Township of Washington

Mercer County, New Jersey
March, 2005

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Municipal Stormwater Management Plan

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Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Township of Washington, Mercer County ("the Township") 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, 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 and water quantity and the loss of groundwater recharge that provides base flow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

This plan also addresses the review and update of existing ordinances and other planning documents to allow for project designs that include low impact development techniques. 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, any increase in stormwater runoff from any new development;
- reduce soil erosion from any development or construction project;
- assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- maintain groundwater recharge;
- prevent, to the greatest extent feasible, an increase in nonpoint pollution;
- maintain the integrity of stream channels for their biological functions, as well as for drainage;
- minimize pollutants in stormwater runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water; and
- protect public safety through the proper design and operation of stormwater basins.

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

Stormwater Discussion

Land development can dramatically alter the hydrologic cycle (See Figure 1) of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

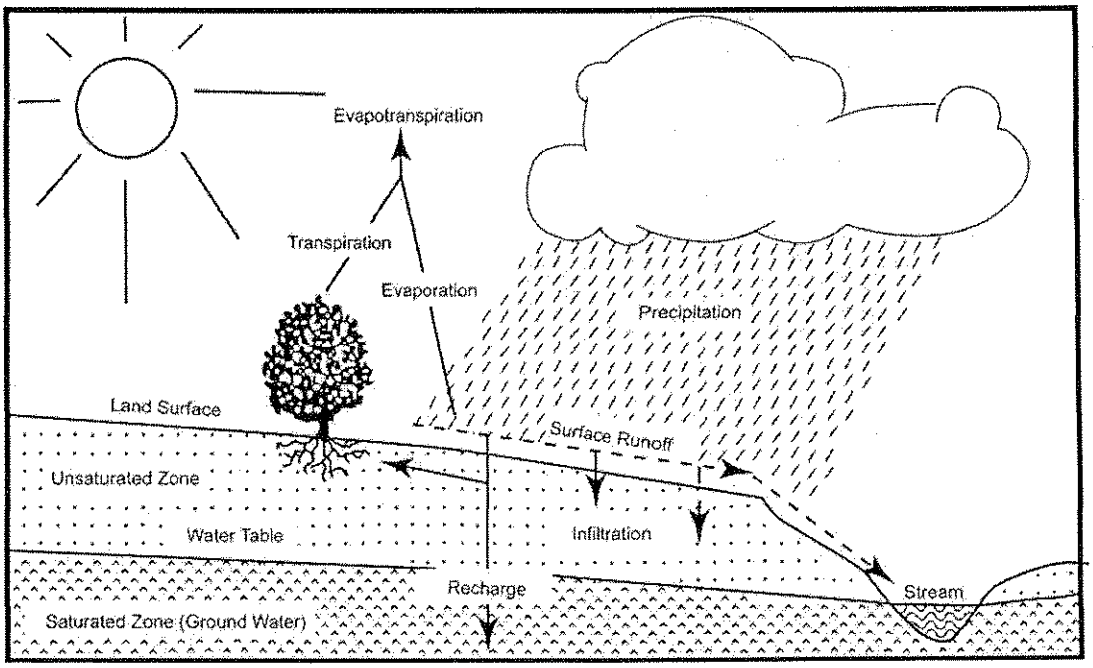


Figure 1: Groundwater Recharge in the Hydrologic Cycle

Source: New Jersey Geological Survey Report GSR-32.

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

The Township encompasses a 21 square mile area in Mercer County, New Jersey. In recent years, the Township has been under significant development pressure. The population of the Township has increased from 5,815 in 1990, to 10,275 in 2000. This population increase has resulted in changes to the landscape and those changes have most likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality. These population increases also demonstrate an increasing demand for new development and related changes.

Figure 2 illustrates the waterways in the Township. These waterways may have many different names (creek, ditch, run, stream). Each waterway has a defined land area that drains into it. These land areas are known as watersheds and each waterway has its own watershed. The watershed of a large waterway (river, brook) includes the watershed of all of the smaller waterways that drain into it (subwatersheds). As stated above, rain falling in a particular watershed may either runoff or may infiltrate (recharge) back into the ground helping supplement the groundwater (Figure 1). This groundwater may return to the streams as the flow that may normally be observed in streams (base flow) or may be the water ultimately used wells. Each watershed is definable using mapping that shows topography and elevations. Topographic maps may be found in a variety of forms and Figure 3 depicts the Township boundary on topographic maps known as quadrangle maps as published by the United States Geologic Survey.

The New Jersey Department of Environmental Protection (NJDEP) has established an Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways. 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 the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macroinvertebrate community dynamics.

Figure 2
Washington Township and its Waterways

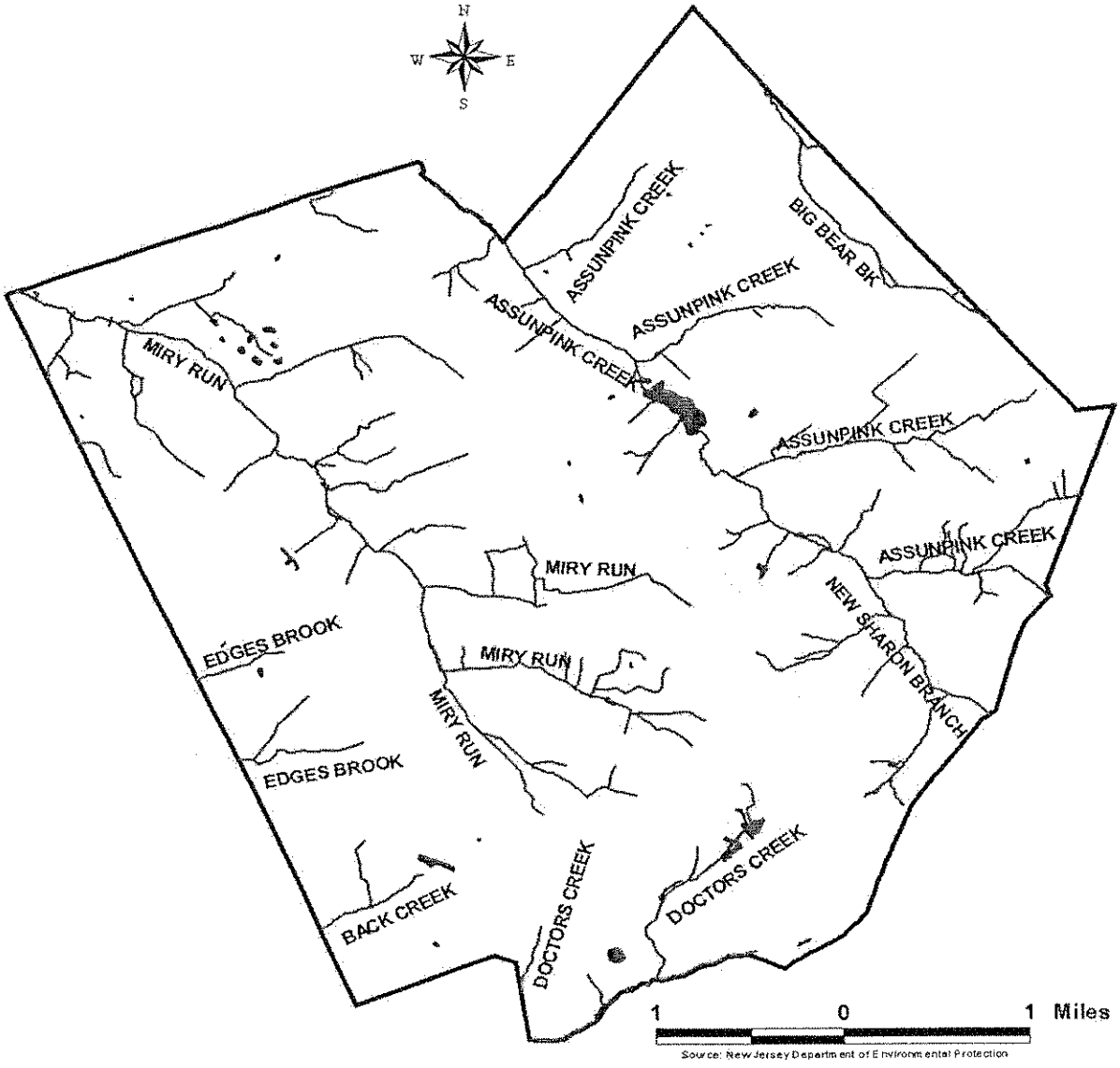
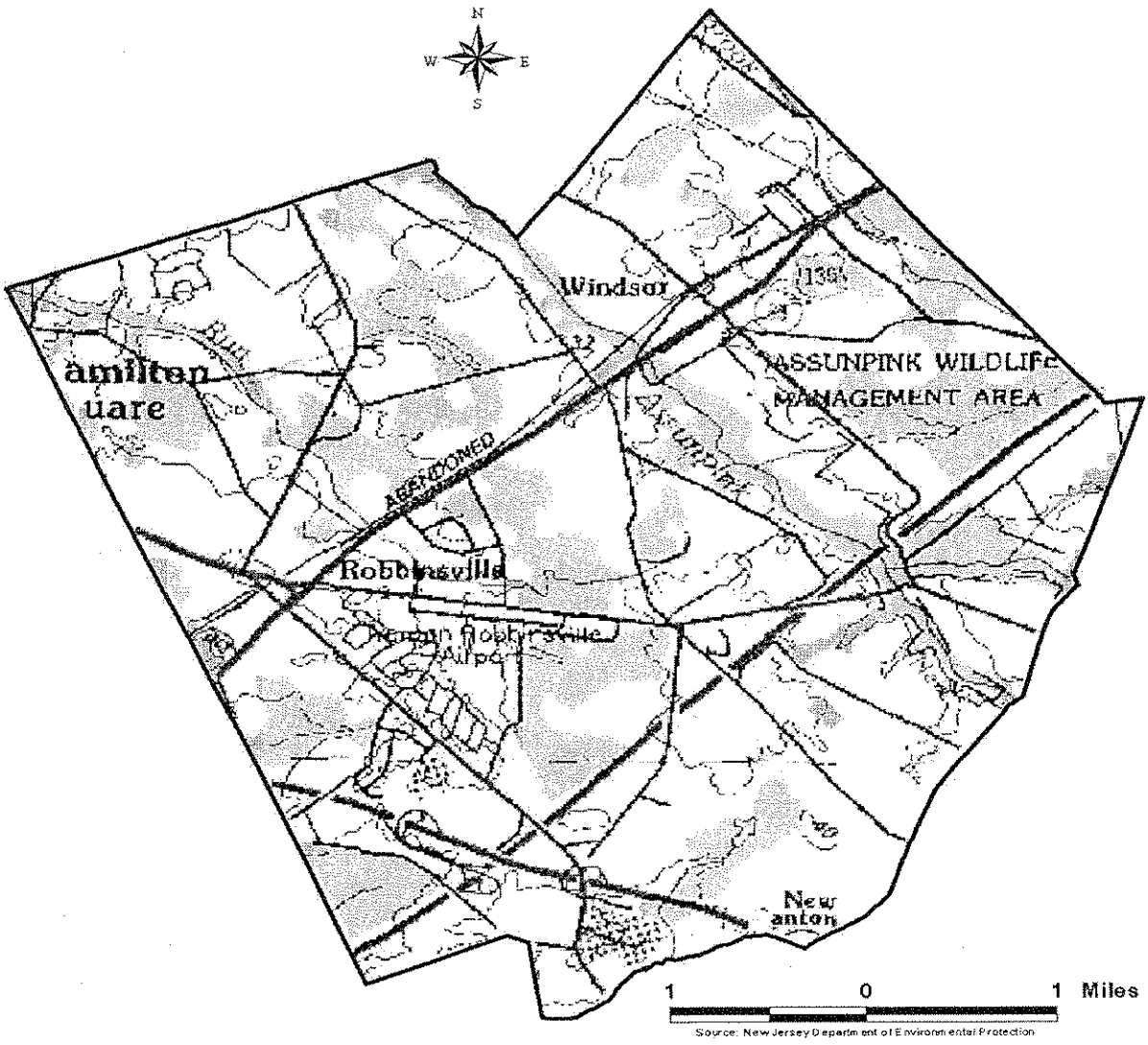


Figure 3
Washington Township Boundary on USGS Quadrangles



In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on the streams in the state[1]. This information is provided based upon the specific watershed management area (watershed) in which the testing is performed.

There are major waterways that either border or bisect the Township include the Miry Run[2] and Crosswicks Creek[3] tributaries in the west, and the Assunpink Creek[2], Bear Brook[4] and their tributaries in the east. All waterways noted have some measured level of impairment at certain locations based on AMNET data. Because these waterways have some measured level of impairment, each waterway is in need of defined pollutant limits (Total Maximum Daily Load (TMDL)) in order to help prevent further contamination.

A TMDL is the amount of a pollutant that can be accepted by a waterbody without causing an exceedance of water quality standards or interfering with the ability to use a waterbody for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant, such as stormwater and wastewater discharges, which require an NJPDES permit to discharge, and nonpoint source, which includes stormwater runoff from agricultural areas and residential areas, along with a margin of safety. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan is developed to identify how the various sources will be reduced to the designated allocations. Implementation strategies may include improved stormwater treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems, and other BMPs.

In addition to water quality degredation, the Township has experienced a wide variety of water quantity problems including flooding, stream bank erosion, and diminished base flow in its streams. Culverts, roadside ditches and waterways associated with road crossings in the Township surcharge during severe storms and have, in many instances, were installed without design as part of routine public works management operations. These amenities were installed during a time period with much different land uses, soil cover and related hydrologic conditions (i.e., less impervious area) than those which presently exist in the Township. As land use changes occurred, runoff and pollutants increased in the Township. The increased volume of water has resulted in stream bank erosion which has resulted in unstable areas at roadway/bridge crossings and degraded stream habitats.

Groundwater recharge has also diminished with growth. Diminishing recharge also decreases base flows in streams during dry weather periods. Lower base flows can have a

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[1] 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. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDLs are needed. The integrated list is available from the NJDEP website at www.nj.gov/dep/wmm/sgwqt/wat/index.html. Specific data on biological monitoring (AMNET data) is available from the NJDEP web site at www.state.nj.us/dep/wmm/bfbm. Additional data can be found on the United States Geological Survey (USGS) site at www.water.usgs.gov.

[2] Watershed Management Area 11
[3] Watershed Management Area 20
[4] Watershed Management Area 10

negative impact on instream habitat during the summer months. A map of the groundwater recharge areas are shown in Figure 4. Wellhead protection areas, also required as part of this Municipal Stormwater Management Plan, are shown in Figure 5.

Design and Performance Standards

The Township will adopt the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the 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. The ordinances will be submitted to the county for review and approval within 24 months of the effective date of the Stormwater Management Rules.

During construction, Township inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed.

Plan Consistency

The Township is not within a Regional Stormwater Management Planning Area and no TMDLs have been developed for waters within the Township; therefore this plan does not need to be consistent with any regional stormwater management plans (RSWMPs) nor any TMDLs. If any RSWMPs or TMDLs are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent.

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.

The Township's Stormwater Management Ordinance requires all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. During construction, Township inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies to the local Soil Conservation District.

Nonstructural Stormwater Management Strategies

A review of Chapter 103, the Development Regulations of Washington Township, was reviewed with regard to incorporating new stormwater management strategies. Article V, General Provisions and Design Standards, provides guidance for design elements. The following specific sections should be revised:

FIGURE 4
GROUNDWATER RECHARGE AREAS

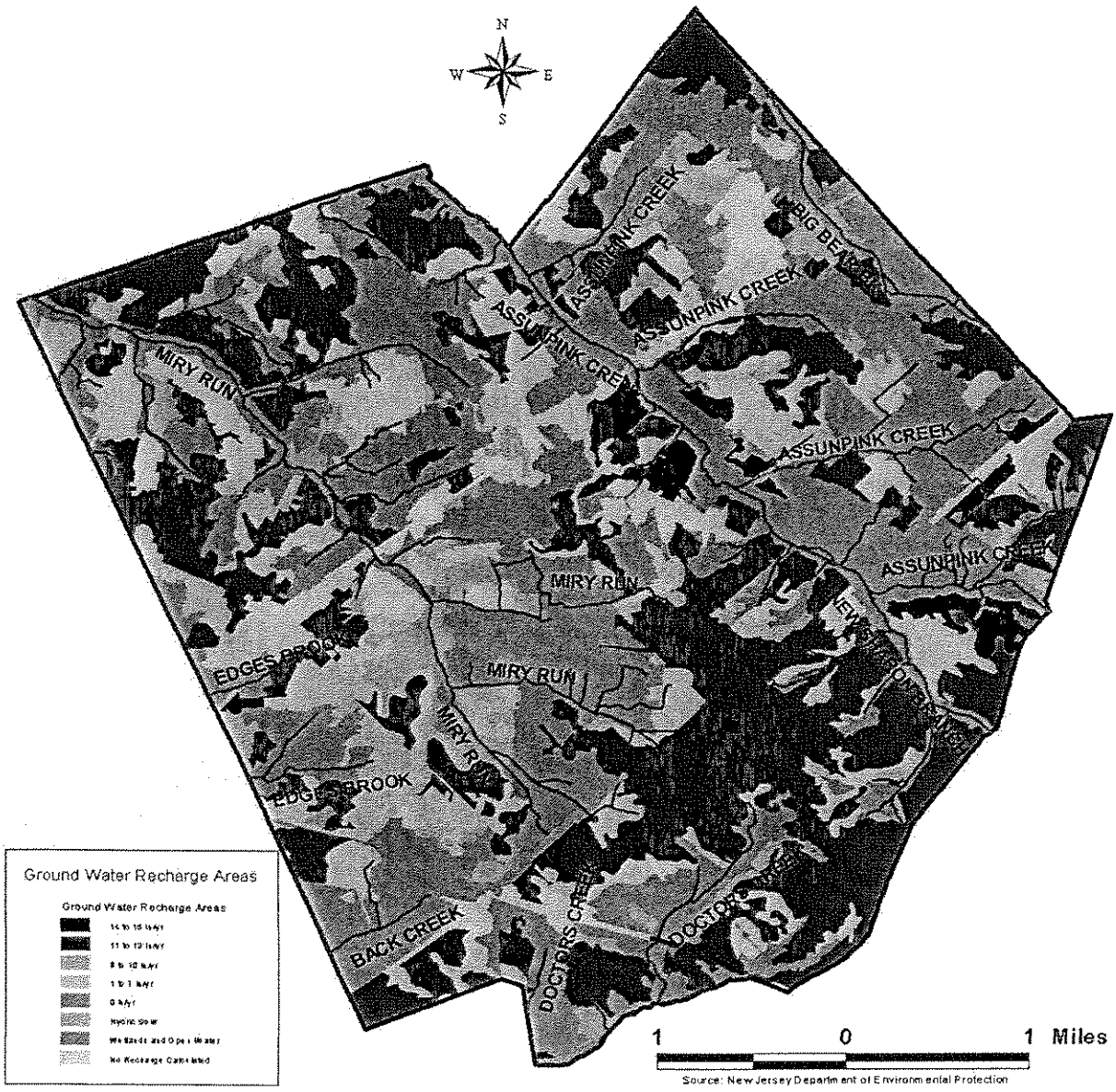
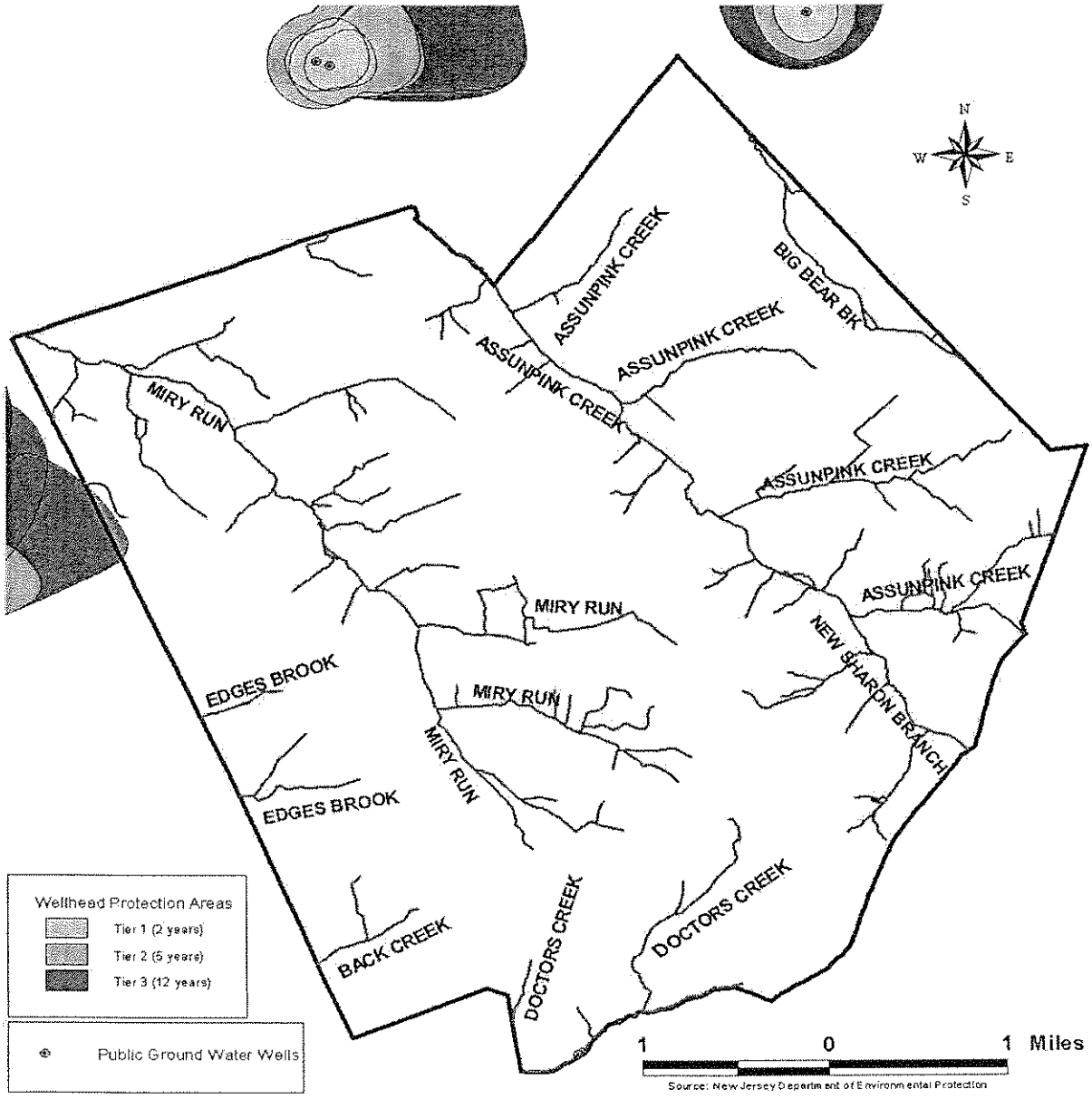


FIGURE 5
WELLHEAD PROTECTION AREAS



§103-47 Accessory Buildings,
§103-49 Stormwater Management,
§103-52 Lot Configuration.
§103-53 Natural and Cultural Resource Conservation.
§103-55 Off-Street Parking, Loading Areas and Driveways.
§103-57 Performance Standards for All Uses.
§103-61 Landscape Architecture
§103-65 Streets, Curbs and Sidewalks.
§103-71 Rural Residential Development.

Revisions should provide references to water quality, quantity and groundwater recharge provisions and to encourage the use of nonstructural design strategies or low impact development techniques. Revision of Section 103-49, Stormwater Management, is necessary to comply with N.J.A.C. 7:8-5 and N.J.A.C. 5:21. This can be easily accomplished by deleting current design standards and by making compliance with N.J.A.C. 7:8-5 and N.J.A.C. 5:21 a requirement.

Although each zone has a maximum allowable percent impervious surface, the Township may consider amendments to its Article III, District Regulations, and Article VI, Exceptions and Modifications, sections to include notification that merely satisfying the percent impervious requirement does not relieve the responsibility for complying with the Design Standards for stormwater management .

If an applicant is given a variance to exceed the maximum allowable percent imperviousness, it must mitigate the impact of the additional impervious surfaces. Mitigation is acceptable provided any mitigation comply with the standards included in this Municipal Stormwater Management Plan or in any adopted stormwater management ordinances.

Ordinances related to this Plan will be submitted to the county for review and approval within 24 months of the effective date of the Stormwater Management Rules.

Land Use/Build-Out Analysis

A build-out analysis assuming full development under existing zoning for each HUC14 drainage area in the municipality will be completed within 24 months of the effective date of the Stormwater Management Rules. The following steps will be used to prepare the build-out analysis for this Municipal Stormwater Management Plan:

1. Determine the total land area within each of the HUC14s of the municipality.

2. Determine the area of constrained lands within each HUC14 of the municipality.

3. Determine the land available for development by simply subtracting the constrained lands from the total land area for each HUC14. In essence, the land available for development is the agricultural, forest and/or barren lands available within each HUC14. Existing residential, commercial, and industrial

areas are also eligible for redevelopment and should be considered as land available for development.

4. For each HUC14, complete a build-out analysis by using the municipal zoning map and applicable ordinances to determine the acreage of new development. Once the build-out acreage of each land use is determined for each HUC14, nonpoint source loadings will be determined for the build-out scenario.

Mitigation

Mitigation for a proposed development that is granted a variance or exemption from the stormwater management design and performance standards is permitted. In the absence of planned or approved mitigation projects that are specifically detailed as part of this Plan or as part of the Stormwater Management Ordinance, the only form of acceptable mitigation shall be the perpetual preservation of land from future development. Since the total pollutants generated by development in a specific watershed are cumulative, land that is preserved from generating the same type and magnitude of pollutants in the same watershed can offset the pollutants that cannot otherwise be mitigated through on-site controls. Mitigation by preservation is only acceptable in Washington Township by satisfying the following conditions:

1. Preservation shall be in the same watershed/subwatershed.

2. The land to be preserved shall have the same zoning. Pollutant types differ by land use, therefore, in order to be equivalent the same potential land use must be equivalent to the land being preserved. Preserving lands having different potential land uses could, possibly, create the same total pollutant loads, however, preservation will not be an acre for acre basis. Preserving land having different potential land uses may be permitted but only following detailed evaluations and at the discretion of Washington Township.

3. Mitigation plan approval by the Township shall be based upon environmental benefits proposed by the specific mitigation proposal.