

# Municipal Stormwater Management Plan

For the

Township of Hamilton

*Prepared by*

SCHOOR DEPALMA, INC.

Justin Corporate Center  
200 State Highway Nine  
Manalapan, NJ 07726

## Table of Contents

Introduction.....	3
Goals.....	3
Stormwater Discussion .....	4
Background.....	5
Design and Performance Standards.....	7
Plan Consistency .....	8
Nonstructural Stormwater Management Strategies .....	9
Land Use/Build-Out Analysis.....	11
Mitigation Plans.....	12

### List of Figures

Figure 1: Groundwater Recharge in the Hydrologic Cycle.....	5
---	---

### Appendix A

Table 1: Build-Out Calculations for HUC14s

Table 2: Nonpoint Source Loads at Build-Out for HUC14s

### Appendix B

Zoning Districts Within the Township

### Appendix C

Figure C-2: Township and Its Waterways

Figure C-3: Township Boundary on USGS Quadrangles

Figure C-4: Groundwater Recharge Areas in the Township

Figure C-5: Wellhead Protection Areas in the Township

Figure C-6: Township's Existing Land Use

Figure C-7: Hydrologic Units (HUC14s) Within the Township

Figure C-9: Wetlands and Water Land Uses within the Township – Constrained Land

## Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for Hamilton 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 and or increase the impervious surfaces by one quarter or greater of an acre. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides baseflow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

A “build-out” analysis has been included in this plan based upon existing zoning and land available for development. The plan also addresses the review and update of existing ordinances, the Township Master Plan, 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:

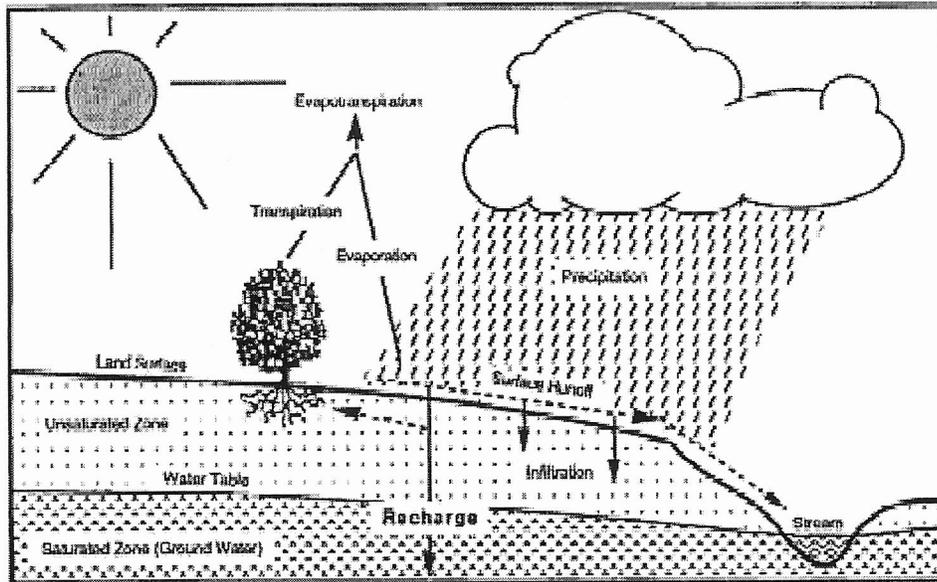
- reduce flood damage, including damage to life and property;
- minimize, to the extent practical, any increase in stormwater runoff from any new development;
- reduce soil erosion from any development or construction project;
- assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- maintain groundwater recharge;
- prevent, to the greatest extent feasible, an increase in nonpoint 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; 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 of Hamilton encompasses a 39.4 square mile area in Mercer County, New Jersey. In recent years, the Township has been under moderate development pressure. The population of the Township has increased from 82,801 in 1980, to 86,553 in 1990, to 87,109 in 2000. This population increase has resulted in moderate demand for new development; changes in the landscape have most likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality. Figure C-2 illustrates the waterways in the Township. Figure C-3 depicts the Township boundary on the USGS quadrangle maps.

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. The associated rivers and waterbodies that traverse the Township are the Assumpink Creek, Miry Run (Low Priority – Benthic Macroinvertebrates), Pond Run (Low Priority– Benthic Macroinvertebrates), Edges Brook, Back Creek (Low Priority – Benthic Macroinvertebrates) and Doctors Creek (Low Priority – Benthic Macroinvertebrates) and Crosswicks Creek (Low Priority – Benthic Macroinvertebrates).

In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on the streams in the state. These data show that the in-stream total phosphorus concentration of the Assumpink Creek at Trenton frequently exceeds the state's criteria. This means that this river is an impaired waterway and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for this pollutant. According to the June 22, 2004 Integrated Water Quality monitoring and Assessment Report this TMDL or other responses to the Non-Attainment Parameter (Phosphorous) shall be completed by 2006.

Additionally, these data show that the benthic macroinvertebrates in Back Creek, Crosswicks Creek, Doctors Creek, Miry Run and Pond Run within the Township do not meet the state's criteria. The health of the population of benthic macroinvertebrates is an indication of stream water quality. Consequently, this means that each stream is an impaired waterway and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for each stream, however the NJDEP has assigned a low priority to each stream, therefore has not set a deadline for developing the TMDLs nor has it identified the pollutant or pollutants for which the TMDLs will be developed.

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.

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.

In addition to moderate water quality problems, as land is developed, permeable soils are replaced by impermeable surfaces, which increase runoff volumes. All future development in Hamilton Township shall utilize the best available technology to minimize off-site stormwater runoff, increase on-site infiltration, simulate natural drainage systems and minimize off-site discharge of pollutants to ground or surface water and encourage natural filtration functions. A map of the groundwater recharge areas are shown in Figure C-4. Wellhead protection areas, also required as part of the MSWMP, are shown in Figure C-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 Municipal Stormwater General Permit or Effective Date of Permit Authorization (EDPA).

Non-structural measures to be considered first shall include site design and preventive source controls. To confirm the effectiveness of such measures, applicants must verify that control of stormwater quantity impacts as detailed in the Stormwater Management rules. The tests of assuring control of the quantity impacts as detailed in these rules have been incorporated into the Township's Stormwater Ordinance.

The general standards for structural measures are specified in the Stormwater Management rules and have been incorporated into the Hamilton Township's Ordinance. These measures shall be incorporated as needed to meet the soil erosion, infiltration and runoff quantity standards included in the Township's Stormwater Ordinance. The design standards for the specific structural stormwater management measures as those included in the New Jersey Stormwater Best Management Practices Manual. Other designs or practices may be used if they are approved by the Soil Conservation District. The design and construction of such facilities must comply with the Soil Erosion and Sediment Control Standards as well as any other applicable state regulation including the Freshwater Wetland Protection Act rules, the Flood Hazard Control rules, the Surface Water Quality Standards and the Dam Safety rules. The requirement to be consistent with all other applicable rules has been included in the Township's Stormwater Ordinance. Stormwater runoff quality controls for total suspended solids and nutrient load shall meet the design and performance standards as specified in the Stormwater Management rules. The minimum design and performance standards for infiltration and

groundwater recharge specified in the Stormwater Management Rules have been incorporated into the Township's Stormwater Ordinance and must be met for all applicable development. Consistent with the Stormwater Management Rules, the Ordinance allows for an exemption from this requirement where the applicant can demonstrate that it is not practicable to meet the standards but has taken all possible steps to meet all stormwater management measures.

During construction, Township inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed. Adequate long term operation as well as preventative and corrective maintenance of the selected stormwater management measures will be ensured by requiring the design engineer to prepare a maintenance plan for its stormwater management facilities incorporated into the design of the major development. The maintenance plan shall have specific preventative maintenance tasks, schedules and cost estimates as well as the responsible party for corrective and preventative maintenance.

Where the Township assumes maintenance responsibility, preventative maintenance shall be performed on a regular basis and will be appropriate for the particular structural management measure being implemented. These maintenance measures shall be in accordance with N.J.A.C. 7:8-5 and may include: periodic inspections, vegetation management, sediment, debris and trash removal and mosquito control. Corrective maintenance shall be performed on an as needed basis for structure repairs or replacements, removal of outlet and pipe blockages, erosion restoration, snow and ice removal, etc. The person or persons responsible for maintenance shall keep a detailed log of all preventative and corrective maintenance for the structural management measures incorporated into the design of the development, including a record of all inspections and work orders.

## **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.

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**

The Township has reviewed the master plan and ordinances, and has provided a list of the sections in the Township land use and zoning ordinances that are to be modified to incorporate nonstructural stormwater management strategies. These are the ordinances identified for revision. Once the ordinance texts are completed, they will be submitted to the county review agency for review and approval within 24 months of the effective date of the Municipal Stormwater General Permit or Effective Date of Permit Authorization (EFDPA). A copy will be sent to the Department of Environmental Protection at the time of submission. The Township has established as a milestone to amend the ordinances identified in this section within one year of the adoption of the Stormwater Management Plan by the Township of Hamilton Planning Board.

Article IV – General Regulations and Design Standards of the Township Code, was reviewed with regard to incorporating nonstructural stormwater management strategies. Several changes were made to the Standards to incorporate these strategies.

### **Section 160-113. Stormwater management.**

**(c)2. (2)** For roadside swales used to control drainage to, from or in the development, the 25-year 24-hour storm shall be used. Inlets shall be provided a maximum of 500 feet apart in roadside swales. The minimum grade for roadside swales shall be two percent, or swales shall be underdrained. **The Township has evaluated this ordinance and will consider amending this section to encourage the use of naturally vegetated swales in combination with inlets and pipes as a complement to address stormwater runoff quantity, quality and groundwater recharge. Plans will be designed in a manner that will not create an adverse condition resulting in the ponding of water or exacerbate an existing condition of standing or ponded water.**

### **Section Section 160-117. Natural features and tree preservation.**

**(c)** A conscious effort shall be made to preserve all worthwhile trees and shrubs which exist on the site. Stripping trees from a lot or filling around trees on a lot shall not be permitted unless it can be shown that grading or construction requirements necessitate removal of trees, in which case those lots shall be replanted with trees to reestablish the tone of the area. **This ordinance recognizes that the preservation of mature trees and forested areas is a key strategy in the management of environmental resources, particularly watershed management, air quality and ambient temperature. This section complies with minimizing land disturbance, which is a non-structural stormwater management strategy. The Township has evaluated this ordinance and will consider amending this section to require the identification of forested areas and that (insert percentage ) of forested areas be protected from disturbance.**

**Section 160-119. Off-street parking, loading areas and driveways.**

(c) 3. Curbing shall be provided along all off-street parking and loading areas as well as along all traffic aisles providing access to said parking and loading areas. **The Township has evaluated this ordinance and will consider amending this section to allow for curbing with curb cuts to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas. Plans will be designed in a manner that will not create an adverse condition resulting in the ponding of water or exacerbate an existing condition of standing or ponded water.**

(g) 7. Where off-street parking, loading or service areas are proposed to be located closer than 50 feet to a lot in any residential zoning district or to any lot upon where there exists a dwelling as a permitted use under these regulations and where such parking, loading and service areas are not entirely screened visually from such lot by an intervening building or structure, there shall be provide along the lot line a continuous screen. The screen shall consist of evergreens five feet in height planted four feet on center. No such screen shall extend nearer to a street right-of-way line than the established building line of the adjoining residential lot. **The Township has evaluated this ordinance and will consider amending this section to require the use of native vegetation to the maximum extent practicable, which requires less fertilization and watering than non-native species. Additionally, language could be included to allow buffered areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff for these impervious surfaces, as deemed appropriate by the Township engineer.**

**Section 160-120. Performance standards for all uses.**

4. Buffers. Buffering shall be located around the perimeter of the site and/or in groupings at strategic locations in order to minimize the glare of headlights of vehicles, lights from structures, noise and the movement of people and vehicles and to shield activities from adjacent properties, etc. Buffering may consist of fencing, evergreens, shrubs, bushes, deciduous trees, etc, or combinations thereof to achieve the stated objectives. **The landscape requirements for these buffer areas in the existing section do not recommend the use of native vegetation. The Township has evaluated this ordinance and will consider amending this section to require the use of native vegetation, which requires less fertilization and watering than non-native species. Additionally, language can be included to allow buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces, as deemed appropriate by the Township engineer.**

**Section 160-125. Streets, curbs and sidewalks.**

(b) Belgian block or concrete curbing shall be installed along every street and at intersections with existing township, county or state roads shall be laid in a manner approved by the township engineer and shall conform to the township construction details. A curb and sidewalk permit must be obtained before any new work or repair work is done. Permits may be obtained from the township engineer's office. **The Township has evaluated this ordinance and will consider amending this section to**

allow for curb cuts to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas, as deemed appropriate by the Township engineer. Plans will be designed in a manner that will not create an adverse condition resulting in the ponding of water or exacerbate an existing condition of standing or ponded water.

**(c) Sidewalks**

2. Where required, sidewalks shall be at least four feet wide and located as approved by the board and shall be constructed in accordance with current township construction details and specifications of the New Jersey highway department. **The Township has evaluated this ordinance and will consider amending this section to require developers to design sidewalks to discharge stormwater to neighboring lawns, where feasible, to disconnect these impervious surfaces or use permeable parking materials where appropriate, as deemed appropriate by the Township engineer. Plans will be designed in a manner that will not create an adverse condition resulting in the ponding of water or exacerbate an existing condition of standing or ponded water.**

**(d) Trees**

Street trees shall be planted at the following intervals. Large shade trees shall be planted an average of 40 feet on center. Trees shall be a minimum of 2 ½ inches caliper at time of planting. **Native species shall be encouraged, due to their reliance on less fertilization and watering than non-native species, as deemed appropriate by the Township engineer.**

**Section 160-130. Landscaping and buffers.**

**(a) 10.** Street trees shall be planted at intervals an average of 40 feet on center. Trees shall be planted along all public rights-of-way. Species selection of trees shall be subject to the approval of the department of engineering, planning and inspection. See section 160-125 for additional standards. **Native species shall be encouraged, due to their reliance on less fertilization and watering than non-native species, as deemed appropriate by the Township engineer.**

**Section 160-132. Environmental considerations.**

**b.** Development shall preserve salient natural features, keep cut-fill operations to a minimum and ensure conformity with topography so as to create the least erosion potential and adequately handle the problem and velocity of surface water runoff. **The Township has evaluated this ordinance and will consider amending this section to protect forested areas, to ensure that leaf litter and other beneficial aspects of the forest are maintained.**

## **Land Use/Build-Out Analysis**

A detailed land use analysis for the Township was conducted assuming full build out under existing zoning for each HUC 14 drainage area in the Township. Figure C-6 illustrates the existing land use in the Township based on the 1995/1997 GIS information from NJDEP. Figure C-7 illustrates the HUC 14s within the Township. The Township

zoning map is shown in conjunction with the HUC 14 zones in the Township in order to complete the build out calculations. Figure C-9 illustrates the constrained lands within the Township. The build-out calculations for impervious cover are shown in Table C-1. Table C-2 presents the pollutant loading loads at full build-out by multiplying the build out acreage of each land use for each HUC 14 by the appropriate pollutant loading coefficients by land cover.

## **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. It shall be noted that the list is by no means exhaustive. The applicant may be required to do any of the following or a combination of them as mitigation against shortfalls in meeting the requirements of the SWMP. These include the following:

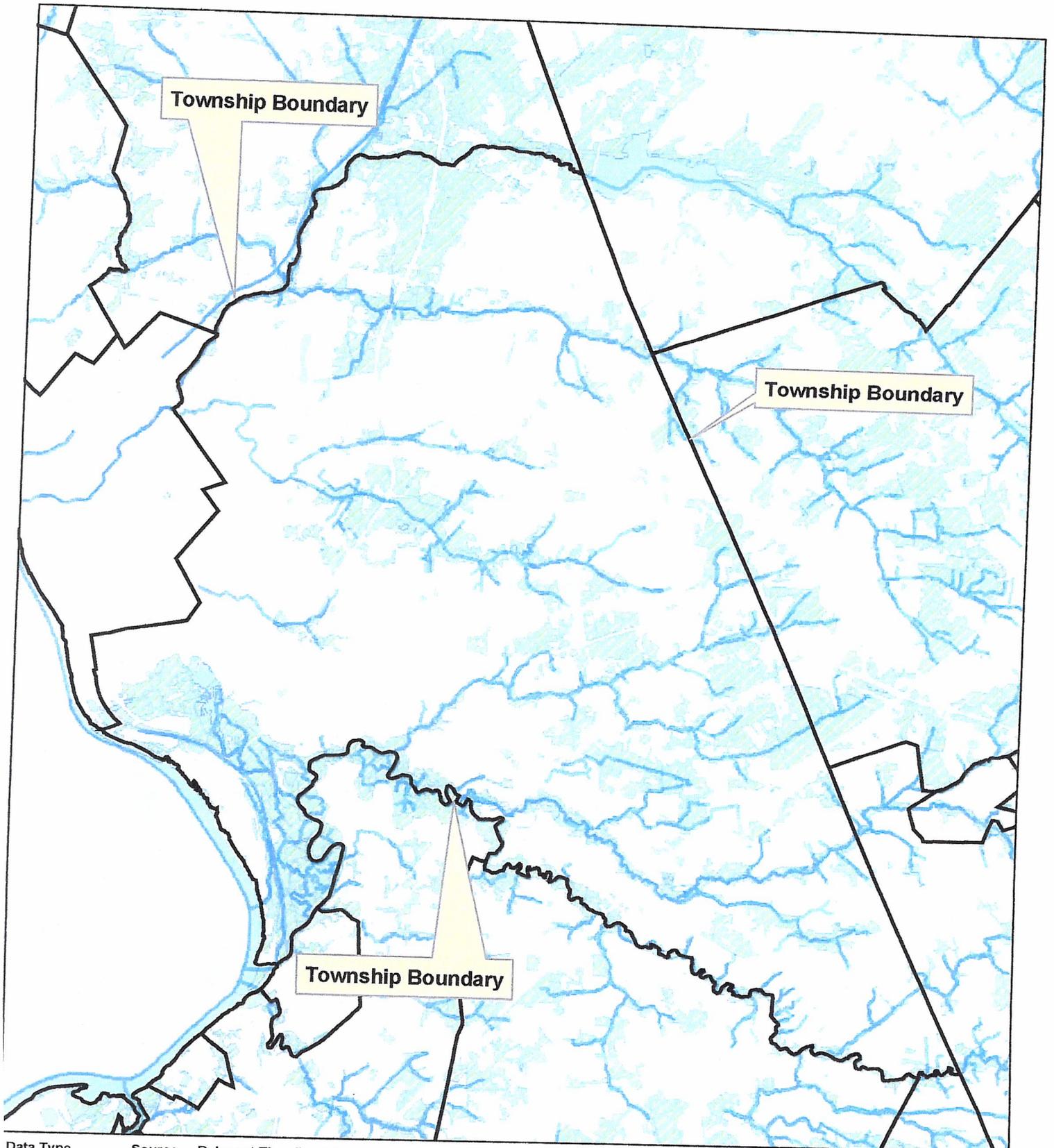
- Retrofit a number of storm drain inlets on a street or streets within the sub-watershed area of the project.
- Rehabilitate existing Township owned malfunctioning detention/retention basins or detention/retention basins, which are not performing to standards.
- Repair Township owned malfunctioning stormwater outfalls and sediment and erosion control facilities.
- Retrofit parking and adjoining recharge areas and upgrade to standards.
- Repair malfunctioning stormwater outfalls and sediment/erosion control devices.
- Rehabilitate existing privately owned malfunctioning detention/retention basins or detention/retention basins, which are not performing to standards.
- Repair Township owned malfunctioning stormwater outfalls and sediment and erosion control facilities

The applicant is required to propose a mitigation project that meets the requirement of item 1 below as the first option. If the applicant is unable to identify a suitable project that meets the requirements of item 1, as determined by the Township of Hamilton, then the applicant must propose a project that meets the requirements of either item 2 or item 3 below. All proposed mitigation projects must include a construction cost estimate and the cost of long-term maintenance. All mitigation projects proposed by an applicant must be approved by the Township of Hamilton prior to implementation.

### **Mitigation Project Criteria**

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

2. If a suitable site cannot be located in the same drainage area as the proposed development, the mitigation project may provide mitigation that does not necessarily have to be equivalent to the impacts for which the variance or exemption is sought, but that addresses the same issue. (e.g. If mitigation is to make up a recharge shortfall the developer could retrofit stormwater inlets to meet the new standards.)
3. The Township may allow a developer to provide funding or partial funding for an environmental enhancement project. The funding must be equal to or greater than the cost to implement a proposed mitigation project, including costs associated with purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure.



Data Type	Source	Relevant Time Period
USGS Quad	UGSG	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
Wetlands	NJDEP	1986
Lakes	NJDEP	1986
Streams	NJDEP	1998

0 1,000,000 Feet

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

## Figure C-9

### Wetlands and Water Land Uses within the Township

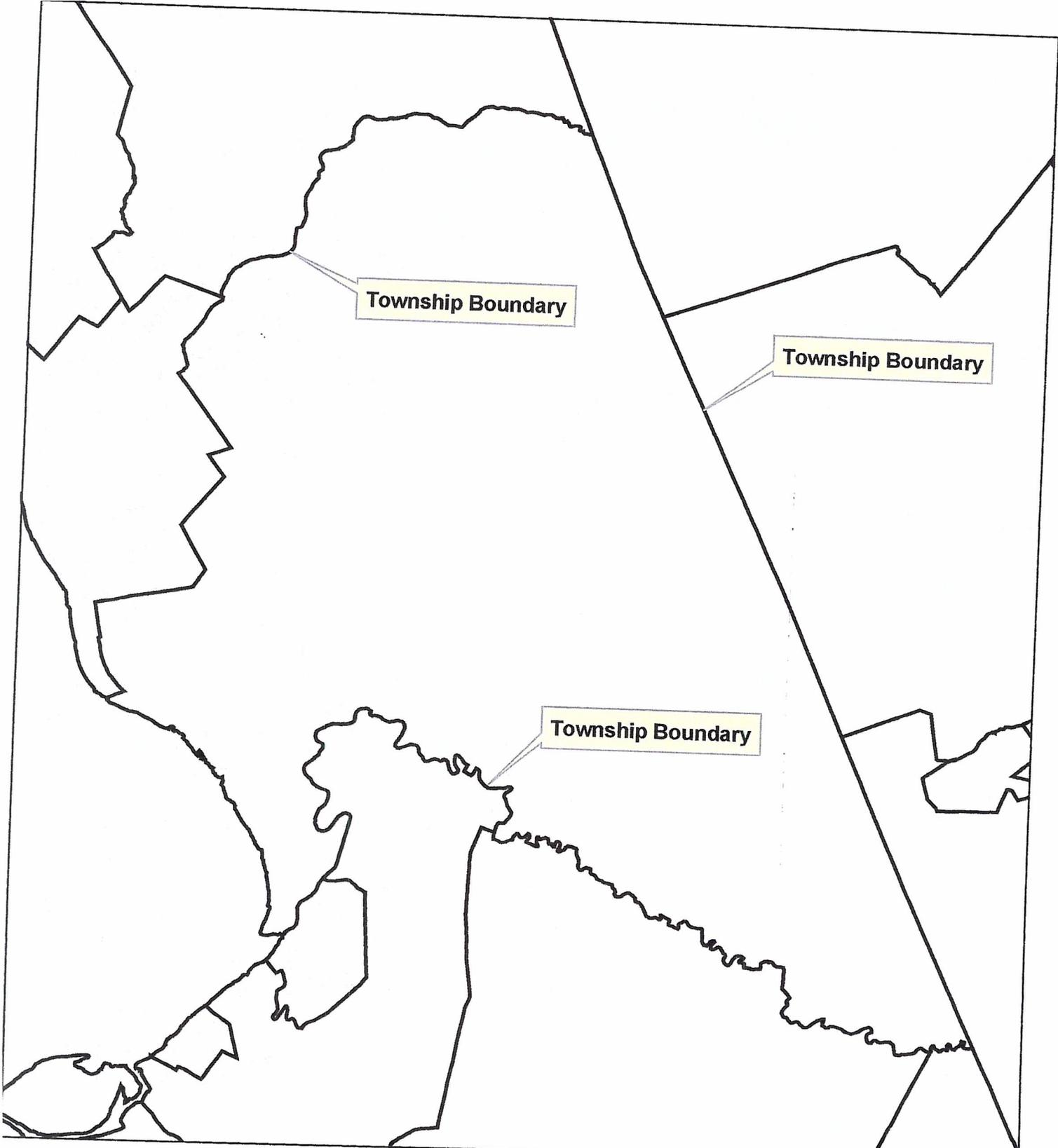
Township of Hamilton  
Mercer County, New Jersey

#### Symbol Legend

-  Streams
-  Lakes
-  Wetlands
-  Municipal Boundary



 SCHOOR DEPALMA  
Engineers and Consultants



Data Type	Source	Relevant Time Period
USGS Quadrangles		Feb-Apr 2002
Municipal Boundary	NJDEP	1989

## Figure C-3

### Township Boundary on USGS Quadrangles

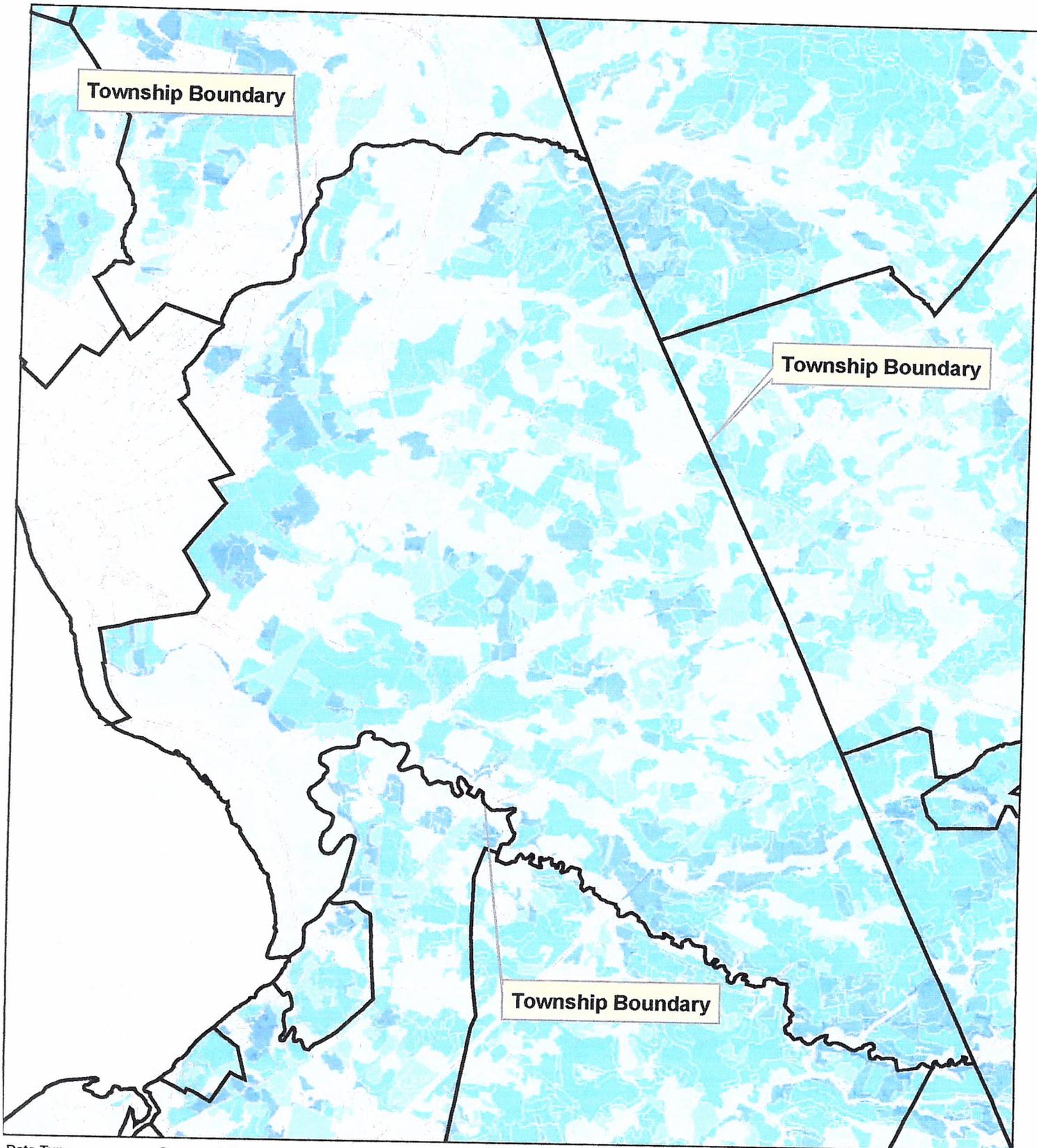
Township of Hamilton  
Mercer County, New Jersey



0 1 000 000  
Feet

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





Data Type	Source	Relevant Time Period
USGS Quad	USGS	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
Groundwater Recharge Areas	NJDEP	Various

## Figure C-4 Groundwater Recharge Areas in the Township

Township of Hamilton  
Mercer County, New Jersey

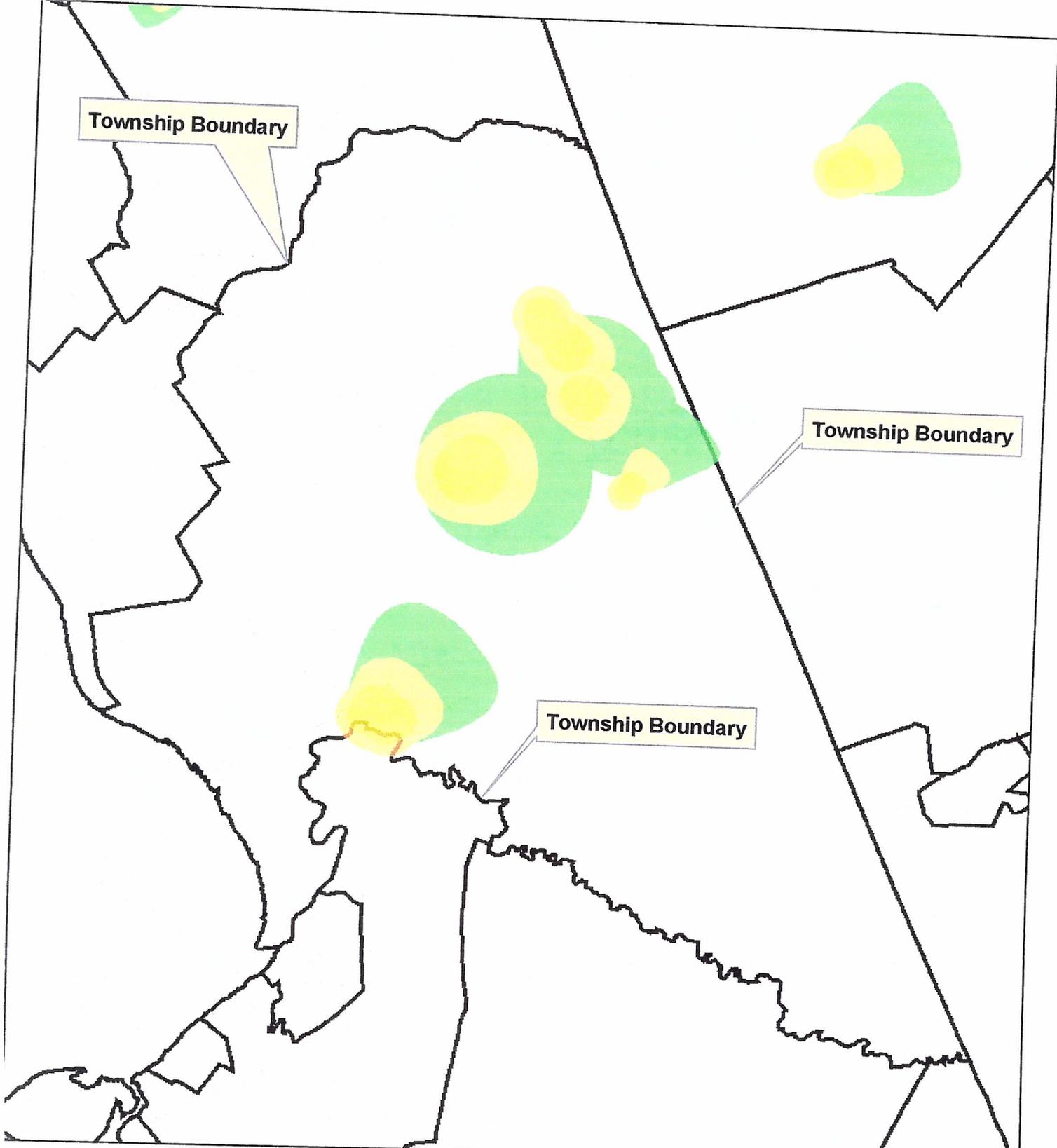
### Symbol Legend

- Municipal Boundary
- Ground Water Recharge Areas**
- 0.00 in/yr
- 0.01 - 9.00 in/yr
- 9.01 - 12.00 in/yr
- 12.01 - 16.00 in/yr
- 16.01 - 22.74 in/yr



0 1,000 2,000 Feet

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



Data Type	Source	Relevant Time Period
USGS Quadrangles	USGS	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
Wellhead Protection Areas	NJDEP	2004 (Updated)

0 1,000,000  

 Feet

**Figure C-5**  
**Wellhead Protection Areas**  
**in the Township**  
**Township of Hamilton**  
**Mercer County, New Jersey**

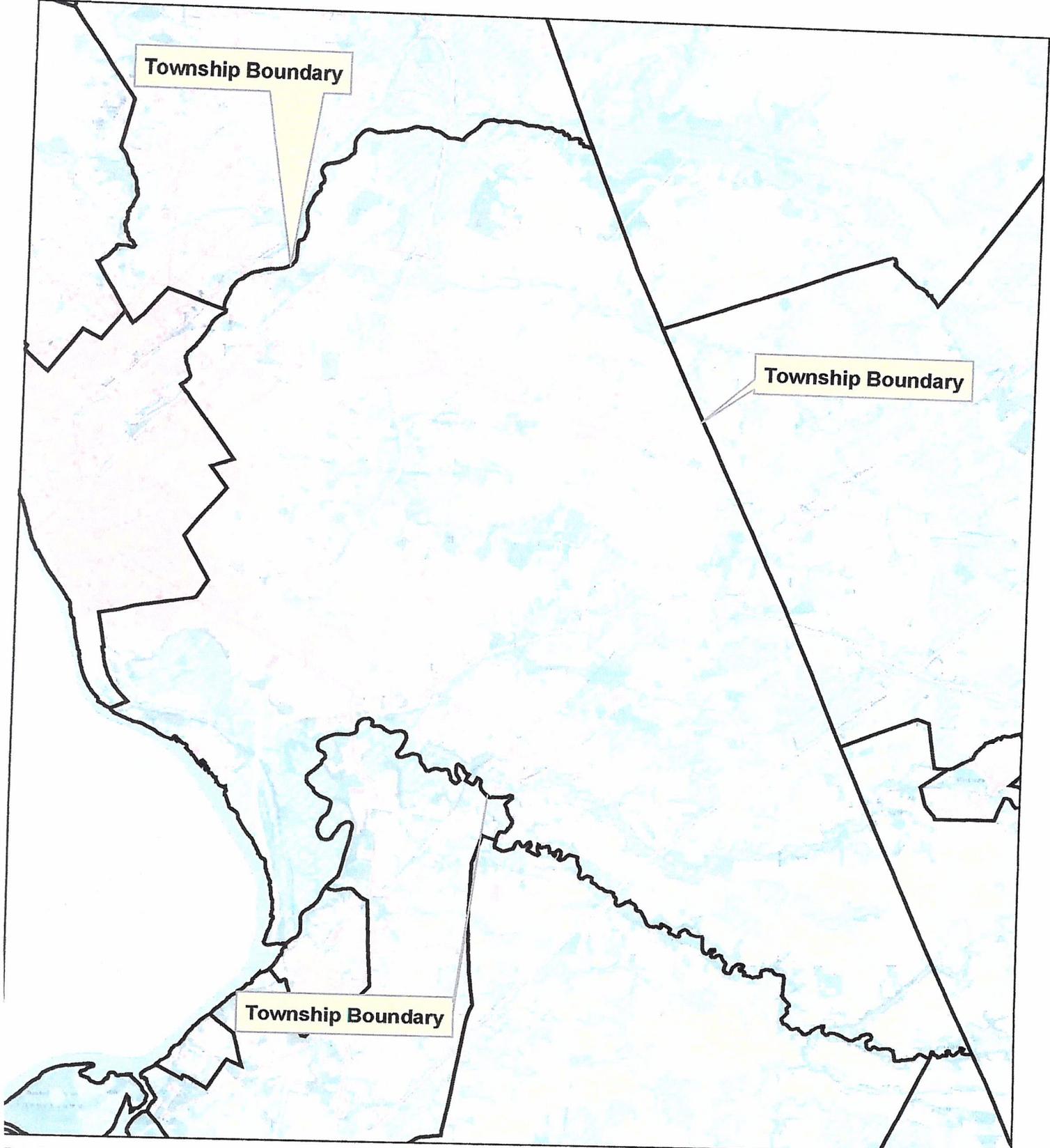
**Symbol Legend**

- Municipal Boundary
- Wellhead Protection Areas**
- 2 Year
- 5 Year
- 12 Year



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





Data Type	Source	Relevant Time Period
USGS Quad	USGS	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
Land Use/Land Cover	NJDEP	1995/1997

0 1,000,000  

 Feet

**Figure C-6**  
**Township's Existing**  
**Land Use**

**Township of Hamilton**  
**Mercer County, New Jersey**

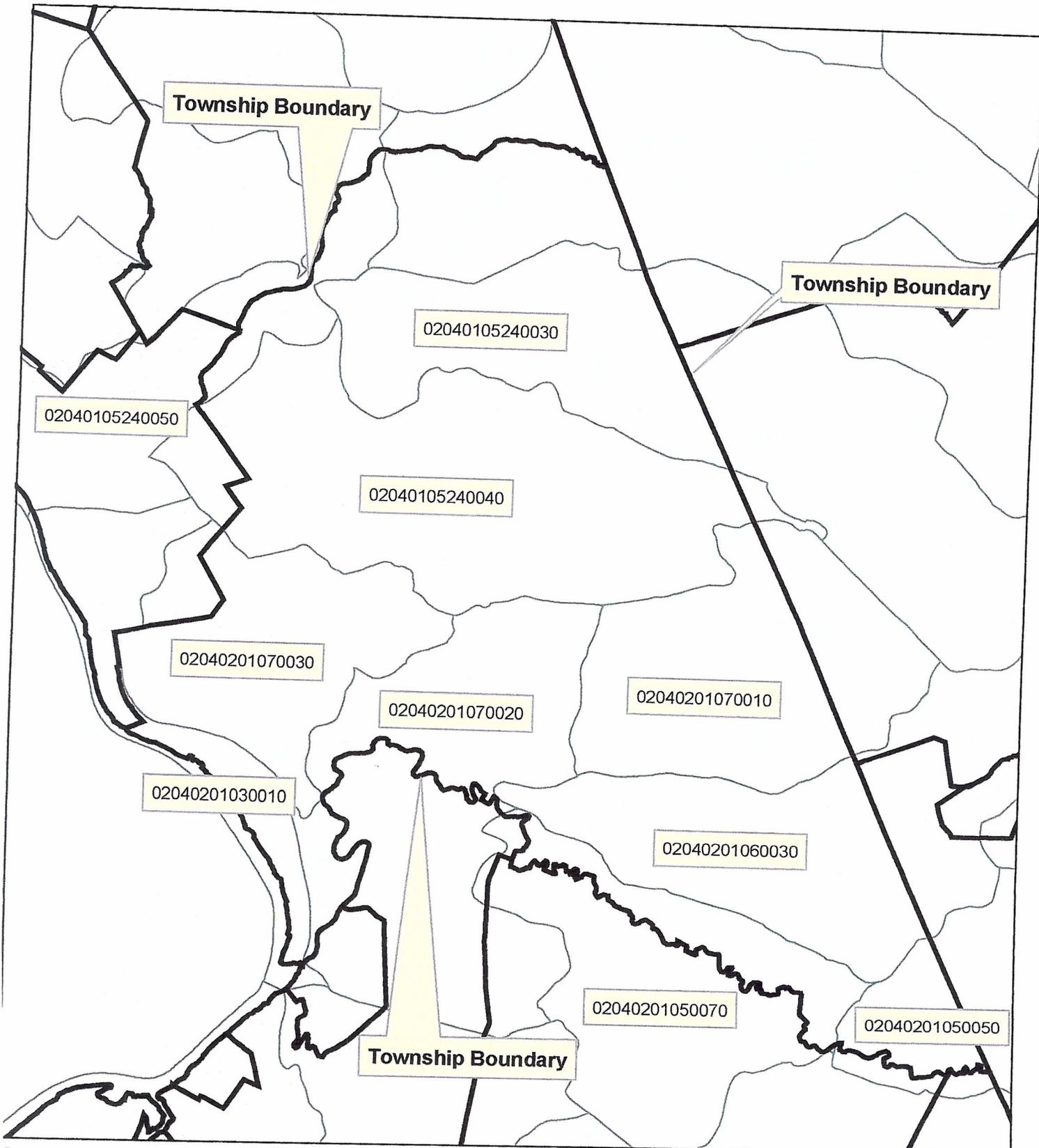


**Symbol Legend**

	Municipal Boundary
<b>Land Use</b>	
	AGRICULTURE
	BARREN LAND
	FOREST
	URBAN
	WATER
	WETLANDS



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



Data Type	Source	Relevant Time Period
USGS Quad	USGS	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
HUC14	NJDEP	2000

0 1,000,000  
Feet

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

## Figure C-7

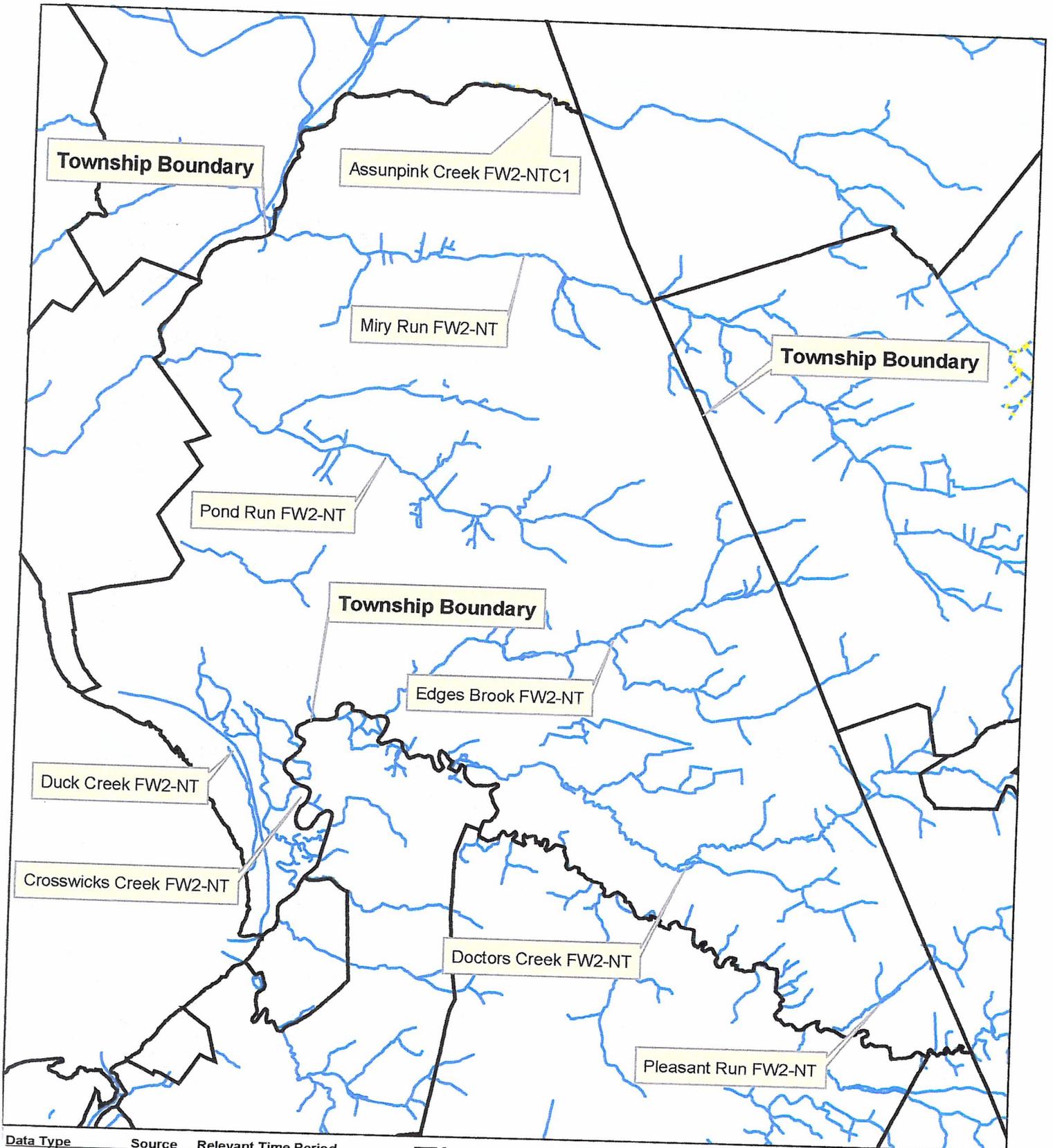
### Hydrologic Units (HUC14) Within the Township

Township of Hamilton  
Mercer County, New Jersey

#### Symbol Legend

-  NJDEP Huc 14
-  Municipal Boundary





Data Type	Source	Relevant Time Period
USGS Quad	USGS	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
C1 Waters	NJDEP	2003

0 1,000 2,000 Feet

## Figure C-2

### Township and its Waterways

Township of Hamilton  
Mercer County, New Jersey

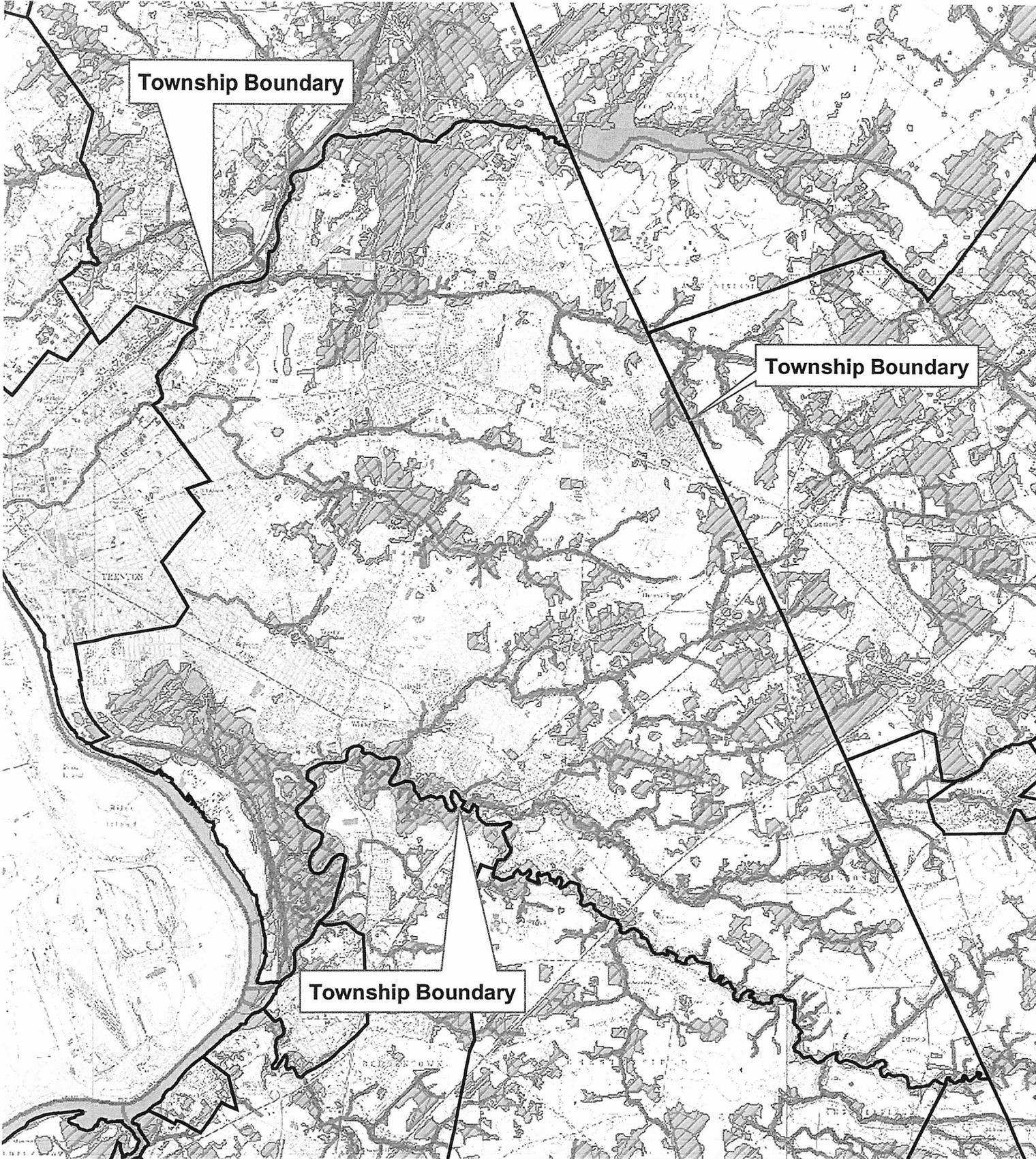


#### Symbol Legend

- Municipal Boundary
- C1 Waters**
- FW2-NT
- FW2-NTC1



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



Data Type	Source	Relevant Time Period
JSGS Quad	UGSG	Feb-Apr 2002
Municipal Boundary	NJDEP	1989
Wetlands	NJDEP	1986
Lakes	NJDEP	1986
Streams	NJDEP	1998

0 1,000 2,000 Feet

This map was developed using Geographic Information System digital data developed under the auspices of the Department of Environmental Protection, Geographic Information System digital data, but this secondary product has not been verified by NJDEP

## Figure C-9

### Wetlands and Water Land Uses within the Township

Township of Hamilton  
Mercer County, New Jersey

#### Symbol Legend

-  Streams
-  Lakes
-  Wetlands
-  Municipal Boundary





Hamilton Township Build-Out Calculations

ID	HUC14 and Zone	Total Area (acres)	Existing Impervious (%)	Existing Impervious (acres)	Constraints [Wetlands, Water, FEMA 100-yr Floodplains] (acres)	Developable Area (acres)	Allowable Impervious (%)	Build-Out Impervious (acres)
<b>02040105230050 - Assumpink Creek (above Shipetaukin Ck)</b>								
1	MULTIPLE FAMILY RESIDENTIAL (AT)	8.44	100.00%	8.44	0.00	0.00		
2	CONSERVATION (C)	726.88	0.00%	0.00	535.16	191.72		
3	HIGHWAY COMMERCIAL (HC)	21.89	65.00%	14.23	7.66	0.00		
4	INDUSTRIAL (I)	435.58	65.00%	283.13	125.50	26.95		
5	MANUFACTURING (MFG)	140.90	20.00%	28.18	63.64	49.08		
6	SINGLE FAMILY RESIDENTIAL (R10)	45.11	98.20%	44.30	0.81	0.00		
7	SINGLE FAMILY RESIDENTIAL (R15)	231.79	97.60%	226.23	5.56	0.00		
8	RESEARCH ENGINEERING OFFICE (REO-2)	2.02	100.00%	2.02	0.00	0.00		
9	RESEARCH ENGINEERING OFFICE (REO-4)	48.25	100.00%	48.25	0.00	0.00		
<b>TOTALS</b>		<b>1,660.86</b>		<b>654.77</b>	<b>738.33</b>	<b>267.76</b>		
<b>02040105240030 - Assumpink Creek (below Shipetaukin Ck)</b>								
10	MULTIPLE FAMILY RESIDENTIAL (AT)	35.46	46.25%	16.40	19.06	0.00		
11	CONSERVATION (C)	10.43	25.00%	2.61	0.54	7.28		
12	COMMUNITY COMMERCIAL (CC)	17.98	100.00%	17.98	0.00	0.00		
13	HIGHWAY COMMERCIAL (HC)	107.67	58.00%	62.45	45.22	0.00		
14	INDUSTRIAL (I)	208.70	23.24%	48.50	160.20	0.00		
15	MANUFACTURING (MFG)	11.22	71.00%	7.97	3.25	0.00		
16	NEIGHBORHOOD COMMERCIAL (NC)	8.54	100.00%	8.54	0.00	0.00		
17	SINGLE FAMILY RESIDENTIAL (R10)	1,247.87	77.36%	965.35	282.44	0.08		
18	SINGLE FAMILY RESIDENTIAL (R15)	875.04	80.00%	700.03	173.94	1.07		
19	SINGLE FAMILY RESIDENTIAL (R7)	472.61	97.23%	459.52	13.05	0.04		
20	RESEARCH DEVELOPMENT (RD)	73.30	19.18%	14.06	59.24	0.00		
21	RESEARCH ENGINEERING OFFICE (REO-2)	7.77	100.00%	7.77	0.00	0.00		
22	RESEARCH ENGINEERING OFFICE (REO-4)	0.23	100.00%	0.23	0.00	0.00		
<b>TOTALS</b>		<b>3,076.82</b>		<b>2,311.41</b>	<b>756.94</b>	<b>8.47</b>		
<b>02040105240040 - Assumpink Creek (below Shipetaukin Ck)</b>								
23	MULTIPLE FAMILY RESIDENTIAL (AT)	367.21	67.57%	248.12	119.08	0.01		
24	CONSERVATION (C)	377.55	40.00%	151.02	101.73	124.80		
25	COMMUNITY COMMERCIAL (CC)	87.81	63.11%	55.42	32.39	0.00		
26	GENERAL COMMERCIAL (GC)	93.54	83.94%	78.52	15.02	0.00		
27	GOVERNMENT SERVICE CENTER (GSC)	290.36	48.33%	140.33	150.03	0.00		

Hamilton Township Build-Out Calculations

28	HIGHWAY COMMERCIAL (HC)	408.92	90.00%	368.03	16.61	24.28		
29	INDUSTRIAL (I)	207.37	86.76%	179.91	27.45	0.01		
30	MANUFACTURING (MFG)	89.11	95.00%	84.65	0.00	4.46		
31	NEIGHBORHOOD COMMERCIAL (NC)	35.07	87.24%	30.60	4.47	0.00		
32	SINGLE FAMILY RESIDENTIAL (R10)	1,163.20	82.22%	956.38	206.76	0.06		
33	SINGLE FAMILY RESIDENTIAL (R15)	650.37	85.43%	555.61	94.74	0.02		
34	SINGLE FAMILY RESIDENTIAL (R25)	116.80	50.00%	58.40	9.71	48.69		
35	SINGLE FAMILY RESIDENTIAL (R5)	323.09	78.31%	253.01	70.08	0.00		
36	SINGLE FAMILY RESIDENTIAL (R7)	799.18	90.00%	719.26	77.58	2.34		
37	RESEARCH DEVELOPMENT (RD)	99.36	40.00%	39.74	46.59	13.03		
38	RESEARCH ENGINEERING OFFICE (REO-5)	828.52	56.38%	467.12	361.38	0.02		
39	SPECIAL HOUSING ZONE 2 (S2)	6.74	100.00%	6.74	0.00	0.00		
40	SPECIAL HOUSING ZONE 2A (S2A)	10.31	80.00%	8.25	1.92	0.14		
<b>TOTALS</b>		<b>5,954.51</b>		<b>4,401.12</b>	<b>1,335.54</b>	<b>217.85</b>		
<b>02040105240050 - Assumpink Creek (below Shipetaukin Ck)</b>								
41	CONSERVATION (C)	79.92	0.00%	0.00	78.94	0.98		
42	INDUSTRIAL (I)	438.12	80.00%	350.50	83.32	4.30		
43	MANUFACTURING (MFG)	24.79	100.00%	24.79	0.00	0.00		
44	NEIGHBORHOOD COMMERCIAL (NC)	1.77	100.00%	1.77	0.00	0.00		
45	SINGLE FAMILY RESIDENTIAL (R10)	121.62	91.67%	111.49	10.13	0.00		
46	SINGLE FAMILY RESIDENTIAL (R15)	93.57	86.05%	80.52	13.05	0.00		
47	SINGLE FAMILY RESIDENTIAL (R7)	38.28	74.63%	28.57	9.71	0.00		
<b>TOTALS</b>		<b>798.07</b>		<b>597.63</b>	<b>195.15</b>	<b>5.29</b>		
<b>02040201030010 - Duck Creek and UDRV to Assumpink Ck</b>								
48	CONSERVATION (C)	41.18	0.00%	0.00	31.95	9.23		
49	COMMUNITY COMMERCIAL (CC)	1.07	0.00%	0.00	0.00	1.07		
50	MANUFACTURING (MFG)	868.49	4.84%	42.03	826.45	0.01		
51	SINGLE FAMILY RESIDENTIAL (R5)	2.59	100.00%	2.59	0.00	0.00		
<b>TOTALS</b>		<b>913.33</b>		<b>44.62</b>	<b>858.40</b>	<b>10.31</b>		
<b>02040201050050 - Crosswicks Ck (Doctors Ck to New Egypt)</b>								
52	SINGLE FAMILY RESIDENTIAL (R120/80)	748.22	50.00%	374.11	112.56	261.55		
<b>TOTALS</b>		<b>748.22</b>		<b>374.11</b>	<b>112.56</b>	<b>261.55</b>		
<b>02040201050070 - Crosswicks Ck (Doctors Ck to New Egypt)</b>								
53	MULTIPLE FAMILY RESIDENTIAL (A7)	0.46	100.00%	0.46	0.00	0.00		
54	CONSERVATION (C)	43.21	0.00%	0.00	28.68	14.53		
55	SINGLE FAMILY RESIDENTIAL (R10)	136.25	79.07%	107.73	28.51	0.01		
56	SINGLE FAMILY RESIDENTIAL (R120/40)	28.77	0.00%	0.00	7.10	21.67		
57	SINGLE FAMILY RESIDENTIAL (R120/80)	751.78	20.00%	150.36	140.94	460.48		

Hamilton Township Build-Out Calculations

58	SINGLE FAMILY RESIDENTIAL (R15)	84.02	60.00%	50.41	22.00	11.61		
59	RESEARCH DEVELOPMENT (RD)	8.22	32.80%	2.70	5.52	0.00		
60	SPECIAL HOUSING ZONE 1 (S1)	58.41	42.94%	25.08	33.33	0.00		
<b>TOTALS</b>		<b>1,111.12</b>		<b>336.74</b>	<b>266.08</b>	<b>508.30</b>		
<b>02040201060030 - Doctors Creek</b>								
61	MULTIPLE FAMILY RESIDENTIAL (A/T)	20.24	95.12%	19.25	0.99	0.00		
62	COMMUNITY COMMERCIAL (CC)	0.09	100.00%	0.09	0.00	0.00		
63	INDUSTRIAL (I)	25.49	20.00%	5.10	17.11	3.28		
64	SINGLE FAMILY RESIDENTIAL (R10)	263.14	68.25%	179.59	83.54	0.01		
65	SINGLE FAMILY RESIDENTIAL (R120/40)	610.53	50.00%	305.27	184.10	121.17		
66	SINGLE FAMILY RESIDENTIAL (R120/80)	1,932.36	40.00%	772.94	443.97	715.45		
67	SINGLE FAMILY RESIDENTIAL (R15)	119.87	83.39%	99.96	19.91	0.00		
68	SINGLE FAMILY RESIDENTIAL (R25)	26.16	46.02%	12.04	14.12	0.00		
69	SPECIAL HOUSING ZONE 1 (S1)	14.59	90.00%	13.13	0.00	1.46		
<b>TOTALS</b>		<b>3,012.27</b>		<b>1,407.37</b>	<b>763.74</b>	<b>841.36</b>		
<b>02040201070010 - Crosswicks Ck (below Doctors Creek)</b>								
70	COMMUNITY COMMERCIAL (CC)	3.09	100.00%	3.09	0.00	0.00		
71	HIGHWAY COMMERCIAL (HC)	39.81	60.00%	23.89	4.89	11.03		
72	PLANNED RETIREMENT DEVELOPMENT (PRD)	132.47	10.00%	13.25	50.36	68.86		
73	SINGLE FAMILY RESIDENTIAL (R10)	127.03	83.79%	106.44	20.59	0.00		
74	SINGLE FAMILY RESIDENTIAL (R120/40)	943.23	30.00%	282.97	488.52	171.74		
75	SINGLE FAMILY RESIDENTIAL (R120/80)	32.36	0.00%	0.00	0.00	32.36		
76	SINGLE FAMILY RESIDENTIAL (R15)	72.82	48.01%	34.96	37.86	0.00		
77	SINGLE FAMILY RESIDENTIAL (R25)	21.76	62.05%	13.50	8.26	0.00		
78	RESEARCH DEVELOPMENT (RD)	1,556.29	66.16%	1,029.64	526.59	0.06		
79	RESEARCH ENGINEERING OFFICE (REO-5)	78.41	29.02%	22.75	55.66	0.00		
<b>TOTALS</b>		<b>3,007.27</b>		<b>1,530.49</b>	<b>1,192.73</b>	<b>284.05</b>		
<b>02040201070020 - Crosswicks Ck (below Doctors Creek)</b>								
80	MULTIPLE FAMILY RESIDENTIAL (A/T)	81.06	90.00%	72.95	2.99	5.12		
81	CONSERVATION (C)	720.84	0.00%	0.00	605.32	115.52		
82	COMMUNITY COMMERCIAL (CC)	25.74	98.30%	25.30	0.44	0.00		
83	HIGHWAY COMMERCIAL (HC)	39.33	90.00%	35.40	2.4	1.53		
84	INDUSTRIAL (I)	42.41	60.00%	25.45	12.61	4.35		
85	MANUFACTURING (MFG)	6.23	0.08%	0.00	6.23	0.00		
86	NEIGHBORHOOD COMMERCIAL (NC)	26.51	80.00%	21.21	3.93	1.37		
87	SINGLE FAMILY RESIDENTIAL (R10)	862.3	93.16%	803.32	58.98	0.00		
88	SINGLE FAMILY RESIDENTIAL (R15)	72.57	90.00%	65.31	2.24	5.02		
89	SINGLE FAMILY RESIDENTIAL (R5)	53.25	70.00%	37.28	0	15.98		

Hamilton Township Build-Out Calculations

90	SINGLE FAMILY RESIDENTIAL (R7)	427.34	88.47%	378.07	49.25	0.02		
91	RESEARCH DEVELOPMENT (RD)	310.88	66.83%	207.76	103.10	0.02		
<b>TOTALS</b>		<b>2,668.46</b>		<b>1,672.05</b>	<b>847.49</b>	<b>148.92</b>		
<b>02040201030030 - Crosswicks Ck (below Doctors Creek)</b>								
92	MULTIPLE FAMILY RESIDENTIAL (A/T)	162.02	92.09%	149.20	12.81	0.01		
93	CONSERVATION (C)	861.53	13.69%	117.94	743.53	0.06		
94	COMMUNITY COMMERCIAL (CC)	37.79	100.00%	37.79	0.00	0.00		
95	GENERAL COMMERCIAL (GC)	54.53	95.00%	51.80	0.00	2.73		
96	GOVERNMENT SERVICE CENTER (GSC)	0.08	100.00%	0.08	0.00	0.00		
97	HIGHWAY COMMERCIAL (HC)	116.04	99.83%	115.84	0.20	0.00		
98	SINGLE FAMILY RESIDENTIAL (R10)	304.68	95.00%	289.45	11.94	3.29		
99	SINGLE FAMILY RESIDENTIAL (R5)	619.47	90.00%	557.52	15.23	46.72		
100	SINGLE FAMILY RESIDENTIAL (R7)	668.27	86.87%	580.53	87.74	0.00		
<b>TOTALS</b>		<b>2,824.41</b>		<b>1,900.16</b>	<b>871.45</b>	<b>52.80</b>		