUSTRIAL
I	INDUSTRIAL

"I CERTIFY THAT THIS IS THE OFFICIAL ZONING MAP OF THE BOROUGH OF RED BANK, NEW JERSEY, REFERRED TO IN THE CODIFIED ORDINANCES OF THE BOROUGH OF RED BANK, NEW JERSEY."

MAYOR — DATE 4/17/03

CLERK — DATE 4/7/03

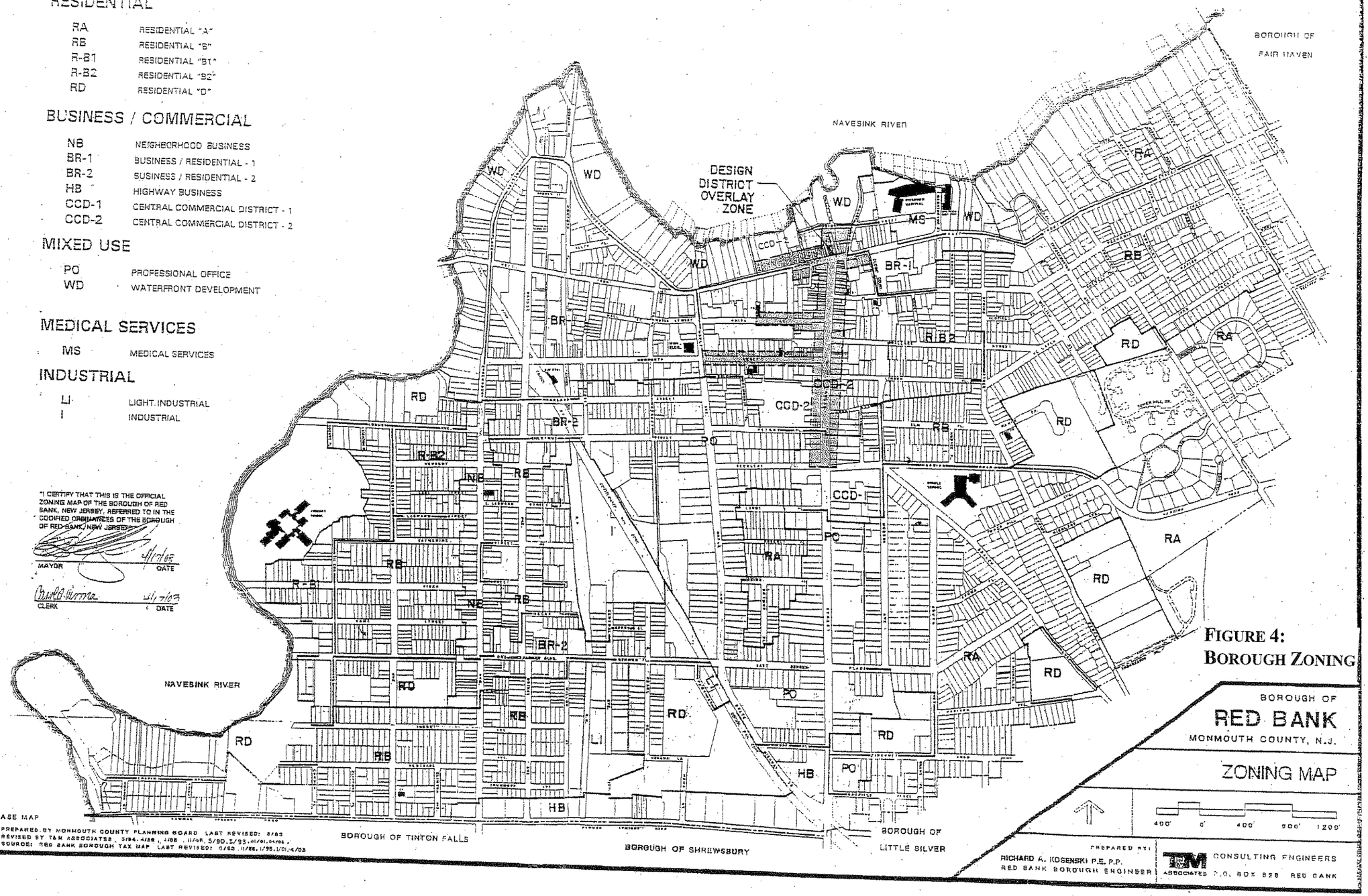


FIGURE 4:
BOROUGH ZONING

BOROUGH OF
RED BANK
MONMOUTH COUNTY, N.J.

ZONING MAP

400' 0' 400' 800' 1200'

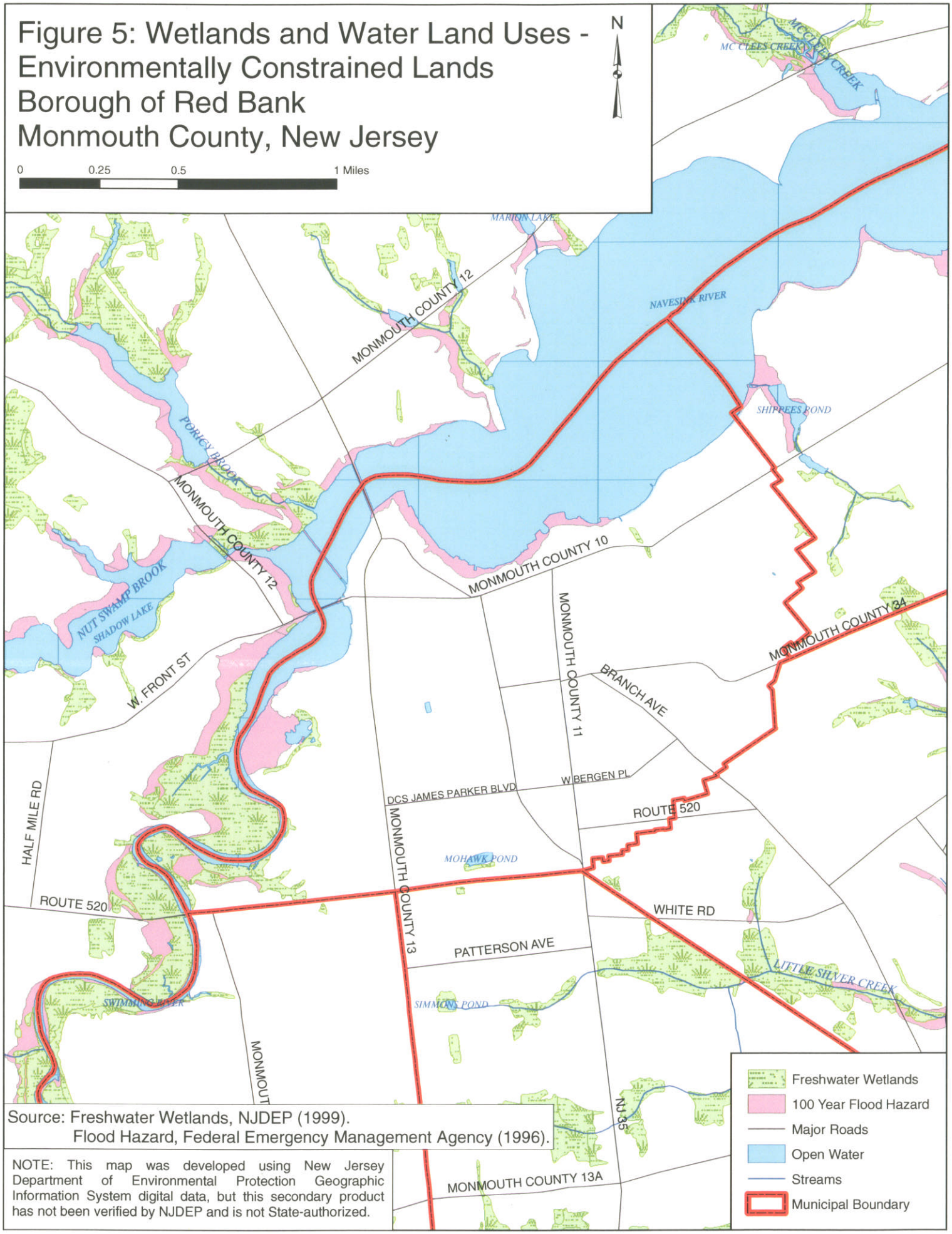
BASE MAP

PREPARED BY MONMOUTH COUNTY PLANNING BOARD LAST REVISED: 8/83
REVISED BY T&M ASSOCIATES 3/84, 4/86, 4/88, 11/89, 5/90, 5/93, 01/01, 04/03
SOURCE: RED BANK BOROUGH TAX MAP LAST REVISED: 8/83, 11/86, 1/95, 1/01, 4/03

PREPARED BY:
RICHARD A. KOSENSKI P.E. P.P.
RED BANK BOROUGH ENGINEER

T&M ASSOCIATES CONSULTING ENGINEERS
P.O. BOX 828 RED BANK

Figure 5: Wetlands and Water Land Uses - Environmentally Constrained Lands
Borough of Red Bank
Monmouth County, New Jersey



Source: Freshwater Wetlands, NJDEP (1999).
Flood Hazard, Federal Emergency Management Agency (1996).

NOTE: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

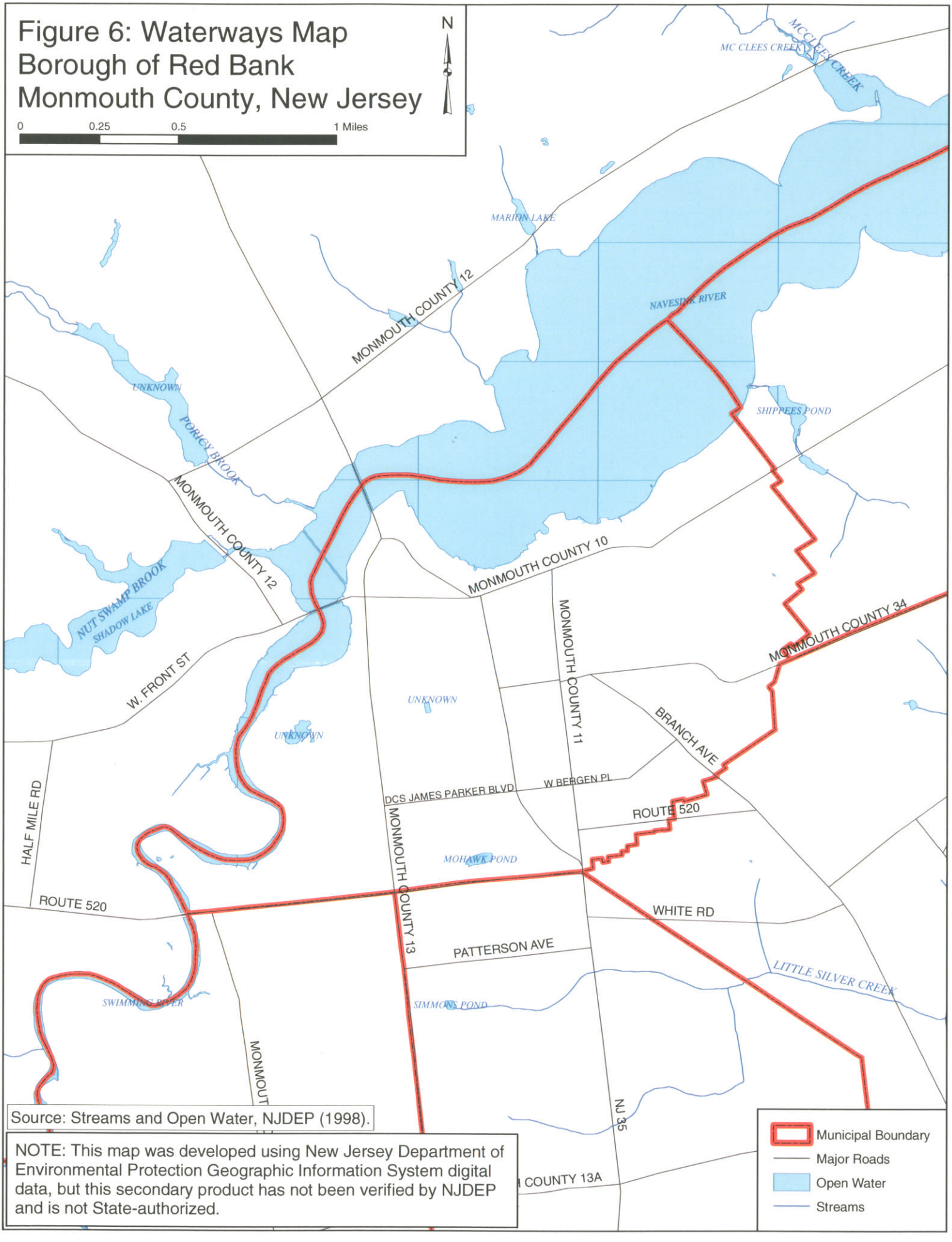
WATERWAYS

The Borough waterways include the Navesink River, the Swimming River and Mohawk Pond. (NJ I-mapNJDEP, http://www.state.nj.us/dep/gis/depsplash.htm#) Figure 6 illustrates the waterways of the Borough.

As noted in the Borough *1995 Master Plan*, the Navesink River, Swimming River and Mohawk Pond each have distinctive environments that have been impacted by human activities in different ways. The Navesink River, including its tributary the Swimming River, drains an area of 95 square miles. It supports substantial hard clam (*Mercenaria mercenaria*), soft clam (*Mya arenaria*), and blue crab (*Callinectes sapidus Rathbun)* populations.

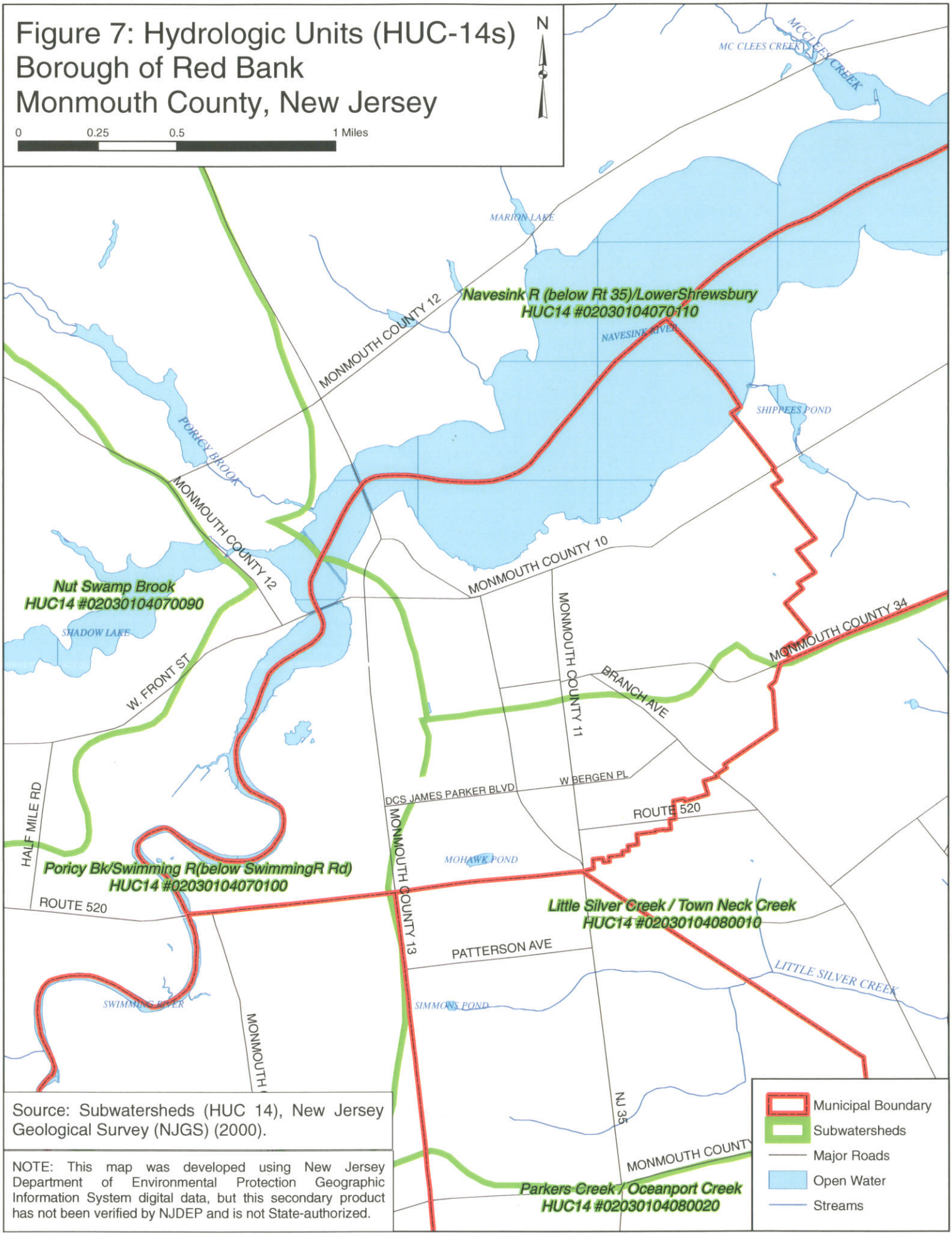
In the 1990's the Borough succeeded in declaring the Swimming River (from Oyster Point to the Swimming River Dam) an Environmentally Sensitive Area on the State Policy Plan Map in order to preserve the marshland ecology. The State designated this area a Planning Area 5 (PA-5) to promote planning that balances limited growth with conservation. Mohawk Pond, which receives discharges from municipal stormwater outfalls, is designated by the NJDEP as a "Special Area" necessitating the use of Best Management Practices (BMPs) as noted by the NJDEP Division of Coastal Resources.

Additionally, the Borough is located within three HUC 14 subwatersheds: the Navesink River (Below Rt. 35)/ Lower Shrewsbury, the Little Silver Creek/Town Neck Creek, and the Poricy Brook/ Swimming River (Below Swimming River Road) subwatersheds. A HUC-14 subwatershed is a hydrologic unit code which NJDEP and USGS use to map small subwatersheds. HUC-14s are usually about 3,000 acres in size, according to the NJDEP. See Figure 7 for a delineation of the Borough HUC-14 subwatersheds.



Source: Streams and Open Water, NJDEP (1998).

NOTE: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.



Source: Subwatersheds (HUC 14), New Jersey Geological Survey (NJGS) (2000).

NOTE: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

WATER QUALITY

The Ambient Biomonitoring Network (AMNET) was established by the NJDEP to monitor and document the health of New Jersey's waterways. AMNET currently has 820 sites in five drainage basins that it monitors for benthic macroinvertebrates on a five-year cycle. Waterways are scored based on the data to generate the New Jersey Impairment Score (NJIS) and categorized as severely impaired, moderately impaired, and non-impaired.

The NJIS is based on biometrics and benthic macroinvertebrate health. (http://www.state.nj.us/dep/wmm/bfbm/). Currently, none of the waterways within the Borough boundaries are listed on the AMNET website. (http://www.state.nj.us/dep/wmm/ bfbm/downloads.html#atl)

In addition to impaired waterways, the NJDEP also provides a list of Category One (C1) waterways. C1 waterways are areas with a special level of protection for waterbodies that provide drinking water, habitat for Endangered and Threatened species, and popular recreational and/or commercial species, such as trout or shellfish. These waterbodies can be designated C1 due to their exceptional significance for ecological, water supply, recreational, shellfish or fisheries resources. Currently, both the Swimming River and Navesink River in Red Bank are classified as Category One waterways. (http://www.nj.gov/dep/ cleanwater/c1_waters_list.pdf)

In addition to biological health, chemical data are gathered by the NJDEP and other organizations, and used to determine the health of waterways. The data are then used to determine which waters require the NJDEP to develop Total Maximum Daily Loads (TMDLs). A TMDL is the quantity of a pollutant that can enter a waterbody without exceeding water quality standards or interfering with the ability to use the waterbody for its designated usage. Point and non-point source pollution, surface water withdrawals and natural background levels are included in the determination of a TMDL, as required by Section 303(d) of the Clean Water Act. Point source pollution includes, but is not limited to NJPDES permitted discharges, while non-point source pollution could include contaminated stormwater runoff from impervious surfaces. Non-point source pollution is contamination that does not have a specific point of origin, and is often associated with human activities.

The NJ Integrated List of Waterbodies is a list of all impaired waterbodies in the state, and the basis for selecting waterbodies in need of TMDLs. TMDLs determine the allowable load from each source, with a factor of safety, of the pollutant entering the waterbody. TMDLs can be used to limit further deterioration of a waterbody, or to improve the current water quality. An implementation plan should be developed to identify how the each of the various sources of pollution will be reduced to the levels specified in the TMDL. Some of the strategies that may be implemented include stormwater treatment, implementation of updated ordinances, restriction of impervious surfaces, retrofitting stormwater systems, disconnection of impervious surfaces, and use of other BMPs. Table 3 indicates the impaired parameters for waterbodies within the Borough of Red Bank, which is encompassed by NJDEP's Watershed Management Area 12. Waterbodies listed on the State Integrated List of Waterbodies are ranked by Sublist in terms of water quality, where Sublist 1 waterbodies have higher quality than those listed on Sublist 5.

Currently there are no established TMDLs for the waterbodies within the Borough's boundaries. It should be noted, however that there are TMDLs listed on the NJDEP website for locations along the Navesink River upstream of the Swimming River Reservoir. It is important to note that, according to the Division of Watershed Management of the NJDEP, no specific stormwater TMDLs have been issued to date, and therefore, they are not governed by this MSWMP.

Table 3: 2004 Borough of Red Bank Integrated List Water Bodies

List #	Station Name/Waterbody	Site ID	Impairment Parameters
5	Navesink River	Navesink River	Fish-PCB, Fish-Dioxin
5	Navesink River Estuary	Shrewsbury/Navesink Estuary-4 thru 7	Total Coliform
1	Navesink River Estuary	Shrewsbury/Navesink Estuary-4 thru 7	Dissolved Oxygen, Fecal Coliform
5	Shrewsbury River Estuary	R59, Shrewsbury/Navesink Estuary-1 thru 3, 8	Total Coliform
1	Shrewsbury River Estuary	Shrewsbury/Navesink Estuary-1 thru 3	Dissolved Oxygen, Fecal Coliform
5	Shrewsbury River Estuary	Shrewsbury/Navesink Estuary-8	Dissolved Oxygen
1	Shrewsbury River Estuary	Shrewsbury/Navesink Estuary-8	Fecal Coliform
1	Swimming River-Tidal	R01	Dissolved Oxygen

Source: New Jersey's 2004 Integrated List of Waterbodies. http://www.state.nj.us/dep/wmm/sgwqt/wat/index.html

Within the shellfish-harvesting portions of the Navesink River, the major pollution problem is high bacterial loadings from non-point sources. According to the NJDEP, water quality improves as one proceeds downstream along the Navesink River.

The New Jersey Bureau of Marine Water Monitoring also monitors the Navesink River. The Bureau publishes triennial Shellfish Sanitary Surveys. These surveys determine the classification of the waters, in terms of shellfish, based on data gathered from 52 monitoring stations throughout the River. The stations upstream of Oceanic Bridge do not meet the *Approved* criteria. Six hundred twenty-four acres east of the Oceanic Bridge were upgraded in 1997 to *Seasonally Approved.* The *Special Restricted* classification requires a special permit for the commercial harvest of shellfish as part of a state sanctioned special program, and that any shellfish harvested must be purified through depuration prior to consumption. *Seasonally Approved* allows for commercial and recreational harvesting, with a license, during a specific season, while *Approved* allows for harvesting, also with a license.

In addition, the Monmouth County Health Department monitors the Navesink and Shrewsbury rivers at seven locations within the County on a quarterly basis. There are two monitoring sites for the Navesink within the Borough, one at the end of Marine Park, and the other at Chapin Avenue. Each location is monitored for fecal coliform bacteria, total phosphorous, total suspended solids, temperature, ammonia, and pH. The County results show levels of fecal coliform bacteria, total phosphorous, total suspended solids and pH that are slightly above recommended standards. Both testing sites within the Borough also exhibit high ammonia, total phosphorous, and seasonal high fecal coliform levels. The County has sampled stormwater outfalls at so-called Hot Spots within the Borough including at the end of Doctors James Parker Boulevard and at the end of Marine Park for high fecal coliform and *enterococcus* immediately following storm events.

In response to the sampling results, the Borough, with coordinated efforts from the Monmouth County and Monmouth Regional Health Departments and the NJDEP, has formed a task force to spearhead efforts in identifying sources of stormwater pollution. The group targeted the three "hot spot" regions along the Navesink River for their physical investigation, and outlined action

items for continuing efforts. As a result, the Borough has identified three potential contributors of fecal contamination. In two of the cases, private septic tanks were discharging sewage either directly into the Navesink or into an adjacent stormwater transmission pipe. The Borough was also able to identify and rectify a possible cross connection between the sanitary and stormwater systems.

In addition to identifying point sources of pollution, the Borough DPW has taken active measures to reduce and prevent contaminated runoff. There are new standard operating procedures in place, which regulate vehicle cleaning and equipment storage. In addition, a regular maintenance program is on-going in an effort to clean and maintain catch basins/manholes that are known to collect trash and debris.

WATER QUANTITY

In addition to water quality issues, stormwater also has an impact on water quantity. However, the *1995 Master Plan* noted that the Borough generally has adequate handling capacity in its culverts, inlets, channels, and conveyances.

GROUNDWATER RECHARGE

Generally, increases in development will increase impervious surface areas thus reducing recharge to the groundwater drawn by wells. Increased imperious surface areas can, as previously mentioned, result in an increase in peak and volumes of the Borough stream flow. Any increase in the amount of water can result in stream erosion and degradation of stream habitats. Additionally, increasing the impervious areas decreases the base flows of streams during dry weather periods which, in turn, can negatively impact stream habitats.

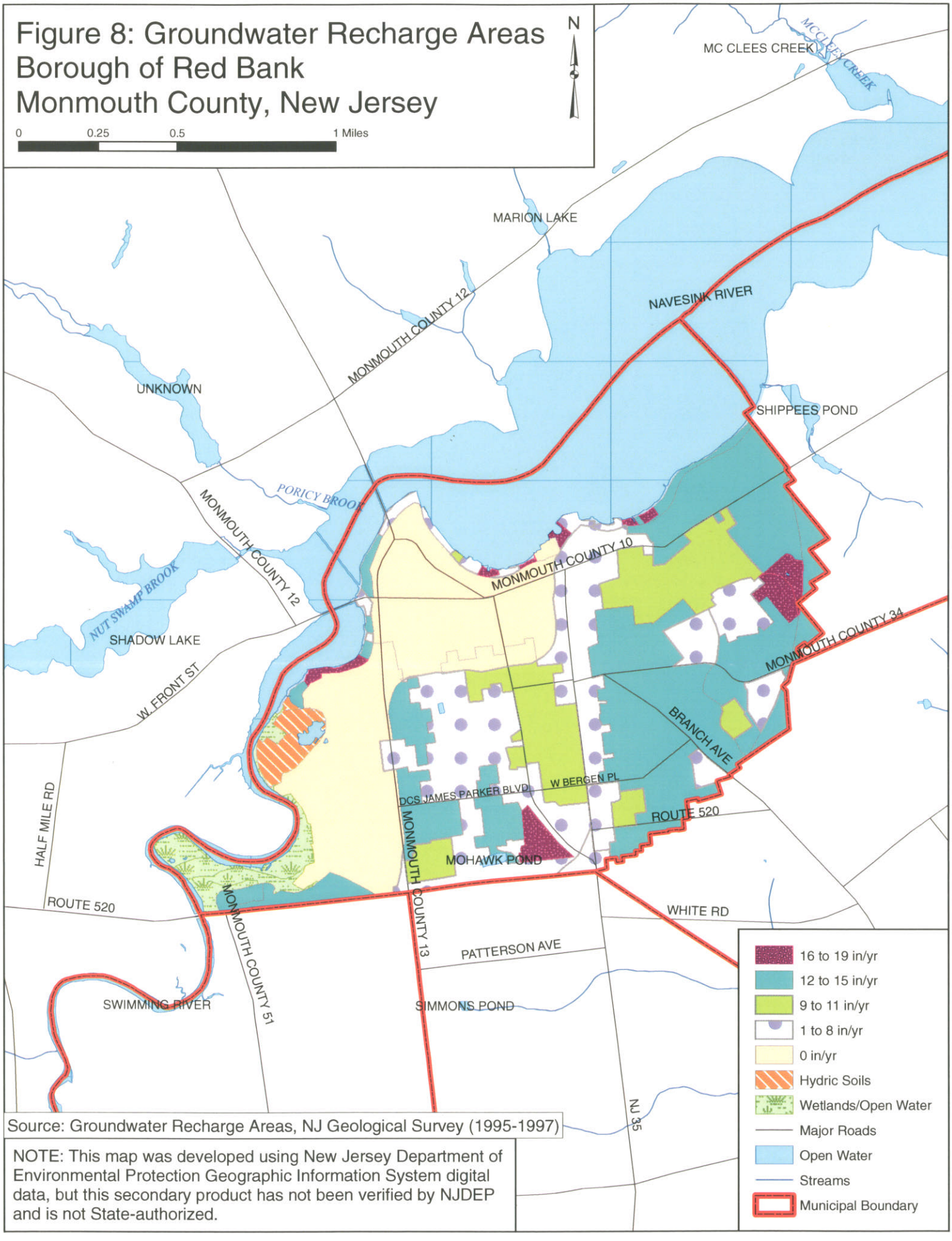
Groundwater recharge is the calculated amount of water actually absorbed into the groundwater from the surface. As stated above, impervious surfaces do not allow water to recharge the aquifers. It should be noted that groundwater recharge is also not calculated for surface water bodies, wetlands, or hydric soils because they may discharge, or recharge any area, or they may have no net effect, depending on each specific site, and its conditions. (http://www.state.nj.us/dep/njgs/pricelst/ofmap/ofm32.pdf). A hydric soil, by definition, is a

soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part .(59 Fed. Reg. 35680, 7/13/94)

The Borough of Red Bank draws its water supply from two Borough owned wells, which draw water from underground aquifers located several hundred feet below ground elevation, as well as, from interconnections with the New Jersey American Water Company (NJAWC). The wells are located at the Tower Hill and Chestnut Street facilities.

Wellhead Protection Areas (WHPA) are delineations of the horizontal extent captured by public water supply well pumping at a given rate over a two-, five-, and twelve-year period of time. These areas are the first step in defining the source of a public drinking supply well. It should be noted, however, that all confined wells have a fifty foot radius delineation which serves as an area to protect the well head. This fifty foot radius is controlled by the water purveyor. No WHPAs with delineated and tiered capture areas are located within the Borough. The Borough groundwater recharge areas are mapped in Figure 8 and WHPAs are shown on Figure 9.

Figure 8: Groundwater Recharge Areas
Borough of Red Bank
Monmouth County, New Jersey



Source: Groundwater Recharge Areas, NJ Geological Survey (1995-1997)

NOTE: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

Source: Public Community Water Supply Wells , NJGS (1997).

NOTE: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

DESIGN AND PERFORMANCE STANDARDS

The Borough has adopted applicable design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to reduce the negative impact of stormwater runoff on water quality and quantity, and loss of groundwater recharge in receiving waterbodies. Design and performance standards were written including the necessary language to maintain stormwater management measures consistent with the applicable stormwater management rules, *N.J.A.C. 7:8-5.8 - Maintenance Requirements*. This included language for safety standards consistent with *N.J.A.C. 7:8-6 - Safety Standards for Stormwater Management Basins*. After adoption, the Borough Stormwater Control Ordinance was submitted to the Monmouth County Planning Board for review and approval...

Proper inspection and maintenance are critical components for the successful performance of a stormwater management system. The Borough has prepared a Stormwater Pollution Prevention Plan (SPPP) addressing inspection and maintenance of existing stormwater infrastructure. Also included in the SPPP is the development of a Local Public Education Program to educate property owners on methods to reduce non-point source stormwater pollution such as proper waste disposal, solids and floatable controls, fertilizer and pesticide use, wildlife feeding, pet waste disposal, etc.

For regulated new development and redevelopment projects meeting the stormwater management threshold, the Borough requires submittal of an operation and maintenance plan in accordance with N.J.A.C. 7:8 - 5.8 and the NJDEP's *New Jersey Stormwater Best Management Practices Manual* (BMP Manual). Copies of each maintenance plan(s) will be filed with the Borough Department of Public Works.

New development and redevelopment activities will be coordinated with the Monmouth County Mosquito Extermination Commission, as needed, so that proposed structural and nonstructural strategies are properly maintained to prevent the promulgation of mosquito breeding habitats. Borough personnel will observe construction of projects to determine that appropriate stormwater management measures are constructed and function as designed. Borough personnel

will conduct periodic inspections after significant storms to determine the system is functioning properly and identify maintenance needs. Annual checks may be performed to identify additional maintenance needs required. This may include clearing blockages from inlets and/or outlet structures, removal of vegetation or accumulated debris/materials.

Borough ordinances provide for the inspection of systems on private property, as needed, provided the necessary easements are in place, and upon giving reasonable notice. Ordinances also provide a time frame for maintenance procedures to occur upon receiving notice from the Borough that maintenance is required.

PLAN CONSISTENCY

REGIONAL STORMWATER MANAGEMENT PLANS

Currently, there are no Regional Stormwater Management Plans (RSWMP) developed for waterbodies within the Borough. Therefore this plan does not need to be consistent with any such plans. This plan will be updated to be consistent with any RSWMP that are established in the future. The Borough intends to take part in the development of any proposed RSWMP that affects waterbodies within its boundaries.

TOTAL MAXIMUM DAILY LOADS

Currently there are no established TMDLs for Borough waterways. The Borough will update this MSWMP be consistent with any stormwater TMDL as they are established by the NJDEP.

RESIDENTIAL SITE IMPROVEMENT STANDARDS (RSIS)

This Municipal Stormwater Management Plan is consistent with regulations established under the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. The Borough will utilize the current update of the RSIS for stormwater management review of residential areas. This Plan incorporates the statute of RSIS and acknowledges that RSIS is periodically updated.

SOIL CONSERVATION

The Borough Stormwater Management Control Ordinance will require that all new development and redevelopment comply with the Soil Erosion and Sediment Control Standards of New Jersey. Borough inspectors will observe on-site soil erosion and sediment control measures as part of construction site inspections. Inspectors will report any inconsistencies or deficiencies to the local Soil Conservation District.

All development and redevelopment projects shall use the most recent DelMarVa unit hydrograph for stormwater calculations. In addition the Freehold Soil Conservation District requires the use of the most recent design storm rainfall data for stormwater calculations. The National Oceanographic and Atmospheric Administration (NOAA), the agency that develops

statistical estimates of rainfall amounts, has increased its estimates for the majority of storm events, particularly the larger events. The following table indicates the old and new twenty-four hour rainfall amounts in inches for Monmouth County.

Table 4: NRCS 24 Hour Design Storm Rainfall Depth (inches) – September 2004

Storm Period	1 yr.		2 yr.		5 yr.		10 yr.		25 yr.		50 yr.		100 yr.	
	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New
Monmouth County	2.8	**2.9**	3.4	**3.4**	4.4	**4.4**	5.3	**5.2**	6.0	**6.6**	6.5	**7.7**	7.5	**8.9**

Source: NOAA

MONMOUTH COUNTY GROWTH MANAGEMENT GUIDE

The Monmouth County Growth Management Guide, adopted in December 1995, sets forth a series of goals and objectives designed to enhance the quality of life for residents of Monmouth County. This plan is consistent with those objectives, which include:

- Encouraging the protection of the County's unique, diverse, natural and scenic natural resources;
- Promoting the protection of non-renewable natural resources;
- Encouraging the protection and conservation of all water resources;
- Promoting the preservation and improvements of surface water quality;
- Encouraging the preservation and improvements of groundwater quality and quantity; and
- Promoting the preservation, restoration, and enhancement of wetlands and stream corridors in order to protect the adjacent water bodies, such as streams, rivers, lakes, bays and oceans.

This plan is consistent with the County Growth Management Guide by encouraging the protection of stream corridors and encouraging flood control and ground water recharge and through the implementation of the principals of non-structural and structural strategies. This Plan is also consistent with the County Growth Management Guide, by preserving and protecting valuable natural features within the Borough.

STATE DEVELOPMENT OR REDEVELOPMENT PLAN (SDRP)

This plan is consistent with the plans and policies of the SDRP, which was adopted in 2001. The SDRP places non-environmentally constrained areas in the Borough in the Metropolitan Planning Area (PA1). Exceptions to the PA1 designation are wetlands and floodplain areas that are located within the Environmentally Sensitive Planning Area (PA5). According to the State Plan, most of the communities within the PA1 planning area are fully developed or almost fully developed with little vacant land available for new development. This Plan is consistent with the State Plan by preserving and protecting the established residential character of the Borough, preserving and upgrading the existing utility infrastructure, providing adequate open space facilities, and preserving and protecting valuable natural features within the Borough.

NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES

The Borough has reviewed its Master Plan, Reexamination Report and development ordinances relative to stormwater management planning. The following is a list of ordinances that will require further investigation/evaluation in order to incorporate the NJDEP's nonstructural strategies for stormwater management. Revised ordinances, if any, will be forwarded to the Monmouth County Planning Board for review and approval.

- **Section 25-8.4 Buffers Areas, Screening, Landscaping and Shade Trees:** Buffers are required between residential and other zones. Section 25-8.4 describes the size and landscaping of these buffers and states that topsoil and trees should be preserved. Slope plantings should be used to prevent erosion. Shade tree regulations are also specified. This section should be evaluated and updated as needed to encourage the use of native vegetation in buffer zones and slopes. Native vegetation will require less fertilization and are generally more drought tolerant than ornamental plantings.

- **Section 25-5.31: Cluster (reduced Lot Size) Criteria:** Section 25-5.31 outlines when applicants may request cluster development. This section should be evaluated and updated as needed to include the use of native vegetation and forested land in open spaces and throughout the development. This section should be evaluated for compliance with the long-term Borough plan and removed from the ordinances if not applicable.

- **Section 25-5.28: Performance Standards:** Section 25-5.28 outlines the performance standards required for compliance, such as noise and odor. This section should be evaluated and updated as needed to ensure compliance with the stormwater design and performance standards described in this MSWMP and as required by N.J.A.C. 7:8.

- **Section 25-8.21: Off-street Parking:** Section 25-8.21 outlines Borough regulations for parking lots, design of landscape islands and the use of curbing throughout the parking lot. This should be evaluated and updated as needed to address the possibility of islands being landscaped in a manner allowing for the disconnection of impervious surfaces and to act as

filters for stormwater runoff. This should be also evaluated and updated to encourage the use of curb stops and flush cut curbing where safe and practicable.

- **Section 25-8.29: Storm Drainage Facilities:** Section 25-8.29 details the design and performance standards for storm drain facilities. This section should be evaluated and updated as needed to ensure compliance with the design and performance standards specified in this MSWMP and as required by N.J.A.C. 7:8.

- **Section 25-5.13: Preservation of Natural Features:** Section 25-5.13 delineates in what areas natural features should be preserved. This section should be evaluated and updated as needed to encourage the preservation of all existing natural drainage features.

- **Section 25-4: Nonconforming Lots**: Section 25-4 details Nonconforming lots and their development. This section should be evaluated and updated as needed to include the design and performance standards described in this MSWMP and as required by N.J.A.C. 7:8.

NONSTRUCTURAL STRATEGIES

This MSWMP encourages the use of low impact design methods and recommends the practical use of the following non-structural strategies for all major developments in accordance with the NJDEP BMP Manual:

1. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.
2. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.
3. Maximize the protection of natural drainage features and vegetation.
4. Minimize the decrease in the pre-construction "time of concentration."
5. Minimize land disturbance including clearing and grading.
6. Minimize soil compaction.
7. Provide vegetated open-channel conveyance systems that discharge into and through

stable vegetated areas.

8. Provide preventative source controls.

In addition, the NJDEP's BMP Manual further requires an applicant seeking approval for a major development[1] to specifically identify which and how these nonstructural strategies have been incorporated into the development's design. Finally, for each of those nonstructural strategies that could not be incorporated into the development's design due to engineering, environmental, or safety reasons, the applicant must provide a basis for this contention.

Recommended Measures

Recommendations in the BMP Manual may be implemented through the use of:

- **Vegetated Filter Buffers**

  Native ground cover and grass areas can provide a vegetated buffer to assist in the filtering of stormwater runoff and provide locations for runoff from impervious areas. They are best utilized adjacent to a buffer strip, watercourse or drainage swale since the discharge will be in the form of sheet flow, making it difficult to convey the stormwater downstream in a normal conveyance system (swale or pipe).

- **Stream Corridor Buffer Strips**

  Buffer strips are undisturbed areas between development and the receiving waters. There are two management objectives associated with stream and valley corridor buffer strips:

  - To provide buffer protection along a stream and valley corridor to protect existing ecological form and functions; and
  - To minimize the impact of development on the stream itself (filter pollutants, provide shade and bank stability, reduce the velocity of overland flow).

  Buffers only provide limited benefits in terms of stormwater management; however, they

are an integral part of a system of best management practices.

- **The Stabilization of Banks, Shoreline and Slopes**

  The root systems of trees, shrubs and plants effectively bind soils to resist erosion. Increasing the amount of required plant material for new and redeveloped residential and non-residential sites should be encouraged throughout the Borough. Planting schemes should be designed by a certified landscape architect to combine plant species that have complementary rooting characteristics to provide long-term stability.

- **Deterrence of Geese**

  Maintaining or planting dense woody vegetation around the perimeter of a pond or wetland is the most effective means of deterring geese from taking over and contaminating local lakes and ponds. Minimizing the amount of land that is mowed will limit the preferred habitat for geese. However, if these actions are not sufficient, the Borough should investigate other actions.

- **Fertilizers & Pesticides**

  The use of fertilizers and pesticides to create the "perfect lawn" is an increasing problem in many residential areas. Fertilizer run-off increases the level of nutrients in water bodies and can accelerate eutrophication[2] in the lakes and rivers and continue on to the coastal areas. The excessive use of fertilizer often causes nitrate contamination of groundwater. Pesticide runoff can contaminate groundwater and surface water sources. Good fertilizer maintenance practices can help in reducing the amount of nitrates in the soil and thereby lower its content in the water. Initially, the Borough should work with the NJDEP to educate homeowners of the impacts of the overuse of fertilizers and pesticides. This discussion should include other techniques to create a "green lawn" without over fertilizing. Almost as important as the use of fertilizer is the combination of over fertilizing and over watering lawns. In many cases this leads to nutrient rich runoff,

[1] Major Development – means any 'development' that provides for ultimately disturbing one or more acres of land or increasing impervious surface by one-quarter acre or more. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

which ultimately may terminate into a nearby stream, lake or other water body. If fertilizer is applied correctly, the natural characteristics of the underlying soils will absorb or filter out the nutrients in the fertilizer.

STRUCTURAL STORMWATER MANAGEMENT[3]

In Chapter 9 of its BMP Manual, the NJDEP identifies several structural stormwater management options. Each of these structures has its advantages and disadvantages to managing stormwater.

The Borough recommends the following structural devices. Specifically, the Borough encourages the use of structural stormwater management systems in a manner that maximizes the preservation of community character:

- **Bioretention Systems**

  A bioretention system consists of a soil bed planted with native vegetation located above an underdrained sand layer. It can be configured as either a bioretention basin or a bioretention swale. Stormwater runoff entering the bioretention system is filtered first through the vegetation and then the sand/soil mixture before being conveyed downstream by the underdrain system. Runoff storage depths above the planting bed surface are typically shallow. The adopted Total Suspended Solids (TSS) removal rate for bioretention systems is 90 percent.

- **Constructed Stormwater Wetlands**

  Constructed stormwater wetlands are wetland systems designed to maximize the removal of pollutants from stormwater runoff through settling and both uptake and filtering by vegetation. Constructed stormwater wetlands temporarily store runoff in relatively shallow pools that support conditions suitable for the growth of wetland plants. The

[2] Eutrophication – The normally slow aging process by which a lake evolves into a bog or marsh and ultimately assumes a completely terrestrial state and disappears.
[3] Definitions provided in the NJDEP – Stormwater Best Management Practices Manual at: http://www.njstormwater.org/tier_A/ bmp_manual.htm

adopted removal rate for constructed stormwater wetlands is 90 percent.

- **Dry Wells**

  A dry well is a subsurface storage facility that receives and temporarily stores stormwater runoff from roofs of structures. Discharge of this stored runoff from a dry well occurs through infiltration into the surrounding soils. A dry well may be either a structural chamber and/or an excavated pit filled with aggregate. Due to the relatively low level of expected pollutants in roof runoff, a dry well cannot be used to directly comply with the suspended solids and nutrient removal requirements contained in the NJDEP Stormwater Management Rules at N.J.A.C. 7:8. However, due to its storage capacity, a dry well may be used to reduce the total stormwater quality design storm runoff volume that a roof would ordinarily discharge to downstream stormwater management facilities.

- **Extended Detention Basins**

  An extended detention basin is a facility constructed through filling and/or excavation that provides temporary storage of stormwater runoff. It has an outlet structure that detains and attenuates runoff inflows and promotes the settlement of pollutants. An extended detention basin is normally designed as a multistage facility that provides runoff storage and attenuation for both stormwater quality and quantity management. The adopted TSS removal rate for extended detention basins is 40 to 60 percent, depending on the duration of detention time provided in the basin.

- **Infiltration Basins**

  An infiltration basin is a facility constructed within highly permeable soils that provides temporary storage of stormwater runoff. An infiltration basin does not normally have a structural outlet to discharge runoff from the stormwater quality design storm. Instead, outflow from an infiltration basin is through the surrounding soil. An infiltration basin may also be combined with an extended detention basin to provide additional runoff storage for both stormwater quality and quantity management. The adopted TSS removal rate for infiltration basins is 80 percent. It should be noted that a dry well is a specialized infiltration facility intended only for roof runoff.

- **Manufactured Treatment Devices**

  A manufactured treatment device is a pre-fabricated stormwater treatment structure utilizing settling, filtration, absorptive/adsorptive materials, vortex separation, vegetative components, and/or other appropriate technology to remove pollutants from stormwater runoff. The TSS removal rate for manufactured treatment devices is based on the NJDEP certification of the pollutant removal rates on a case-by-case basis. Other pollutants, such as nutrients, metals, hydrocarbons, and bacteria can be included in the verification/certification process if the data supports their removal efficiencies.

- **Pervious Paving Systems**

  Pervious paving systems are paved areas that produce less stormwater runoff than areas paved with conventional paving. This reduction is achieved primarily through the infiltration of a greater portion of the rain falling on the area than would occur with conventional paving. This increased infiltration occurs either through the paving material itself or through void spaces between individual paving blocks known as pavers. Pervious paving systems are divided into three general types. Each type depends primarily upon the nature of the pervious paving surface course and the presence or absence of a runoff storage bed beneath the surface course. Porous paving and permeable paver with storage bed systems treat the stormwater quality design storm runoff through storage and infiltration. Therefore, these systems have adopted TSS removal rates similar to infiltration structures.

- **Sand Filters**

  A sand filter consists of a forebay and underdrained sand bed. It can be configured as either a surface or subsurface facility. Runoff entering the sand filter is conveyed first through the forebay, which removes trash, debris, and coarse sediment, and then through the sand bed to an outlet pipe. Sand filters use solids settling, filtering, and adsorption processes to reduce pollutant concentrations in stormwater. The adopted TSS removal rate for sand filters is 80 percent.

- **Vegetative Filters**

  Vegetated filter strips are engineered stormwater conveyance systems that treat small drainage areas. Generally, a vegetated filter strip consists of a level spreader and planted vegetation. The level spreader ensures uniform flow over the vegetation that filters out pollutants, and promotes infiltration of the stormwater.

  A vegetative filter is an area designed to remove suspended solids and other pollutants from stormwater runoff flowing through a length of vegetation called a vegetated filter strip. The vegetation in a filter strip can range from turf and native grasses to herbaceous and woody vegetation, all of which can either be planted or indigenous. It is important to note that all runoff to a vegetated filter strip must both enter and flow through the strip as sheet flow. Failure to do so can severely reduce and even eliminate the filter strip's pollutant removal capabilities. The total suspended solid (TSS) removal rate for vegetative filters will depend upon the vegetated cover in the filter strip.

- **Wet Ponds**

  A wet pond is a stormwater facility constructed through filling and/or excavation that provides both permanent and temporary storage of stormwater runoff. It has an outlet structure that creates a permanent pool and detains and attenuates runoff inflows and promotes the settlement of pollutants. A wet pond, also known as a retention basin, can also be designed as a multi-stage facility that provides extended detention for enhanced stormwater quality design storm treatment and runoff storage and attenuation for stormwater quantity management. The adopted TSS removal rate for wet ponds is 50 to 90 percent depending on the permanent pool storage volume in the pond, where extended detention is also provided, and the duration of detention time provided in the pond.

As previously noted Red Bank is a fully developed community and anticipates the majority of new construction as residential infill development.

LAND USE/ BUILD-OUT ANALYSIS

According to the *1985 Master Plan: Background Studies*, in early 1985 the Borough, which is approximately 1.78 sq. miles in size, had only 20 acres of vacant land available. Therefore, the Borough is exempt from preparing a full Land Use/Build-Out Analysis as required by the NJDEP to determine full-build-out projections.

Figure 5 illustrates the existing land use in the Borough based on the 1995/1997 GIS data from the NJDEP. Figure 7 illustrates the Hydrologic Units (HUC-14s) and Figure 5 shows the environmentally constrained lands within Red Bank.

MITIGATION PLAN

This mitigation plan is to provide potential solutions to offset stormwater related impacts to groundwater recharge, stormwater quantity control, and/or stormwater quality control for proposed development and establishes the criteria to grant a variance or exemption from the stormwater management design and performance standards set forth in this MSWMP and in N.J.A.C. 7:8-5.

MITIGATION PROJECT CRITERIA

To grant a variance or exemption from the stormwater regulations, new development and redevelopment plan applicants must propose a mitigation project affecting the impacted sensitive receptor. Mitigation for major development as defined by N.J.A.C. 7:8 – 1.2 et seq. must be implemented in the same drainage area as the proposed development and must provide additional groundwater recharge benefits, or protection from stormwater runoff quality and quantity from previously developed property.

The proposed mitigation project must address the performance standard for which the variance or exemption is requested. Performance standards must ensure the long-term maintenance of the approved mitigation system, which include the maintenance requirements under Chapters 8 and 9 of the NJDEP BMP Manual. The Borough does not anticipate granting variances or exemptions for "major developments" until a detailed mitigation plan is developed and approved. The Borough will consider granting variances or exemptions for "major developments" subject to the following NJDEP and local requirements:

1. The Developer shows that literal compliance is technically impractical or presents a substantial economic hardship.

2. The project must be within the same area that would contribute to the receptor impacted by the project. Note that depending on the specific performance standard waived, the sensitive receptor and/or the contributory area to that receptor may be different. If there are no specific sensitive receptors that would be impacted as the result of the grant of the

waiver/exemption, then the location of the mitigation project can be located anywhere within the Borough, and should be selected to provide the most benefit relative to an existing stormwater problem in the same category (quality, quantity or recharge).

3. Legal authorization must be obtained to construct the project at the location selected. This includes the maintenance and any access needs for the project in the future.

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

5. For ease of administration, if sensitive receptors are addressed, it is preferable to have one location that addresses any and all of the performance standards waived, rather than one location for each performance standard.

6. It must be demonstrated that implementation of the mitigation project will result in no adverse impacts to other properties or the environment.

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

DEVELOPER MITIGATION PLAN REQUIREMENTS

Proposed mitigation projects shall have Mitigation Plans submitted to the Borough for review and approval prior to granting final approval for site development. Developers should include the following in a Mitigation Plan:

- Mitigation project name, Owner name and address, Developer name and address, Mitigation project location, drainage area, cost estimate;
- Proposed project and mitigation project descriptions, proposed mitigation strategy and

impact to sensitive receptor. Descriptions should include what is being impacted, how it is impacted, what is being mitigated and how;

- Sensitive Receptor: Identify the sensitive receptor(s) related to the performance standard from which a waiver is sought. Demonstrate that the mitigation site contributes to the same sensitive receptor;
- Legal authorization required for construction, maintenance, and access;
- Responsible Party including: a schedule of required maintenance or maintenance plan, who will perform the maintenance, proposed cost of maintenance, and how it will be funded;
- All other permits required for construction of the mitigation project;
- Cost estimate of construction inspection; and
- Reason a waiver or exemption is required and supporting evidence.

Due to the minimal amount of vacant or developable land available, it is anticipated that the majority of the mitigation projects proposed will result in retrofitting/rehabilitation of existing stormwater facilities and natural infrastructures. Any applicant seeking relief via a mitigation option shall provide such relief that is equal to or greater than the parameter being sought for relief. Mitigation options shall be quantifiable in order to be compared to that being substandard on the proposed site. More detailed information may be available from the Borough or the Borough Engineer's office.

It is the developer's responsibility to provide a detailed study of any proposed mitigation project, and provide the Borough with a proposed mitigation plan for review and approval. Mitigation projects should meet all applicable safety, design and performance standards. Approval of the mitigation option will be under the sole discretion of the Board based on the above information and any calculations provided by the applicant and reviewed by the Board's professional consultants. The applicant will be required to submit an alternative mitigation option if the chosen project not suitable or the Board deems it not applicable.

RECOMMENDATIONS

The following are additional recommendations associated with this Stormwater Management Plan Element of the *Master Plan*:

- ***Recommendation A: Encourage the Planning Board and Council to review, discuss, and amend the existing development ordinances to be in compliance with the design, performance and safety standards outlined in this MSWMP and in the NJDEP stormwater regulations. Additionally, encourage adoption of a Stormwater Management Control Ordinance.***

  Portions of the existing development ordinances are inconsistent with recently adopted New Jersey Department of Environmental Protection (NJDEP) Stormwater Management Regulations and the NJDEP's *Best Management Practices Manual*. Some of these inconsistencies are identified in the Stormwater Management Strategies section above. The Borough should evaluate and amend its existing regulations to be in conformance with these regulations and to minimize inconsistencies or conflicts. In addition, NJDEP requires the Municipal Stormwater Control Ordinance that enforces this plan be adopted within twelve months of the adoption date of this MSWMP.

- ***Recommendation B: Educate residents on the impact of overuse of fertilizers and pesticides and good fertilizer maintenance practices.***

  As stated in the Stormwater Management Strategies section above, the overuse of fertilizers and pesticides have a significant detrimental impact on surface water bodies and groundwater. The Borough should work with the NJDEP to educate residents and lawn care or landscaping professionals on these impacts and encourage them to use techniques to create a "green lawn" without over-fertilizing and/or to convert lawn areas to other kinds of vegetation that do not require fertilization, pesticides, and other chemical treatments. Many lawn services also "overspray" fertilizer onto roadways and adjacent properties. The Borough should investigate methods to minimize the application of fertilizers beyond

property lines.

- ***Recommendation C: Seek to ensure inspection, monitoring, and maintenance of stormwater management facilities and develop strategies for maintenance and improvements.***

  Stormwater facilities require regular maintenance to ensure effective and reliable performance. Failure to perform the necessary maintenance can lead to diminished performance, deterioration and failure. In addition, a range of health and safety problems, including mosquito breeding and the potential for drowning, can result from improperly maintained facilities. To minimize these risks, the Borough should implement a procedure for regular inspection, monitoring, and maintenance of Borough owned stormwater facilities.

  Additionally, there are privately maintained stormwater facilities within the Borough. The Borough should work with the various property owners, residents and business owners to identify maintenance and/or improvements needs and develop strategies for regular inspection and maintenance of these facilities.

  The Borough should also encourage the use of low impact design methods and non-structural strategies that require less maintenance.

- ***Recommendation D: Investigate the creation of a Stream Corridor Buffer Protection Ordinance.***

  The NJDEP Stormwater Regulations requires any major development with more than 1 acre of disturbance or ¼ acre of additional impervious coverage to provide a 300-foot buffer along a Category One (C1) stream from the center line of the stream. In previously disturbed areas, this buffer can be reduced to 150 feet, according to NJDEP regulations. C1 streams within the Borough include sections of the Navesink River and Swimming River. The Borough also should encourage the use of Best Management Practices to the extent feasible to encourage the filtering of all stormwater runoff through vegetation or vegetative filter

strips prior to discharge of stormwater runoff into a stream or waterbody.

- ***Recommendation E: Evaluate the use of multi-level parking decks as a means to reduce impervious coverage.***

  Parking within the Borough is limited. Multi-level parking decks can increase the amount of parking spaces, while decreasing the overall footprint of the structure.

BIBLIOGRAPHY

PRINTED RESOURCES

Borough of Red Bank, Red Bank Planning Board. *Borough of Red Bank Master Plan.* 1985.

Borough of Red Bank, Red Bank Planning Board. *1985 Master Plan: Background Planning Studies.* 1985.

Borough of Red Bank, Red Bank Planning Board. *Borough of Red Bank Master Plan.* 1995.

Borough of Red Bank, Red Bank Planning Board. *Borough of Red Bank Master Plan Re-Examination* . 2002.

Linsley, Ray K., Franzini, Joseph B., Freyber, David L, and George Tchobanoglous. *Water Resources Engineering.* 4th ed. New York, New York: Irwin McGraw-Hill, 1992

New Jersey Department of Environmental Protection, Division of Watershed Management *New Jersey Stormwater Best Management Practices Manual* April 2004.

New Jersey Department of Environmental Protection, Division of Watershed Management. *Tier A Municipal Guidance Document: NJPDES General Permit No. NJ0141852.* April 2004.

United States Census Bureau. Profile of General Demographic Characteristics: 1990, 1990

United States Census Bureau. Profile of General Demographic Characteristics: 2000, 2000.

United States Census Bureau. 1990 Summary Tape File (STF 1), 1990.

ONLINE RESOURCES

Kern River Connections. The Hydrologic Cycle.
<http://www.creativille.org/kernriver/watershed.htm>

New Jersey Administrative Code N.J.A.C. 7:14A-25: NJPDES Stormwater Rules. Jan. 5, 2004.

New Jersey Administrative Code, N.J.A.C. 7:8, Stormwater Management Rules, Feb. 2, 2004.

New Jersey Department of Environmental Protection. *The Ambient Biomonitoring Network*

Watershed Management Area 12, 13, 14, 15, and 16, Atlantic Region. March 2001. (http://www.state.nj.us/dep/wmm/bfbm/).

New Jersey Department of Environmental Protection. Bureau of Clean and Plentiful Water, "Category One Waterbodies." <http://www.state.nj.us/dep/cleanwater/c1.html >, Dec. 29, 2003.

New Jersey Department of Environmental Protection. Guidance for the Development of Municipal Mitigation Plans http://www.njstormwater.org/docs/munimitipplan030706.pdf , February 2006.

New Jersey Department of Environmental Protection. List of Category One Streams, Lakes and Reservoirs <http://www.nj.gov/dep/cleanwater/c1_waters_list.pdf. >

New Jersey Department of Environmental Protection. Division of Watershed Management. Total Maximum Daily Loads. <http://www.state.nj.us/dep/watershedmgt/tmdl.htm> Sept. 1, 2004.

New Jersey Department of Environmental Protection. Division of Watershed Management. <http://www.state.nj.us/dep/watershedmgt/index.htm> Dec. 15, 2004.

New Jersey Department of Environmental Protection. Stormwater and Non-point Source Pollution, <www.njstormwater.org> August 30, 2004.

New Jersey Department of Environmental Protection. Sub-list 1-5, New Jersey's 2004 Integrated List of Water Bodies <http://www.state.nj.us/dep/wmm/bfbm/>, June 22, 2004