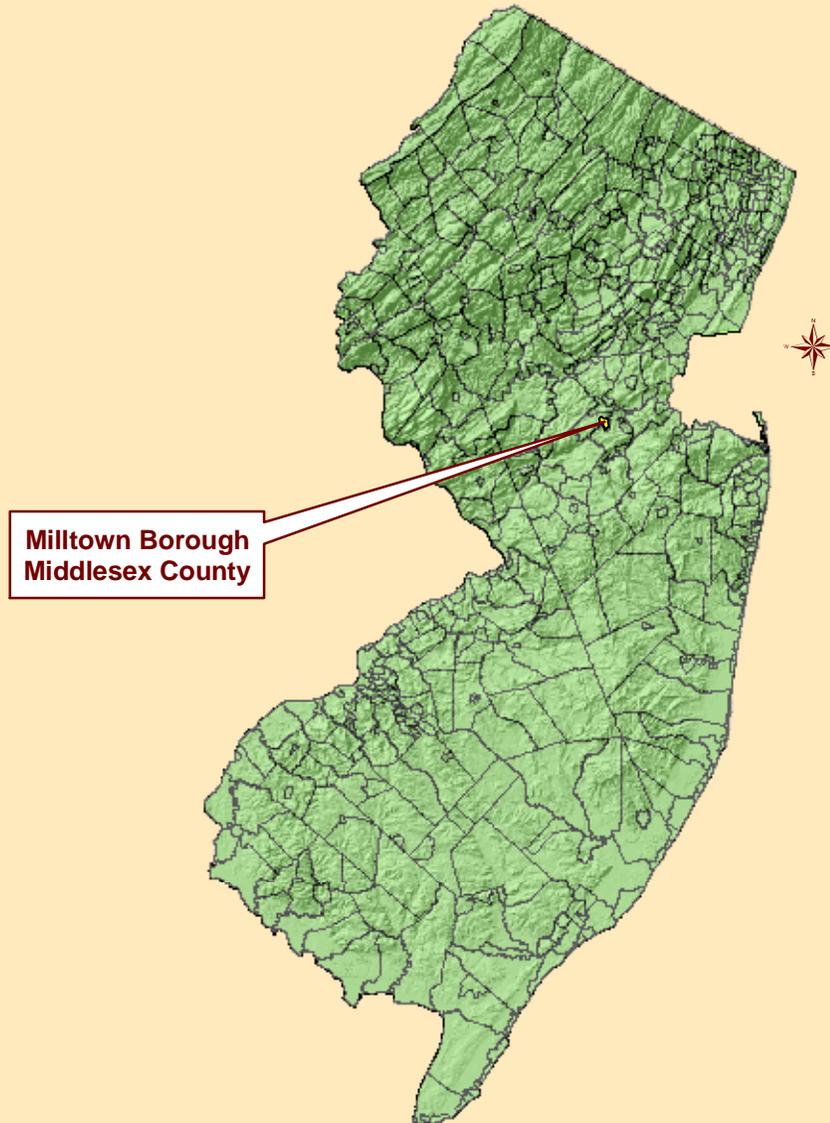


Municipal Stormwater Management Plan

Master Plan Element

for the:

Borough of Milltown Middlesex County, New Jersey



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Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Borough of Milltown (“the Borough”) to address stormwater-related impacts. The creation of this plan is required by N.J.A.C. 7:14A-25 Municipal Stormwater Regulations. This plan contains all of the required elements described in N.J.A.C. 7:8 Stormwater Management Rules. The plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major development, generally defined as projects that disturb one or more acre of land. These standards are intended to minimize the adverse impact of stormwater runoff on water quality, water quantity and the loss of groundwater recharge that provides base-flow in receiving water bodies.

The plan addresses long-term operation and maintenance measures for existing and future stormwater facilities. The final component of this plan is a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

Goals

The goals of this MSWMP are to:

- reduce flood damage, including damage to life and property,
- minimize, to the extent practical, increases in stormwater runoff from new development,
- reduce soil erosion from developments or construction projects,
- maintain the adequacy of existing and proposed culverts and bridges, and other in-stream structures,

- maintain groundwater recharge,
- prevent, to the greatest extent feasible, an increase in nonpoint source pollution,
- maintain the integrity of stream channels for their biological functions, as well as for drainage,
- minimize pollutants in stormwater runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water,
- protect public safety through the proper design and operation of stormwater basins, and
- promote public education and involvement, via the Stormwater Pollution Prevention Plan (SPPP) as implemented by the Borough April 1, 2005.

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

Consideration should be given to a reasonable, efficient funding mechanism for the implementation of stormwater management by all levels of government. Developers will be required to absorb some of the associated costs. State law should be established to permit use of mechanisms such as a stormwater utility.

Stormwater Discussion

Land development can dramatically alter the hydrologic cycle (See *Figure 1: Groundwater Recharge in the Hydrologic Cycle*) of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions.

These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration, which in turn, reduces stream base-flow and groundwater recharge. Reduced base-flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base-flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base-flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

In addition to increases in runoff peaks, volumes, and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate a variety of pollutants from the atmosphere, fertilizers, animal wastes, and leakage and wear from vehicles. Pollutants can include metals, suspended solids, hydrocarbons, pathogens, and nutrients.

In addition to increased pollutant loading, land development can adversely affect water quality and stream biota in more subtle ways. For example, stormwater falling on impervious surfaces or stored in detention or retention basins can become heated and raise the temperature of the downstream waterway, adversely affecting cold water fish species such as trout. Development can remove trees along stream banks that normally provide shading, stabilization, and leaf litter that falls into streams and becomes food for the aquatic community.

Background

Borough Demographics

The Borough of Milltown encompasses a 1.60 square mile area in Middlesex County, New Jersey (see *Figure 2: Milltown Vicinity Map*). In recent years, the Borough population has remained nearly constant, increasing slightly from 6,968 persons in 1990, to 7,000 persons in 2000. Thus, the population has increased by 0.5% from 1990 to 2000. Consequently, the population density has increased from 4,439 persons per square mile in 1990 to 4,458 persons per square mile in 2000. Although the Borough has experienced a small increase in population, redevelopment is ongoing and the amount of impervious area has increased. The constant population density and continued development has resulted in an increase in surface runoff and has affected waterway systems and their function. Based upon information provided by the New Jersey Department of Environmental

Protection (NJDEP) and the Borough of Milltown, *Figure 3: Existing Land Use* depicts the Borough's current land use and the existing land area that has been developed.

Figure 4: Zoning Districts displays the existing zoning districts and dictates the extent to which the existing undeveloped land can be developed. As observed in *Figure 4*, the Borough is predominantly zoned for residential uses with the exception of Main Street, Ryders Lane, Ford Avenue, and the Borough's NJ Turnpike Frontage, which are zoned for commercial and light industrial uses. In general, the areas abutting the Borough's streams are primarily zoned single-family-residential with commercial and commercial center districts along Main Street and Ford Avenue.

Borough Water Features

There is a major stream that falls within the Borough and also a major stream that falls on the Borough's border. Lawrence Brook separates one-third of the Borough from the remainder. Sawmill Brook runs with the northern border of the Borough. The smaller streams, Bog Brook and Sucker Brook run along the western border of the Borough. *Figure 5: Borough Waterways* illustrates the waterways in the Borough. *Figure 6: Boundary on USGS Quadrangle* depicts the Borough boundary on the USGS quadrangle maps and provides a spatial representation of the Borough and its surrounding features.

Hydrologic Unit Code 14

Watersheds are defined by the United States Geological Survey (USGS). The most basic defined watershed area or hydrologic unit is a unique defined feature having a minimum size of 3,000 acres. The base hydrologic unit is given a unique hydrologic unit code (HUC) fourteen (14) digits long; hence, the terminology Hydrologic Unit Code 14 (HUC14). The hydrologic unit network is

hierarchical. HUCs are combined to identify larger watershed areas such as HUC11, HUC8, HUC6, HUC4, watershed management areas (WMAs), watershed regions and so on.

The Borough falls within one watershed management area (WMA 9, Lower Raritan, South River & Lawrence) and located within two Hydrologic Unit Code 14 (HUC14) drainage areas; see *Figure 8: Hydrologic Unit Code 14 (HUC14)*.

Future Developable Land

Based upon information provided by the NJDEP and the Borough of Milltown, the amount of future developable land (i.e. vacant and agricultural land, excluding: wetlands, wetlands transition areas and open space) was determined to be 0.005 square miles. Since the amount of future developable land is less than one square mile, the Borough is not required to reevaluate the master plan and provide future nonpoint source pollutant loads assuming full build-out in accordance with N.J.A.C. 7:8-4.3(a). Based on current land use, the Borough does not anticipate substantial re-development throughout the Borough. See *Figure 7: Developable and Un-developable Land*.

Existing Water Quality Issues

Ambient Biomonitoring Network (AMNET)

Changes in the landscape caused by development have most likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality. It is necessary to monitor the health of waterways and determine methods to mitigate pollution where encountered. Studies, programs and networks have been developed to document the health of waterways, such as the Ambient Biomonitoring Network (AMNET) established by the NJDEP. There are over 800 AMNET sites throughout the state of New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired based on AMNET data. The data is used to generate a New Jersey Impairment

Score (NJIS), which is based on a number of biometrics related to benthic macroinvertebrate community dynamics.

Based on AMNET data, the study locations of Lawrence Brook on Riva Avenue and Sawmill Brook on Ryders Lane are both moderately impaired sites. Both of these AMNET sites are located in separate Hydrologic Unit Code 14 (HUC 14) drainage areas. Please see *Figure 8: Hydrologic Unit Codes 14 (HUC 14)* for the boundaries of the Borough's two HUC 14s. See *Figure 9: Water Quality Assessment Locations* for the locations of monitoring sites and Appendix B for associated AMNET data sheets.

New Jersey Integrated Water Quality Monitoring and Assessment Report

In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on streams within the state. The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)) (Integrated List) is required by the Federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. Waterways are categorized by Sublist, ranging from Sublist 1, which indicates a healthy functioning waterway, to Sublist 5, which indicates an unhealthy waterway not meeting its intended use.

Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants for which one or more Total Maximum Daily Loads (TMDLs) are needed. A TMDL is the amount of a pollutant that can be accepted by a waterbody without exceeding water quality standards or interfering with the ability to use a waterbody for one or more of its designated uses. Waterways are placed on Sublist 3 because there is insufficient data or the guidelines/criteria to conduct a use attainment assessment is unavailable; therefore, it cannot be determined if a designated use is threatened.

The allowable load is allocated to the various sources of the pollutant, such as stormwater and wastewater discharges, which require a NJPDES permit to discharge, and nonpoint sources, which includes stormwater runoff from agricultural and residential areas, along with a margin of safety. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan will be developed to identify how the various sources will be reduced to the designated allocations. Implementation strategies can include improved stormwater treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems, and other BMPs.

The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)), issued June 2004, examined Lawrence Brook and Sawmill Brook, both of which were listed on Sublist 5. The data shows Lawrence Brook at Riva Avenue, also issued by AMNET, as attaining water quality criteria for Phosphorus, Temperature, pH, Nitrates, Dissolved Solids, Total Suspended Solids, dissolved oxygen, and Un-ionized Ammonia; however, this stream exceeds water quality standards for benthic macroinvertebrates. Sawmill Brook at Ryders Lane, also issued by AMNET, exceeds standards for the presence of benthic macroinvertebrates, as there are more pollution tolerant benthic macroinvertebrates than pollution sensitive benthic macroinvertebrates, if any at all. Consequently, these are all impaired waterways. See *Figure 9: Water Quality Assessment Locations* for the locations of monitoring sites and Appendix C for the associated Integrated List data.

As noted above, there are streams within Milltown originating outside of its borders, namely Sawmill Brook, Lawrence Brook and Sucker Brook; hence, some degree of impairment may be caused by regional factors that are not exclusive to Borough of Milltown. In implementing the new NJDEP regulations, N.J.A.C. 7:8, Stormwater Management, the Borough anticipates improvement within the streams relating to water quality.

Existing Water Quantity Issues

In addition to water quality problems, the Borough has exhibited severe water quantity problems including flooding, stream bank erosion, and diminished base-flow in its streams. Bog Brook has exhibited some of these quantity problems. Chronic flooding has been observed on South Brook Drive, Lani Lane, and Fisher Drive and has resulted in erosion of stream banks, and ponding in the yards of residential properties that border the stream. Please see *Figure 14: FEMA Flood Prone Map Q3 Flood Data* per the National Flood Insurance Program (NFIP) issued September 1996 for areas of flooding concern.

The high impervious coverage of the Borough has significantly decreased groundwater recharge; hence, decreasing base flows in the streams during dry weather periods. Lower base flows can have a negative impact on stream habitat during the summer months. A map of the groundwater recharge areas is depicted in *Figure 10: Groundwater Recharge Areas*. There are no wellhead protection areas located within Milltown Borough; see *Figure 11: Wellhead Protection Areas*.

Design and Performance Standards

The Borough will adopt the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5, via the Stormwater Control Ordinance, to minimize the adverse impact of stormwater runoff on water quality, water quantity and loss of groundwater recharge in receiving water bodies for residential and commercial site development. Generally, projects meeting the definition of a major development are required to meet the regulations stated under N.J.A.C. 7:8-5. Said regulations address erosion control, groundwater recharge, runoff quantity standards, stormwater runoff quality standards, standards for calculating stormwater runoff and groundwater recharge, structural stormwater management standards, and maintenance

requirements, as stated above. The major development must meet the established design and performance standards set forth in the Soil Erosion and Sediment Control Act.

Low Impact Development (LID) Techniques

The N.J.A.C. 7:8: Stormwater Management regulations promote stormwater management measures for major developments that minimize the adverse impact of stormwater runoff on water quantity, water quality and the loss of groundwater recharge to receiving water bodies. In N.J.A.C. 7:8-5.3 and Chapter 2 of the *New Jersey Stormwater Best Management Practices (BMP) Manual 2004* stormwater management design techniques are focused on non-structural stormwater management strategies. Non-structural Stormwater Management Strategies, Low Impact Development (LID) techniques, are enumerated as follows:

1. "Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;" (N.J.A.C. 7:8-5.3(b)1.)
i.e., preserve forested areas, riparian corridors and high groundwater or aquifer recharge capabilities and any other natural area with significant hydrologic function, specific legal and/or procedural measures to ensure areas remain preserved in the future and, reestablish wooded and forested areas that were disturbed
2. "Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;" (N.J.A.C. 7:8-5.3(b)2.)
i.e., use vegetative filters and buffers, promote sheet flow over vegetated areas, use level and/or curb cuts at appropriate locations, utilize the minimum pavement widths, vegetate/landscape islands, utilize pervious materials at appropriate locations and locate parking underground or beneath buildings
3. "Maximize the protection of natural drainage features and vegetation;" (N.J.A.C. 7:8-5.3(b)3.)
i.e., preserve forested areas, riparian corridors and high groundwater or aquifer recharge capabilities and any other natural area with significant hydrologic function and take specific legal and/or procedural measures to ensure areas remain preserved in the future

4. “Minimize the decrease in the pre-construction “time of concentration;” (N.J.A.C. 7:8-5.3(b)4.)
i.e., increase sheet flow, disconnect impervious areas, use vegetative stormwater conveyance systems and dense vegetation at appropriate locations, utilize natural features and reduce slopes
5. “Minimize land disturbance including clearing and grading;” (N.J.A.C. 7:8-5.3(b)5.)
i.e., preserve forested areas, riparian corridors and high groundwater or aquifer recharge capabilities and any other natural area with significant hydrologic function and reduce lawn areas
6. “Minimize soil compaction;” (N.J.A.C. 7:8-5.3(b)6.)
i.e., use light weight equipment during construction and minimize disturbed land areas
7. “Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;” (N.J.A.C. 7:8-5.3(b)7.)
i.e., use of native plants will result in lower fertilizer and water needs, will promote infiltration characteristics similar to those of natural area and can attract native wildlife and provide better habitats
8. “Provide vegetated open-channel conveyance systems discharge into and through stable vegetated areas;” (N.J.A.C. 7:8-5.3(b)8.)
i.e., use vegetated channels and swales at appropriate locations to increase surface roughness and decrease flow velocities and ensure vegetative conveyance systems are tolerant to higher frequency storms
9. “Provide other source controls to prevent or minimize the use or exposure of pollutants at the site in order to prevent or minimize the release of those pollutants into stormwater runoff.” (N.J.A.C. 7:8-5.3(b)9.)
i.e., provide trash receptacles, litter fences, require regular sweepings, provide “pet waste stations,” provide storm drain inlets and trash racks, utilize berms and secondary containment systems (This section is more specifically geared towards commercial and industrial areas or areas with high residential population densities.)

The applicant submitting for review must address the nonstructural stormwater management strategies utilized in the proposed design. If these strategies are not incorporated into the design, the applicant must state reasons for contention. All nonstructural stormwater management strategies must be incorporated to the “maximum extent practical.” An applicant should demonstrate the design

has exhausted all measures to implement the nonstructural strategies prior to the use of the structural methods.

“...nonstructural LID-BMPs are to be given preference over structural BMPs. Where it is not possible to fully comply with the Stormwater Management Rules solely with nonstructural LID-BMPs, they should then be used in conjunction with LID and standard structural BMPs to meet the Rules’ requirements.” (NJ Stormwater BMP Manual 2004, page 2-3)

NJAC 7:8-5.3(a) states:

“To the maximum extent practical, the standards in NJAC 7:8-5.4 and 5.5 shall be met by incorporating nonstructural stormwater management strategies at NJAC 7:8-5.3 into the design. The persons submitting an application for review shall identify the nonstructural strategies incorporated into the design of the project. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management strategies identified in (b) below [NJAC 7:8-5.3(b)] into the design of a particular project, the applicant shall identify the strategy and provide basis for the contention.”

See Appendix A of the *NJ Stormwater BMP Manual 2004* for Low Impact Development Checklists provided by the NJDEP.

Stormwater Management Regulations Overview

Groundwater Recharge Requirements

Major developments must also meet one of two standards for groundwater recharge per

N.J.A.C. 7:8-5.4(a)2.:

- (1) maintain 100 percent of the average annual pre-construction groundwater recharge volume for the site or
- (2) infiltrate the increase in the stormwater runoff volume from pre-construction to post-construction for the two-year storm.

Stormwater Quantity Requirements

For water quality, N.J.A.C. 7:8-5.5 requires that stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in the stormwater

runoff generated by the water quality design storm by 80 percent of the anticipated load from the major development.

To control stormwater runoff quantity impacts, N.J.A.C. 7:8-5.4 3. further requires that a major development must meet one of three design standards:

- (1) demonstrate at no point in time that the post-construction runoff hydrograph exceed the pre-construction runoff hydrograph,
- (2) demonstrate there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the 2, 10, 100-year storm event and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site, and
- (3) demonstrate the post-construction peak runoff rates for the 2, 10 and 100-year storm events are 50, 75 and 80 percent, respectively, of the pre-construction runoff rates.

However, for stormwater water runoff quantity requirement (3), stream encroachment standards (N.J.A.C. 7:13-2.8) will require for the 100-year storm event 75 percent of the pre-construction peak runoff rates.

Maintenance, Safety and Ordinances

The design and performance standards include the language for maintenance of stormwater management measures consistent with the stormwater management rules at N.J.A.C. 7:8-5.8 Maintenance Requirements, and language for safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins. These sections address long-term operation and maintenance measures for existing and future stormwater facilities.

The Stormwater Control Ordinance must be submitted to the County for review and approval within 24 months of the effective date of the Stormwater Management Rules, April 2006. The Borough must adopt the following ordinances and meet the minimum requirements set forth in the Tier A Municipal Stormwater General Permit (NJ0141852). If the following ordinances already exist then they must be reviewed and updated where necessary.

Those ordinances include, but are not limited to:

1. Pet Waste Ordinance – will require owners and keepers to immediately and properly dispose of their pet's solid waste and will require information provided by NJDEP to be distributed with pet licenses regarding said ordinance;
2. Litter Ordinance – will meet the minimum standards set forth in the State Litter Statute (N.J.S.A. 13:1E-99.3);
3. Improper Disposal of Waste Ordinance – will prohibit spilling, dumping or disposing of any materials other than stormwater into the municipal separate storm sewer system;
4. Wildlife Feeding Ordinance – will prohibit feeding of non-confined wildlife in any public park or property owned/operated by the municipality;
5. Illicit Connection Ordinance – will prohibit illicit connections to the municipal separate storm sewer system.

During construction, Borough inspectors will be present during the construction of the project to observe the installation of stormwater management measures so that they are constructed and function as designed. Operation and Maintenance Manuals will be required for structural Best Management Practices ("BMP's"), such as detention basins or infiltration facilities, to ensure long-term maintenance strategies.

As a requirement of the Borough's Stormwater Pollution Prevention Plan (SPPP), implemented April 1, 2005, the public will be provided educational material and the opportunity to participate in annual events focusing on stormwater management issues. From the implementation of the SPPP, the public will be knowledgeable of stormwater issues and capable of relating stormwater management concerns to the above stated ordinances and recognizing their importance. As public education and involvement continues, it is anticipated that the public will work towards preventing stormwater quality, quantity and groundwater recharge problems with in the Borough.

Plan Consistency

Regional Stormwater Management Plan (RSWMP)

The Borough is not within a Regional Stormwater Management Planning Area, thus it does not need to be consistent with any Regional Stormwater Management Plans (RSWMP's). If at any time a Regional Stormwater Management Plan (RSWMP) is adopted, the Borough will revise this MSWMP to be consistent with the RSWMP.

Total Maximum Daily Loads (TMDL)

At this time no TMDL's have been adopted, however there have been TMDL's established in waters bordering the Borough, namely the Lawrence Brook AMNET site. The United States Environmental Protection Agency (EPA) has recommended a TMDL be established for the Lawrence Brook for "biological impairments." See Appendix D for associated TMDL reports. Accordingly, this MSWMP will be updated to be consistent if TMDLs are approved.

Residential Site Improvement Standards (RSIS)

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

Freehold Soil Conservation District (FSCD)

The Borough's Stormwater Control Ordinance will require all new development and redevelopment plans to comply with the Freehold Soil Erosion and Sediment Control Standards. During construction, Freehold Soil Conservation District (FSCD) inspectors will observe on-site soil

erosion and sediment control measures. FSCD is the local review and enforcement agency for soil erosion and sediment control.

Mitigation Plans

This mitigation plan is provided for a proposed development that is granted a variance or exemption from the stormwater management design and performance standards. Presented is a hierarchy of options, which may be eliminated, updated or revised by the Borough when deemed necessary. The Borough Engineer should be consulted to determine availability of mitigation projects. All mitigation projects are subject to approval of the Borough Engineer and Governing Body.

Mitigation Project Criteria

The mitigation project must be implemented within the same drainage area as the proposed development. If a suitable site cannot be located in the same drainage area as the proposed development, 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. The project must provide additional groundwater recharge benefits, or protection from stormwater runoff quality and quantity from previously developed property, which does not currently meet the design and performance standards as 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.

Listed below are potential projects 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. The Borough maintains the right to update the projects list

below and is not held accountable for time frames or to construct any of the mitigation projects or potential mitigation projects.

Groundwater Recharge

- At this time, there are no known groundwater recharge problems in the Borough. The Borough will update this MSWMP to include any future projects on an as-needed basis.

Water Quality

- Dredging of Mill Pond

Water Quantity

- Rehabilitation of Bog Brook along South Brook Drive, Lani Lane, and Fisher Drive including redefining stream channel and floodplains.
- Alleviating of flooding near Washington Avenue and Main Street by removing abandoned railroad trestle downstream of Mill Pond Dam.

The listed mitigation projects are generalized environmental enhancement projects that control flooding or control nonpoint source pollution. The Borough Engineer should be contacted for availability, description and any other necessary information pertaining to the projects listed above and those not listed.

Mitigation projects are subject to the approval of the Borough Engineer and Governing Body. Each project is approved upon an individual basis considering the extent of the variance, waiver or exception granted. Mitigation projects may require cooperation with outside agencies such as the Freehold Soil Conservation District, Mosquito Commission, Army Corp of Engineers, etc.

The municipality may require 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. Funding quantities are subject to the approval of the Borough Engineer and Governing Body and will include costs or partial costs, including those associated with purchasing a property or easement for mitigation, and those associated with the long-term maintenance requirements of the mitigation measure.

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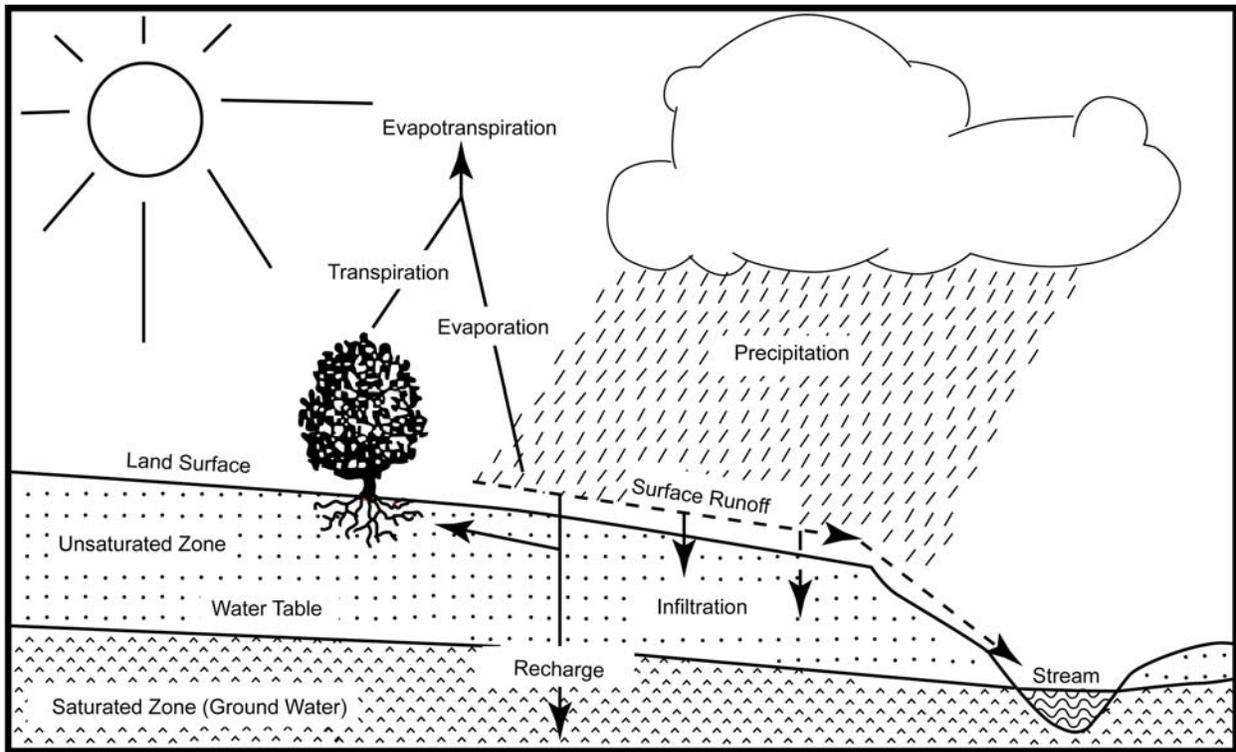
APPENDICES

APPENDIX A

Appendix of Figures

Figures 1 thru 14

Figure 1: Groundwater Recharge in the Hydrologic Cycle



Source: New Jersey Geological Survey Report GSR-32.

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

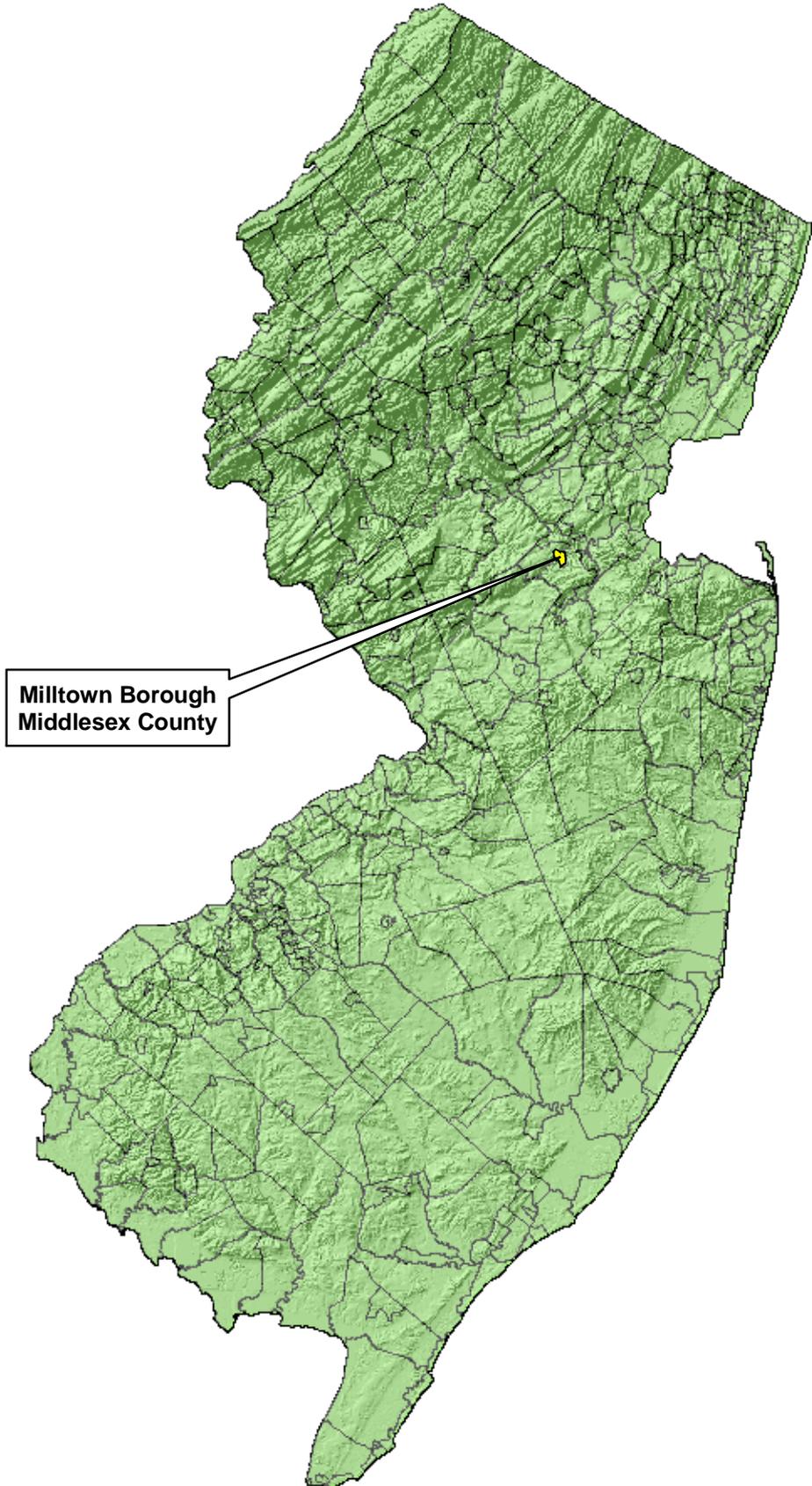
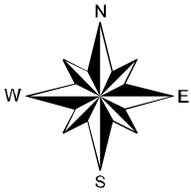


Figure 2:
Vicinity Map
Borough of Milltown,
Middlesex County, NJ



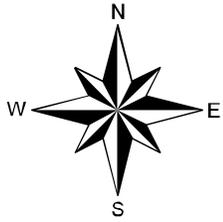
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, this secondary product has not been verified by NJDEP and is not state authorized.

LEGEND

**LAND USE
(1995/97)**

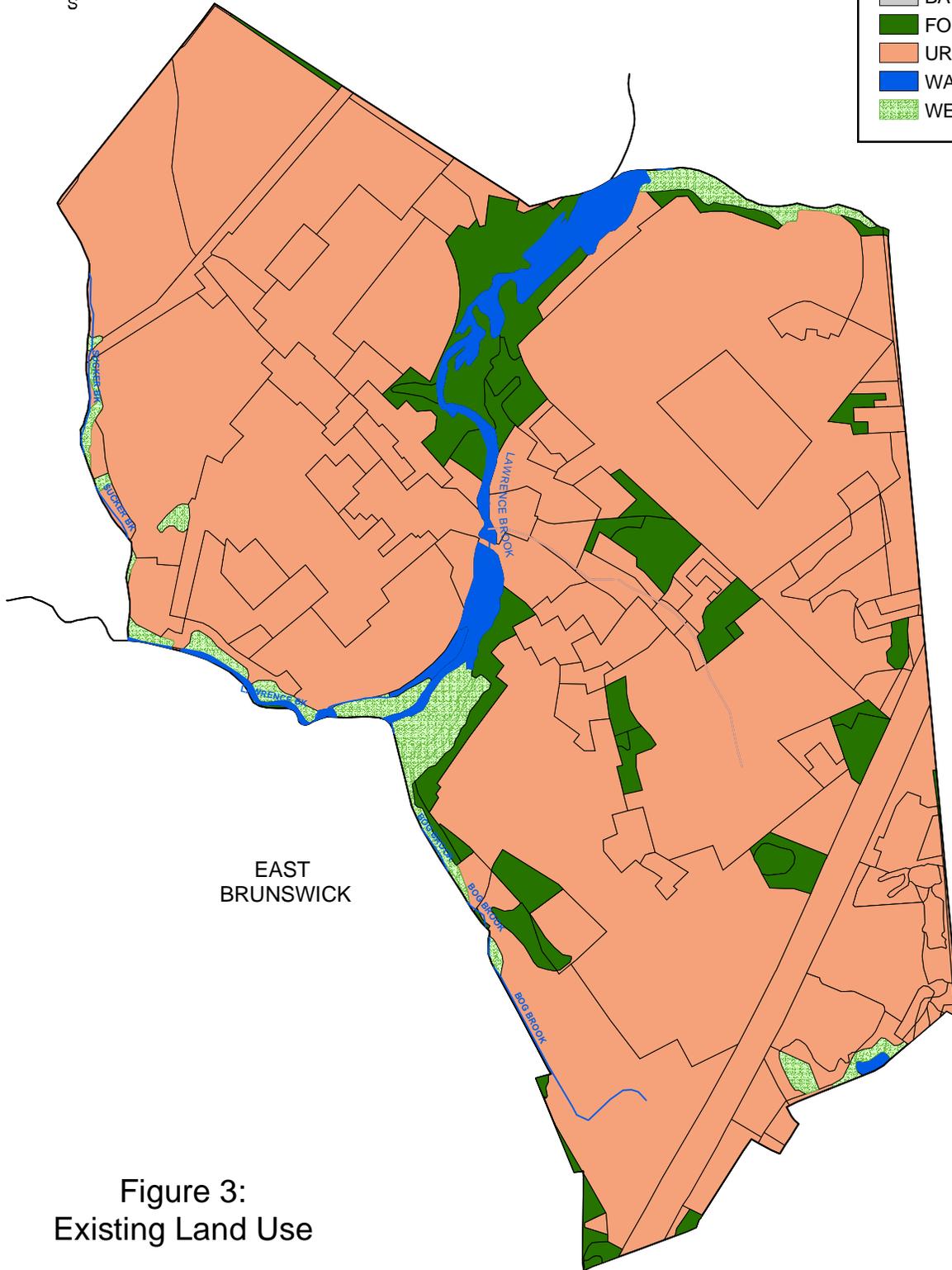
TYPE95

- AGRICULTURE
- BARREN LAND
- FOREST
- URBAN
- WATER
- WETLANDS



NORTH
BRUNSWICK

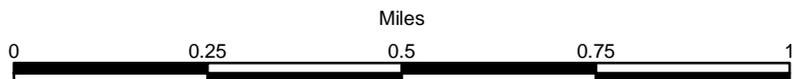
EAST
BRUNSWICK



EAST
BRUNSWICK

Figure 3:
Existing Land Use

Borough of Milltown
Middlesex County, NJ



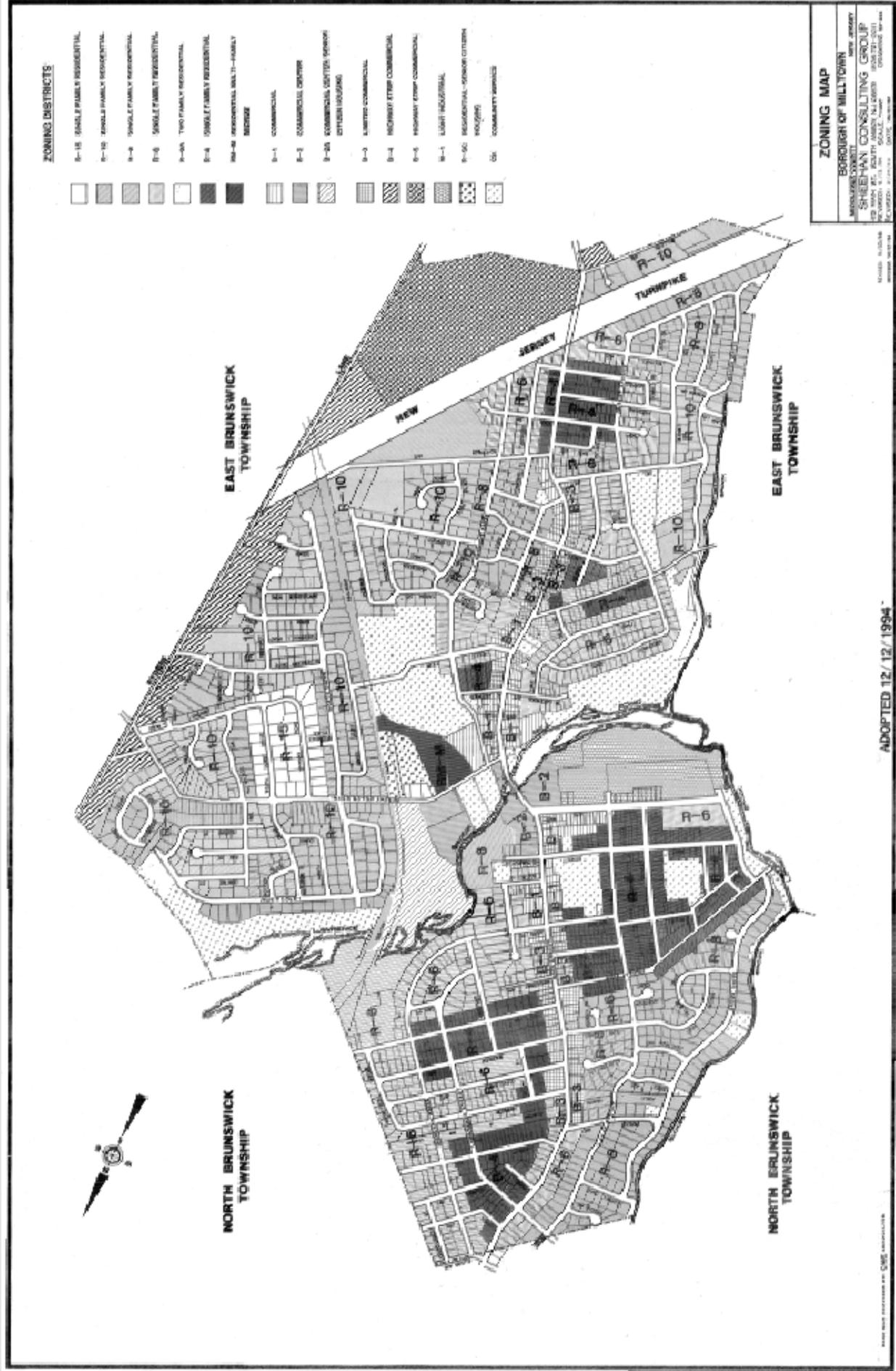


Figure 4: Zoning Districts
 Borough of Milltown, Middlesex County, NJ

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LEGEND

-  MILLTOWN LAKES
-  MILLTOWN STREAMS
-  MILLTOWN BOUNDARY

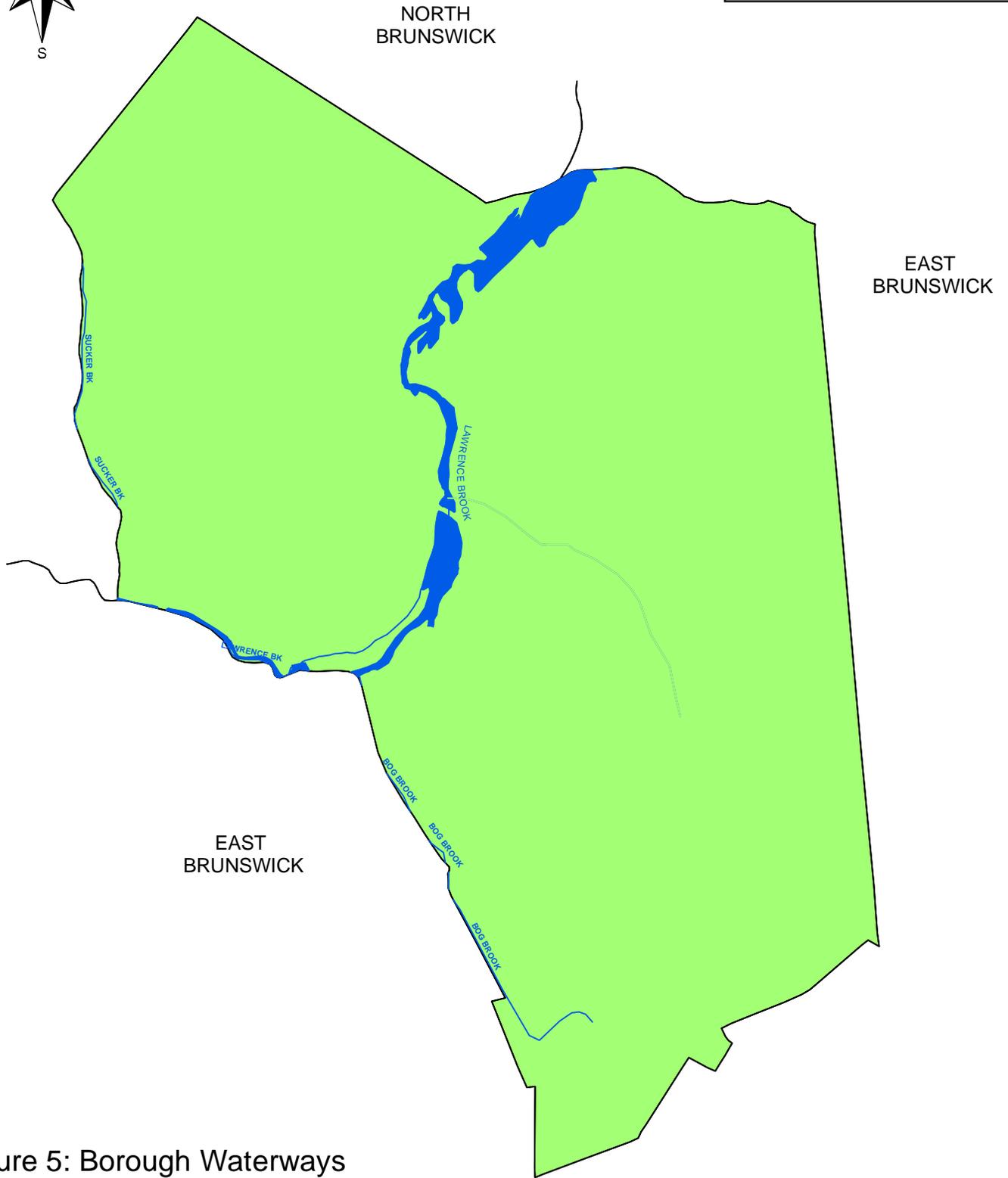
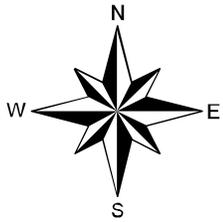
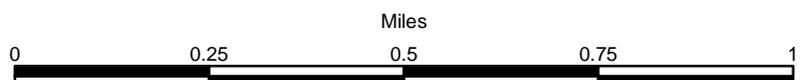


Figure 5: Borough Waterways

Borough of Milltown
Middlesex County, NJ



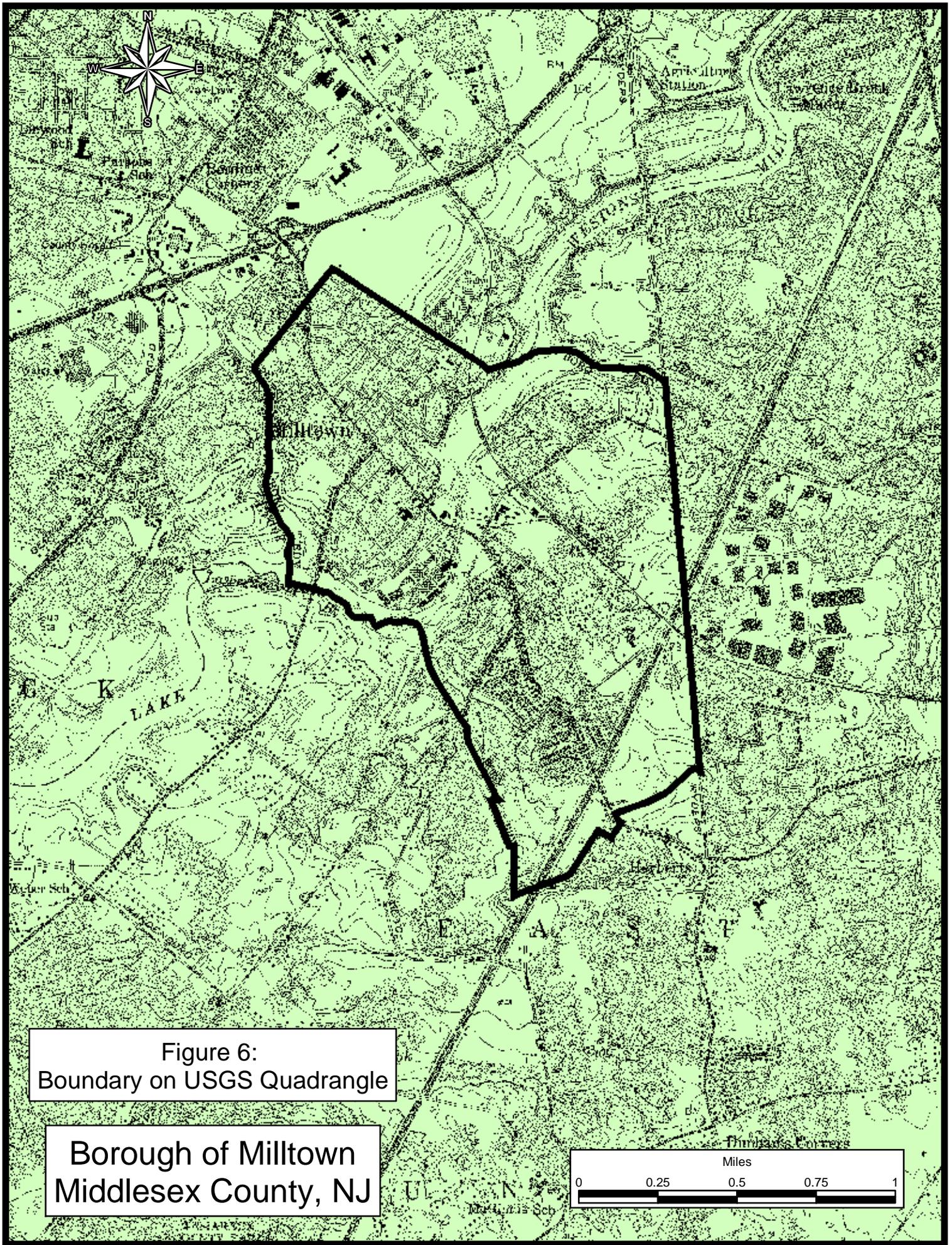
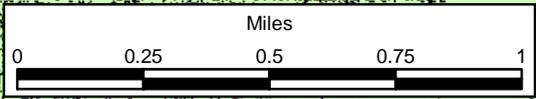
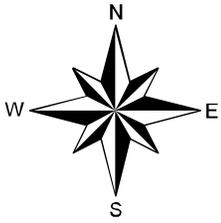


Figure 6:
Boundary on USGS Quadrangle

Borough of Milltown
Middlesex County, NJ



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



LEGEND

- Developed / Re-developable Land - 1.413 Sq. Miles
- Preserved / Un-developable Land - 0.191 Sq. Miles
- Future Developable Land - 0.005 Sq. Miles

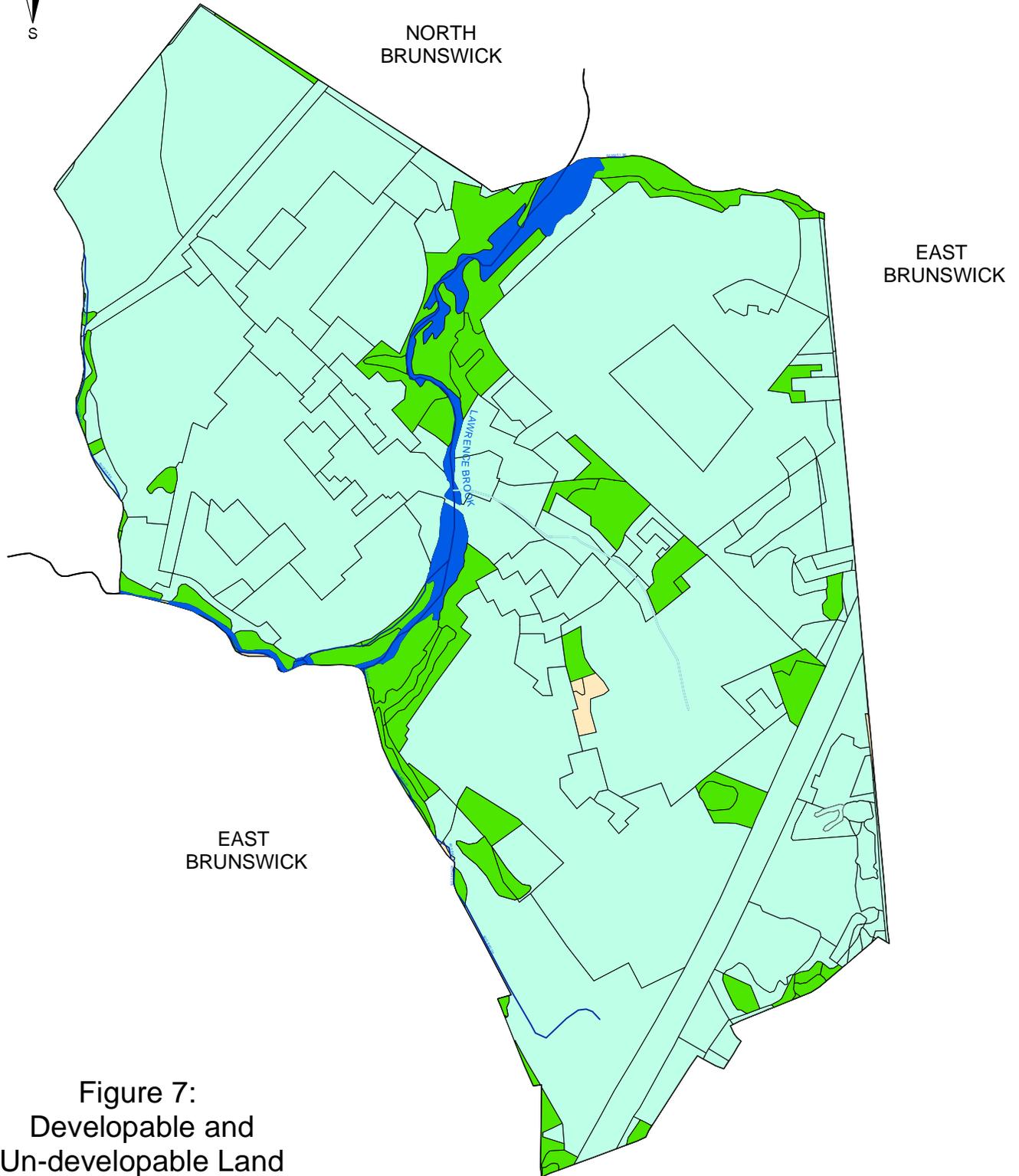
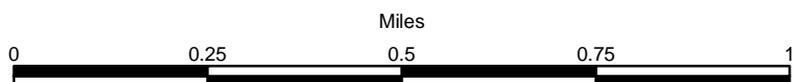


Figure 7:
Developable and
Un-developable Land

Borough of Milltown
Middlesex County, NJ



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LEGEND

HUC 14

- 02030105130060
- 02030105130070
- MILLTOWN STREAMS
- MILLTOWN LAKES

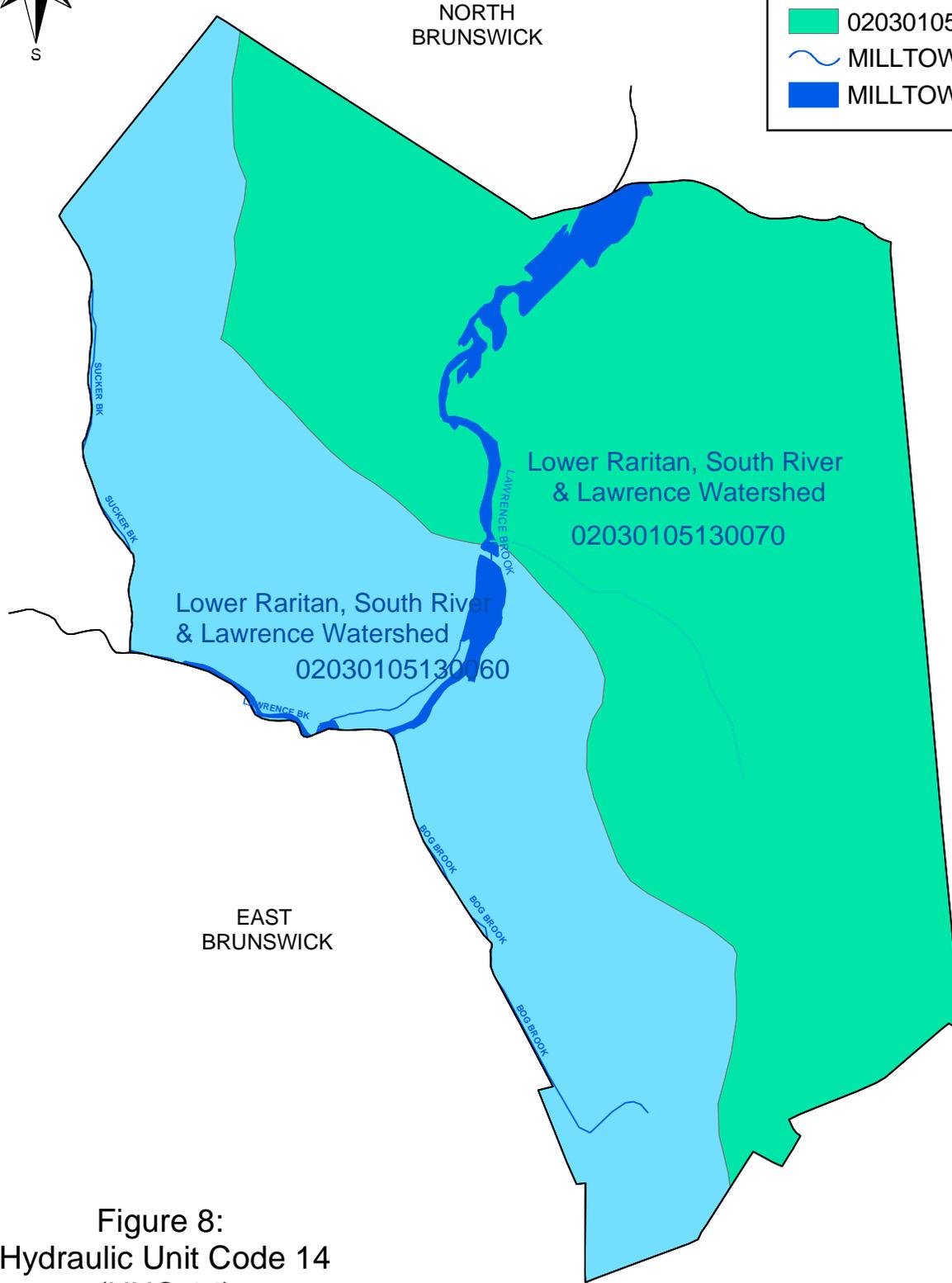
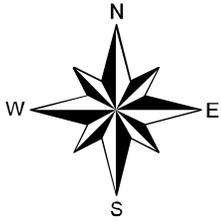
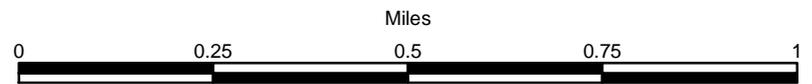
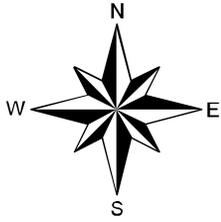


Figure 8:
 Hydraulic Unit Code 14
 (HUC 14)
 Borough of Milltown
 Middlesex County, NJ



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LEGEND

-  INTEGRATED WATER QUALITY MONITORING STATION
-  MILLTOWN STREAMS
-  MILLTOWN LAKES
-  MILLTOWN BOUNDARY

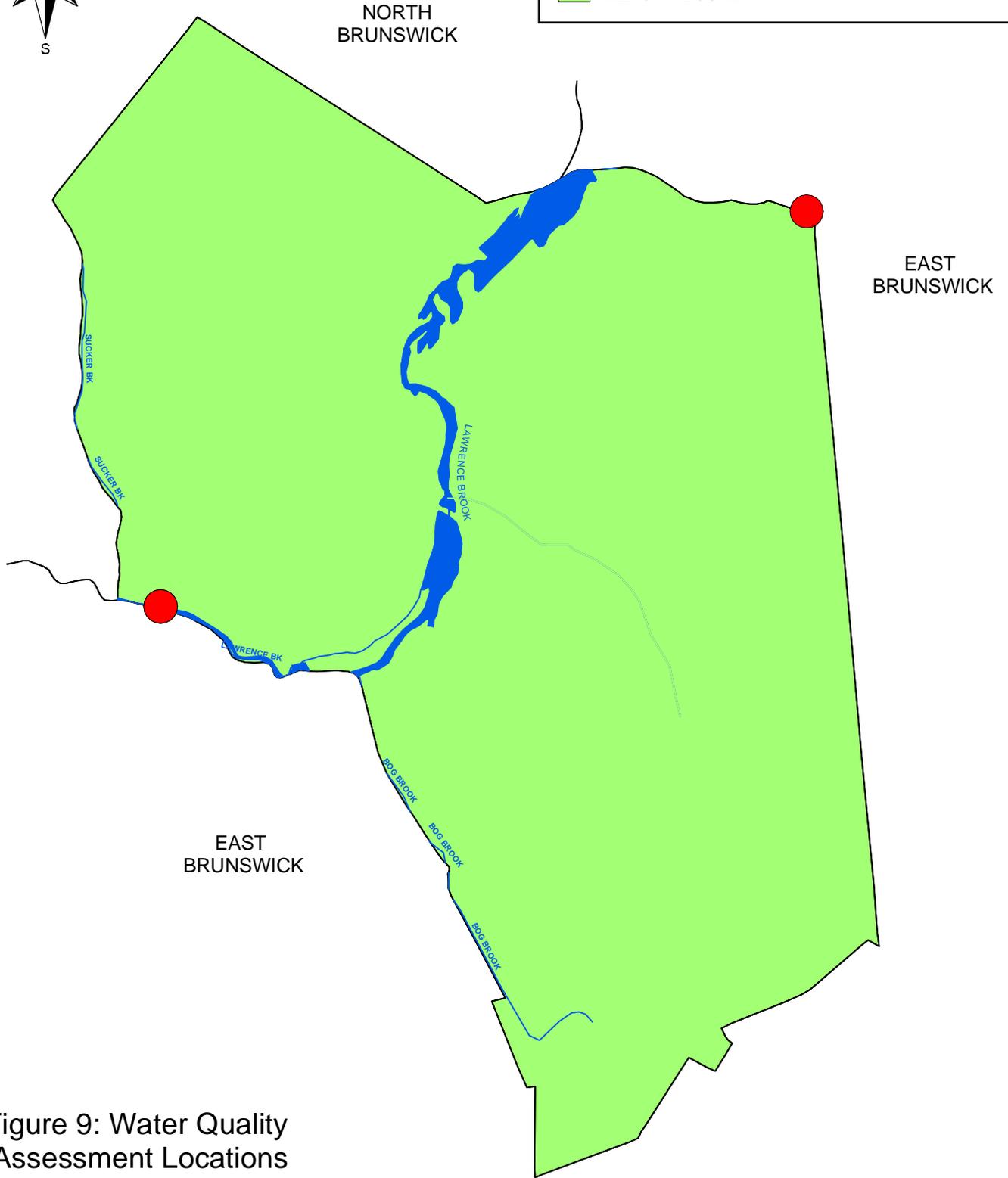
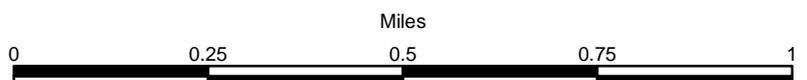
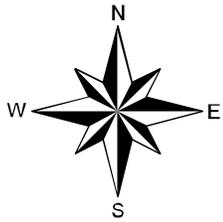


Figure 9: Water Quality Assessment Locations

Borough of Milltown
Middlesex County, NJ



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LEGEND

Groundwater Recharge (inches per year)

-  0.00
-  0.01 - 6.00
-  6.01 - 10.00
-  10.01 - 12.00
-  12.01 - 14.40
-  MILLTOWN LAKES
-  MILLTOWN STREAMS

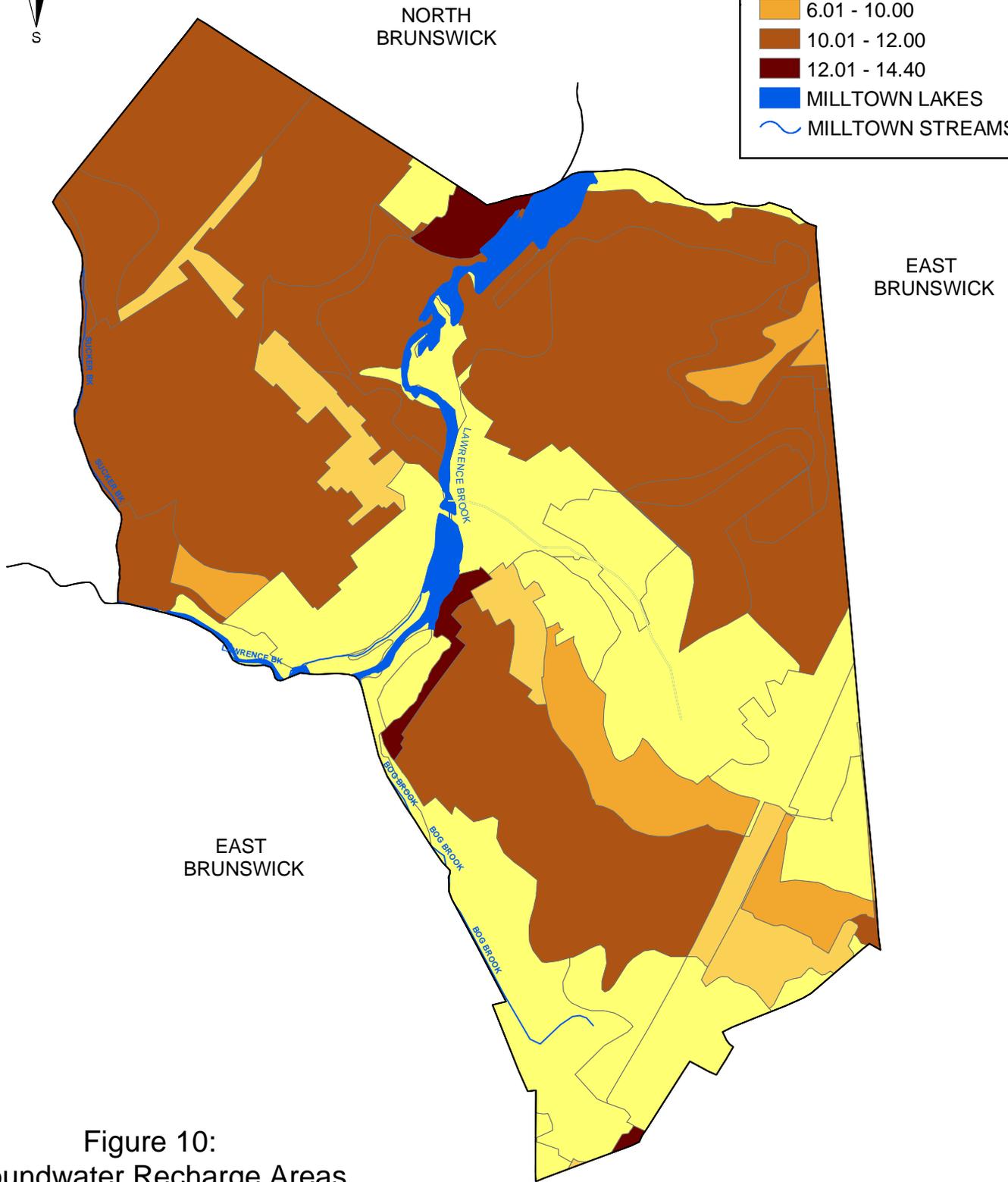
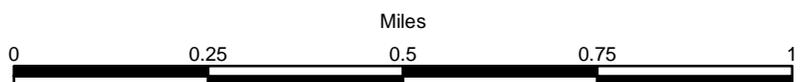
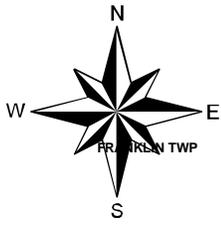


Figure 10:
Groundwater Recharge Areas
Borough of Milltown
Middlesex County, NJ



PISCATAWAY TWP

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HIGHLAND PARK BORO

NEW BRUNSWICK CITY

LEGEND

WELLHEAD PROTECTION AREAS

TIER



1



2



3



MILLTOWN LAKES



MILLTOWN STREAMS



MILLTOWN BOUNDARY

NORTH BRUNSWICK TWP



SAYREVILLE BORO

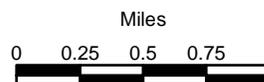
SOUTH RIVER BORO

EAST BRUNSWICK TWP

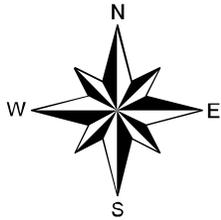
SPOTSWOOD BORO

OLD BRIDGE TWP

Figure 11:
Wellhead Protection Areas
Borough of Milltown
Middlesex County, NJ



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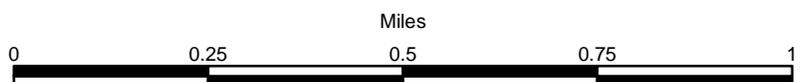
LEGEND

-  MILLTOWN LAKES
-  MILLTOWN STREAMS
-  WETLANDS



Figure 12:
Wetlands and Water Land Uses
Constrained Lands

Borough of Milltown
Middlesex County, NJ



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

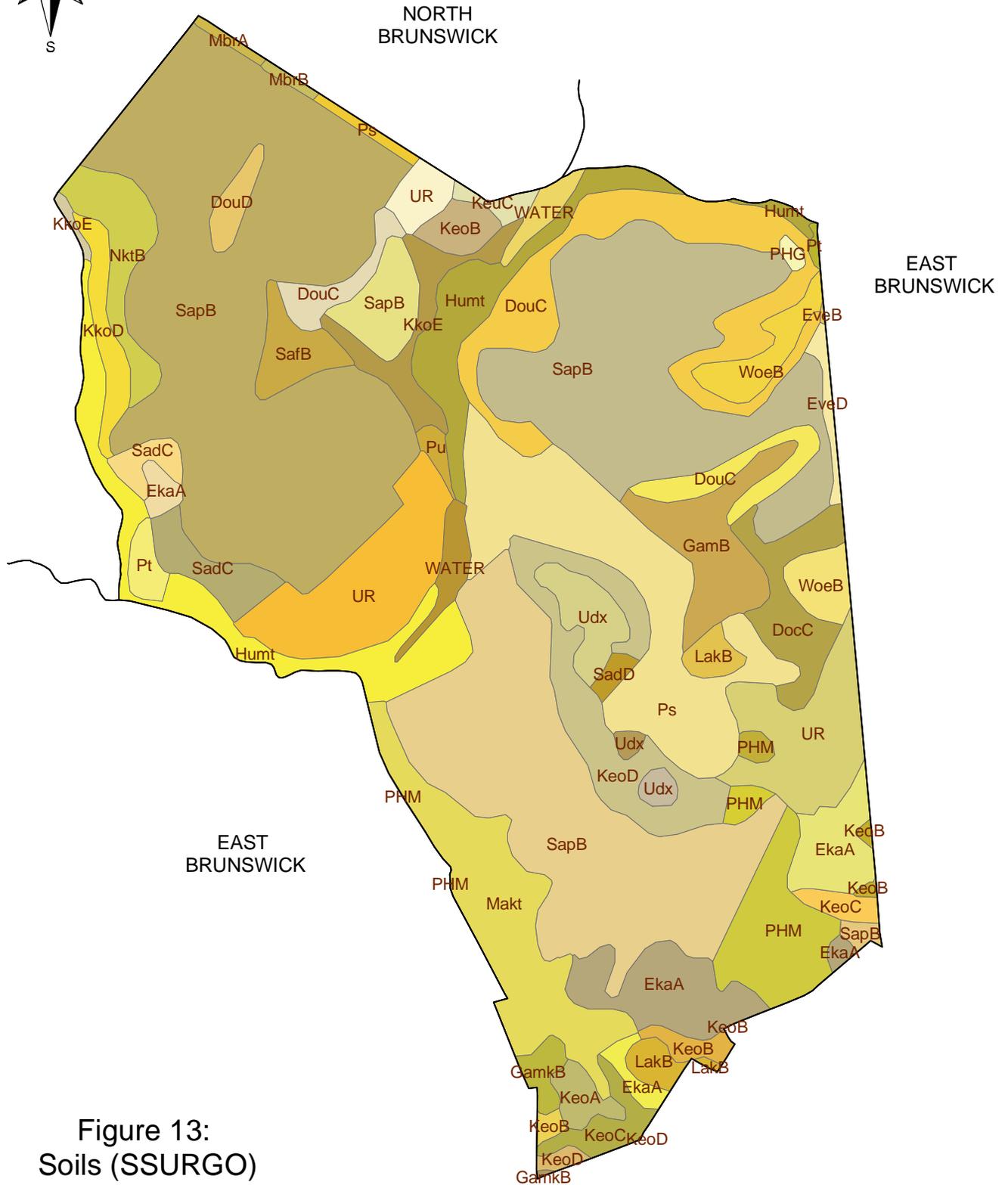
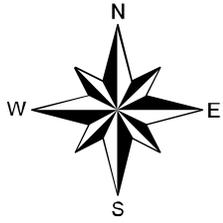
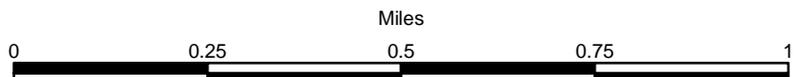


Figure 13:
Soils (SSURGO)

Borough of Milltown
Middlesex County, NJ



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LEGEND

FEMA Flood Zone

ZONE

-  AE
-  X
-  X500
-  MILLTOWN LAKES
-  MILLTOWN STREAMS

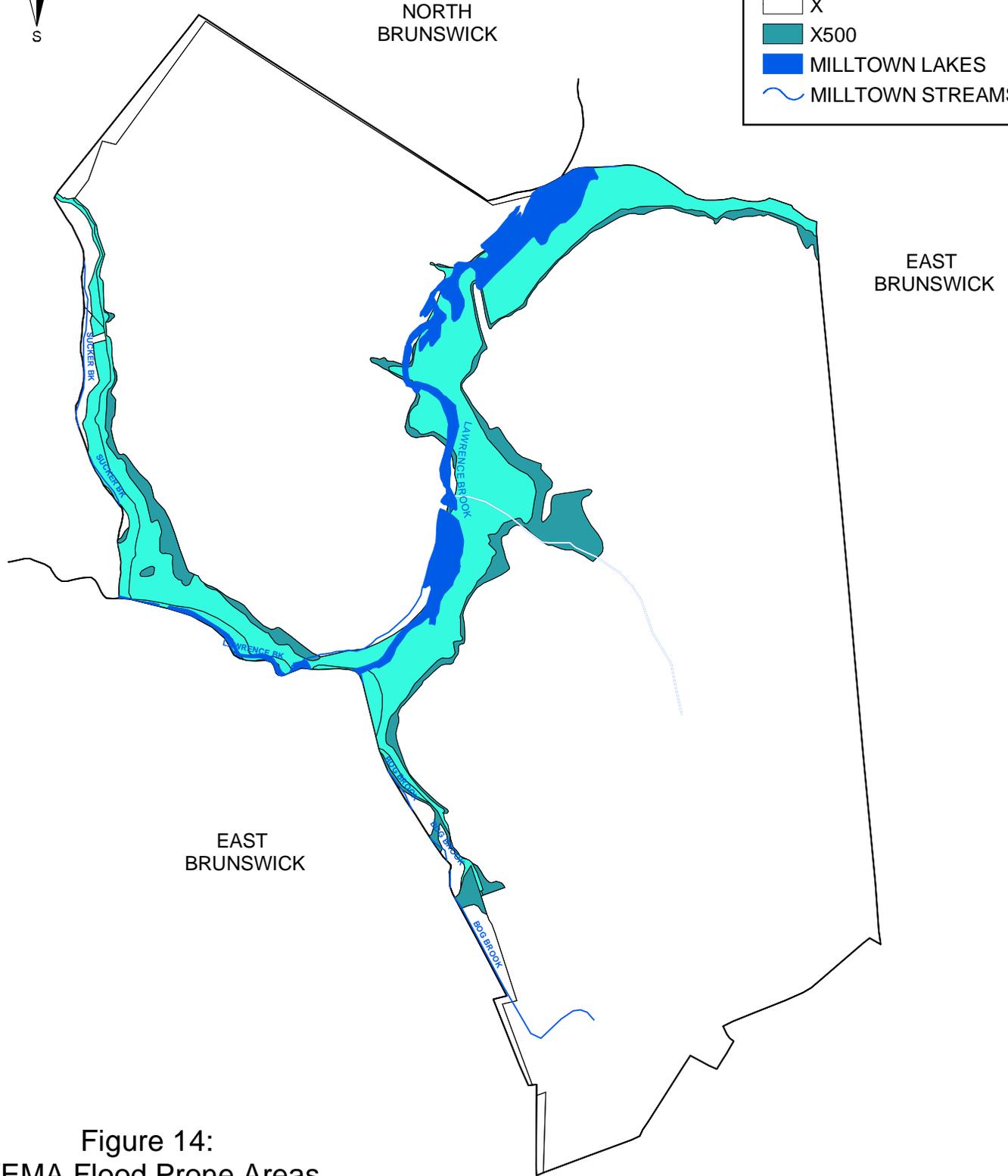
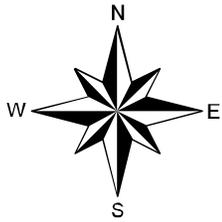
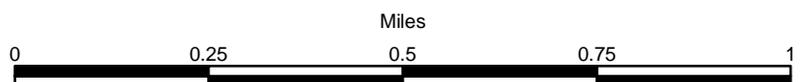


Figure 14:
FEMA Flood Prone Areas
Borough of Milltown
Middlesex County, NJ



APPENDIX B

2001 AMBIENT BIOMONITORING NETWORK DATA: Raritan Region

Benthic Macroinvertebrate Report Data

Station: AN0434
Lawrence Bk, Riva Rd , Milltown, Middlesex County
New Brunswick USGS Quadrangle
Date Sampled: 09/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Naididae	7	30
Tubificidae	10	19
Planariidae	4	16
Chironomidae	6	11
Gammaridae	4	6
BloodRed Chironomidae	8	6
Lumbriculidae	8	5
Corbiculidae	8	2
Planorbidae	6	2
Sphaeriidae	8	2
Viviparidae	6	1
Plagiostomidae	4	1

Statistical Analysis

Number of Taxa: 12
Total Number of Individuals: 101
% Contribution of Dominant Family: 29.70 % (Naididae)
Family Biotic Index: 6.89
Scraper/Filterer Collector Ratio: 0.75
Shredder/Total Ratio: 0.00
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 0
% EPT: 0.00
EPT/C: 0.00
NJIS Rating: 15
Biological Condition: Moderately Impaired
Habitat Analysis: 129
Deficiency(s) noted:
- Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 45/2
Substrate: Gravel,sand....StreamBank Vegetation/Stability: Shrubs,trees/Unstable
Canopy: Mostly Open....Other: Suburban; Water temp.21.9 /pH 6.9 /DO 5.9 /Cond.175

Station: AN0435
 Sawmill Bk, Ryders Ln , Milltown, Middlesex County
 New Brunswick USGS Quadrangle
 Date Sampled: 09/10/98

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	34
Chironomidae	6	20
Coenagrionidae	9	13
Lumbriculidae	8	6
Sphaeriidae	8	6
Calopterygidae	5	4
Tetrastemmatidae	7	4
Corduliidae	5	2
Planariidae	4	2
Glossiphoniidae	8	1
Aeshnidae	3	1
Baetidae	4	1
Planorbidae	6	1
Libellulidae	9	1
Sialidae	4	1
Lymnaeidae	6	1
Naididae	7	1
BloodRed Chironomidae	8	1

Statistical Analysis

Number of Taxa: 18
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 34.00 % (Tubificidae)
 Family Biotic Index: 7.94
 Scraper/Filterer Collector Ratio: 0.33
 Shredder/Total Ratio: 0.00
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 1.00
 EPT/C: 0.05
 NJIS Rating: 12
 Biological Condition: Moderately Impaired
 Habitat Analysis: 113
 Deficiency(s) noted:
 - Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid....Flow: Slow....Width/Depth (ft): 9/1
 Substrate: Gravel,sand,silt....StreamBank Vegetation/Stability: Trees,shrubs/Unstable
 Canopy: Mostly Closed....Other: Suburban/Forested; Water temp.17.2 /pH 6.6 /DO 7.2
 /Cond.367

APPENDIX C

2004 Integrated Water Quality Monitoring & Assessment Report

Integrated List Report Data

New Jersey's
2004 Integrated List of Waterbodies

Sublist	Wtrshd Region	WMA	Station Name/Waterbody	Site ID	Parameters	Data Source
1	Raritan	09	Lawrence Brook at Riva Rd in Milltown	EWQ0434	Phosphorus, Temperature, Dissolved Oxygen, pH, Nitrate, Dissolved Solids, Total Suspended Solids, Unionized Ammonia	EWQ
3	Raritan	09	Sawmill Brook at Ryders Ln in East Brunswick	AN0435	Benthic Macroinvertebrates	NJDEP AMNET
5	Raritan	09	Lawrence Brook at Riva Rd in Milltown	AN0434	Benthic Macroinvertebrates	NJDEP AMNET

APPENDIX D

Total Maximum Daily Loads

TMDL Reports



U.S. Environmental Protection Agency

Total Maximum Daily Loads

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Listed Water Information

CYCLE : 2002

Click [here](#) to see metadata for this report.

Cycle: 2002 **State:** NJ **List ID:** NJ-02030105130060-AN0434

Waterbody Name: LAWRENCE BROOK

State Basin Name: 09 RARITAN

Listed Water Map Link: [MAP 303\(d\)](#)

State List IDs:

Cycle	State List ID
2002	AN0434

State Impairments:

State Impairment	Parent Impairment	Priority	Rank	Targeted Flag	Anticipated TMDL Submittal
BIOLOGY MODERATELY IMPAIRED	BIOLOGICAL CRITERIA	LOW		N	DEC-31-2003

Potential Sources of Impairment:

There were no potential sources reported to EPA by the state.

Total Maximum Daily Load (TMDL) Information:

There were no TMDLs reported to EPA by the state.

Watershed Information:

Watershed Name	Watershed States
RARITAN	NEW JERSEY

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