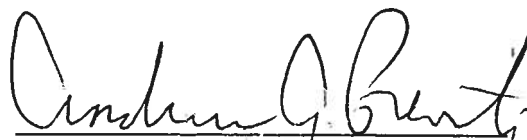


**Stormwater Management Plan  
Township of Dennis  
Cape May County, New Jersey**

**Prepared by:**

**Walker, Previti, Holmes & Associates  
156 Stagecoach Road  
Marmora, New Jersey 08223**

**March, 2005  
March, 2006 Amended  
January, 2008, Amended**



**Andrew A. Previti, P.E.  
Township Engineer**

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## **I. Introduction**

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Township of Dennis 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 baseflow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

The Township of Dennis is involved in the Plan Endorsement process established by the New Jersey Office of Smart Growth to review municipal and regional plans for consistency with the New Jersey State Development and Redevelopment Plan. This process includes the preparation of a land use/build-out analysis. This analysis will consider environmental constraints such as C-1 Waters Wetlands and water supply which will impact development and redevelopment potential. Therefore, a “build-out” analysis has not been included in this Stormwater Management Plan in an effort to avoid duplication.

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.

## II. Goals

The goals of its MSWMP are to:

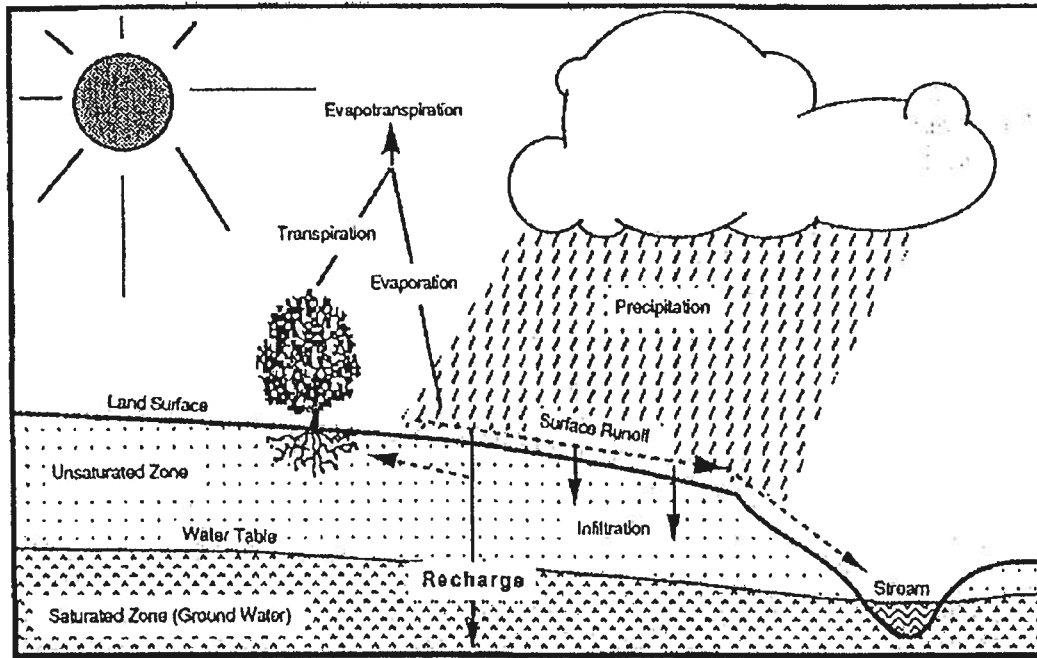
- Reduce flood damage, including damage to life and property;
- Minimize, to the extent practical, any increase in stormwater runoff from any new development;
- Reduce soil erosion from any development or construction project
- Assure the adequacy of existing and proposed culverts and bridges, and other 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.

### **III. 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 volume 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



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.

#### IV. Background

The Township of Dennis is a rural community that straddles the Cape May County peninsula from east to west. The Township is bounded to the west by Cumberland County, to the east by Sea Isle City, to the south by Middle Township and to the north by Woodbine and Upper Township. The Township encompasses 41,664 acres (65.1 square miles) of which 31% is freshwater wetlands and 19% is constrained by tidal wetlands. Over 41% of the total land area in the township is owned and managed by the State and Federal governments. An additional 10% is “public property”.

The Township is one of the sixteen (16) municipalities comprising Cape May County, the southern-most county in New Jersey. It is the third largest municipality in the County and is one of five mainland communities. Figure 2 depicts the Township boundary on USGS quadrangle maps.

The Townships location outside the heavily traveled New Jersey transportation corridor, an abundance of environmentally sensitive areas (wetlands, coastal wetlands, pinelands) and the Township’s desire to preserve its rural and small town lifestyle through planning and zoning tools (Conservation Districts, PF8 Moderate-Density Forest Zoning District with a minimum lot area of 8 acres, PF25 Low-Density Forest Zoning with a minimum lot area of 25 acres, and 3 acre and 10 acre residential lot zoning) has permitted the Township, to some extent, to escape the urbanization pressures faced by many New Jersey municipalities. Nevertheless, due to the high quality of life in the Township, significant growth has occurred over the past 30 years. The Township’s year round population was 2,635 in 1970 while the 2000 census indicates the current population to be 6,492. The bulk of this growth occurred between 1970 and 1990 as illustrated by the following chart:

<b>YEAR</b>	<b>POPULATION</b>	<b>POP. CHANGE</b>	<b>PCT. CHANGE</b>
<b>1970</b>	2,635	308	13%
<b>1980</b>	3,989	1,354	51%
<b>1990</b>	5,574	1,585	40%
<b>2000</b>	6,492	918	17%

Population Projections to the year 2025 indicate a 2025 population of 8,058, an increase of 1,566 residents (24.1%) in twenty-five years. (1) This relative low growth rate is a function of the non-availability of remaining land suitable for residential development.

**(1) Source: SJTPO 12-16-03 Cape May County Forecast.**

The New Jersey Department of Environmental Protection (NJDEP) has established in Ambient Biomonitoring Network (AMNET) to document the health of the states 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.



V. **Design & 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 Township's standards will also meet the regulations of the Pinelands Commission, N.J.A.C. 7:50-6.84, for those portions of the Township which are in the Pinelands Area.

The ordinances will be submitted to the county for review and approval.

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

## **VI. Plan Consistency**

The Township is not within a Regional Stormwater Management Planning Area and no Total Maximum Daily Loads (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 RSIS.

The Municipal Stormwater Management Plan is consistent with the requirements of the Pinelands Comprehensive Management Plan (CMP). The Township will utilize the most current standards of the CMP. This Municipal Stormwater Management Plan will be updated to incorporate any future amendments to the CMP.

The Township's Stormwater Management Ordinance requires all new development and redevelopment plans to comply with the 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.

## **VII. 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. A copy will be sent to the Department of Environmental Protection at the time of submission.

- A. Chapter 165 of the Township Code, entitled Subdivision of Land, was reviewed for the purpose of incorporating nonstructural stormwater management strategies. Modifications are proposed for Article VI, Improvements and Design Standards, which would incorporate these strategies. The following is a list of the applicable Sections of Article VI:

**Section 165-29 Streets and Highways** describes requirements for streets in the Township. Street pavement widths will be reduced to be compatible with RSIS. On street parking will also be restricted to accommodate these narrower widths. This section will be revised to allow the use of pervious paving materials to minimize runoff and promote groundwater recharge.

This section also requires that cul-de-sacs have a minimum cartway radius of fifty-eight (58) feet. This section will be revised to reduce the minimum radius of cul-de-sac designs.

**Section 165-31 Curbs, Gutters and Catch Basins** are required within certain zoning districts in the Township, and includes standards for these improvements. This section will be amended to permit curb cuts or flush curbs with curb stops to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas. This section will also be amended to encourage the use of natural vegetated swales in lieu of inlets.

**Section 165-32 Sidewalks** describes where sidewalks are required and includes design standards. This section will be amended to require developers to design sidewalks to discharge stormwater to neighboring lawns where feasible in order to disconnect impervious surfaces. This section will also be amended to permit permeable sidewalk materials where appropriate.

**Section 165-35 Drainage System** encourages that surface water runoff be recharged to the groundwater. This section also requires that adequate stormwater conveyance structures be included in the development design. This section will be amended to encourage the use of a natural vegetated swales for stormwater conveyance in order to further encourage recharge of storm runoff. Curb cuts and flush curbs will also be permitted in those zoning districts which require curbs as noted previously in relation to Section 165-31 Curbs, Gutters and Catch Basins.

This Stormwater Management Plan has been updated in March, 2006 to reflect the Township's introduction (March 7, 2006) of two ordinances (Pinelands Areas and Non-Pinelands Areas) which will adopt the design and performance standards for stormwater management measures presented in N.J.A.C. 7:8-5 in order to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. These ordinances will be adopted on April 3, 2006.

**Section 165-35 Public Utilities** requires that utilities be installed in accordance with the specifications of the governmental authority having jurisdiction. This section also requires vegetative screening of equipment when natural vegetation is insufficient. This section will be amended to require conformance to the Township's Stormwater Control Ordinances and to require the use of native vegetation for screening, which requires less fertilization and watering than non-native species

**Section 165-37 Natural Features and Public Lands** requires that natural features such as trees, hilltops and views, natural terrain and natural drainage lines shall be preserved whenever possible and that care be taken to preserve selected trees to enhance the landscape treatment of

a development. This section will be amended to expand trees to forested areas, to ensure that leaf litter and other beneficial aspects of the forest are maintained in addition to the trees.

- B. Chapter 185 of the Township Code, entitled Zoning, was reviewed for the purpose of incorporating nonstructural stormwater management strategies. Modifications are proposed for Article V Supplemental Regulations, which would incorporate these strategies. The following is a list of the applicable sections of Article V:

**Section 185-33 Off-Street Parking** addresses off-street parking and loading requirements. This section requires parking and loading areas and access drives be paved and curbed. This section also addresses landscaping requirements. This section will be amended to permit curb cuts or flush curbs with curb stops to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious surfaces. The use of natural (native) vegetated swales will be encouraged. This section will also be amended to allow the use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge.

**Section 185-34 Performance Standards**

**Section 185-34A Buffers** contains standards for landscape screenings between non-residential and residential uses. This section will be amended to require the use of native vegetation for buffers. This section will also be amended to add language to allow buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these pervious surfaces.

**Section 185-34J Landscaping and Clearing** contains standards for disturbance of wooded areas, provides clearing limits and revegetation requirements. This section will be amended to ensure that the minimum natural buffer of twenty (20) feet include preservation of leaf litter and other beneficial aspects of the forest are maintained in addition to the natural trees. This section will also be amended to require that native species be used for revegetation since they require less fertilization and watering.

**Section 185-39 Off-Tract Improvements** addresses essential off-site and off-tract improvements. This section will be amended to require that all off-site and off-tract stormwater management and drainage improvements must conform to the **Design and Performance Standards** described in Part V of this plan including the Township's Stormwater Control Ordinances.

**Sections 185-13 thru 185-25, Article IV District Regulations** contains standards that provide regulations for each specific Zoning District which are supplemented by the regulations of **Article V, Supplemental Regulations**. These sections include maximum allowable percent of impervious surfaces for a few zoning districts, but not all districts. Sections 185-13 thru 185-25 will be amended to be compatible with the revised language of **Sections 185-33, 185-34A, 185-34J and 185-39** relative to Off-Street Parking, Buffers, Landscaping and Clearing and Off-Tract Improvements. These Sections will also be amended to provide maximum allowable percent of impervious surfaces for those zoning districts which do not have this standard.

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

The Township is in the process of preparing a Plan Endorsement Petition to the State Planning Commission which will attempt to develop the Township's Plan to be consistent with the State Plan. One component of the process is the preparation of a build out analysis based on the criteria to be developed by the NJDEP under the Provisions of the Gibson Water Supply Study for Cape May County. Once this build out analysis is complete it will be utilized to finalize the Land Use/Build-Out Analysis of this Stormwater Management Plan.

## **IX. 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.

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

### **Groundwater Recharge**

- Replace the aging 30,000 S.F. impervious parking lot surface at the Municipal Complex on Dennisville-Petersburg Road with permeable paving to provide 180,000 C.F. of additional average annual groundwater recharge.
- Replace the aging 40,000 S.F. of impervious drive aisles at the Municipal Recreation Complex to provide 320,000 C.F. of additional average annual groundwater recharge.

### **Water Quality**

- Retrofit the existing stormwater management system at the Municipal Recreation Complex to provide removal of 80 percent of total suspended solids from the areas of impervious surfaces.

- Retrofit the parking area at the Municipal Complex on Dennisville-Petersburg Road to provide the removal of 80 percent of total suspended solids.

### **Water Quantity**

- Install stormwater management measures at municipal facilities to reduce peak flow from the facilities for the 2, 10 and 100 year storms.
2. If a suitable site cannot be located in the same drainage area as the proposed development, as discussed in Option 1, the mitigation project may provide mitigation that is not equivalent to the impacts for which the variance or exemption is sought, but that addresses the same issue. For example, if a variance is given because the 80 percent TSS requirement is not met, the selected project may address water quality impacts due to a fecal impairment. Listed below are specific projects that can be used to address the mitigation option.
- The video inspection and cleaning of municipal stormwater sewer mains.
  - The video inspection of county storm sewer systems within the Township, to verify the absence of illegal connections.
  - Re-establish a vegetation zone along the 1000 foot shoreline of the pond on the former “Kapp Property”.

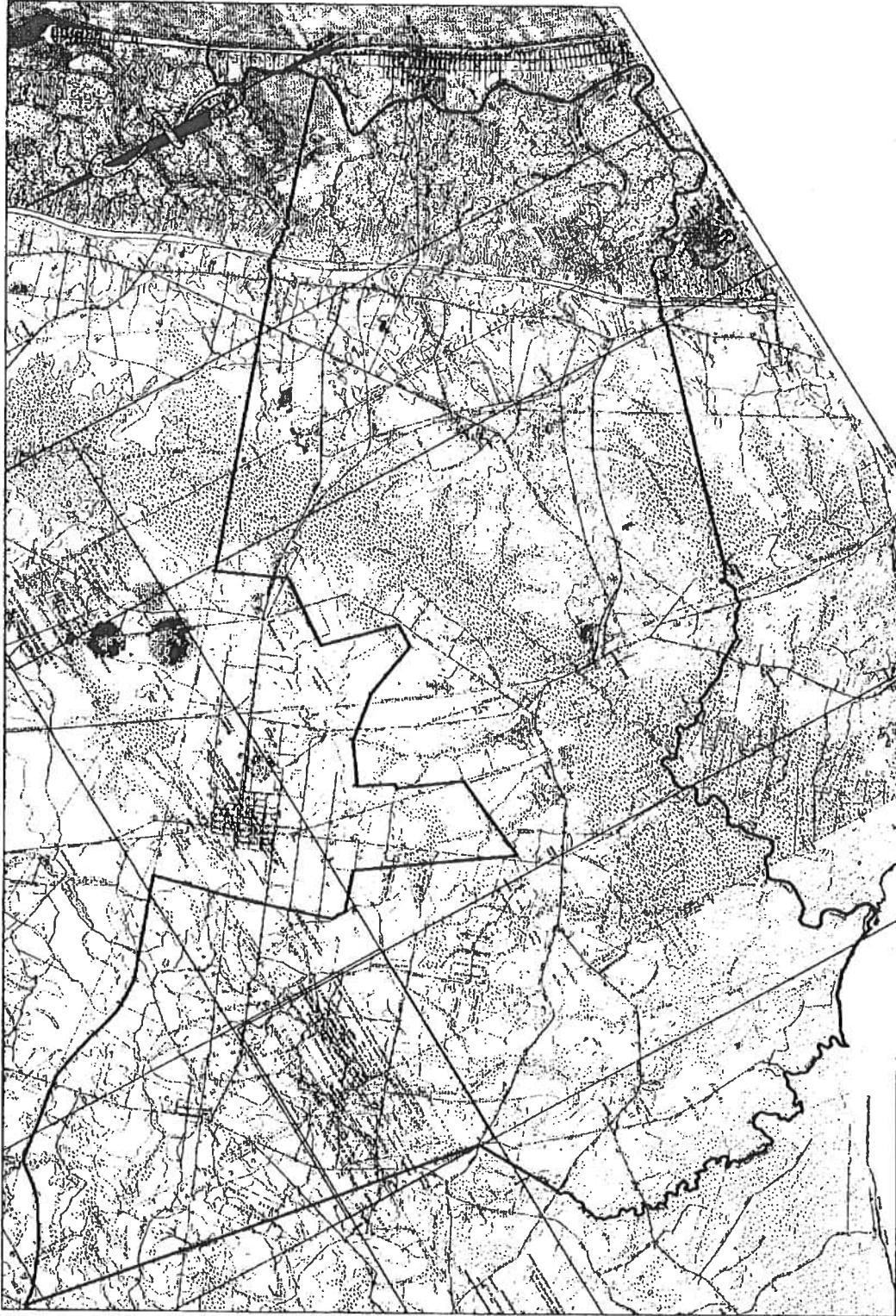
The Township may allow a developer to provide funding or partial funding to the Township for an environmental enhancement project that has been identified in a Municipal Stormwater Management Plan, or towards the development of a Regional Stormwater Management Plan. The funding must be equal to or greater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

Mitigation measures for projects in the Pinelands Area, which are off-site, must occur within the Pinelands Area and must also be within the same drainage area as the parcel proposed for development.

Monetary contributions may be made to the Township in lieu of performing the off-site mitigation for projects in the Pinelands Area. The amount of any such in lieu contribution must be equal to the cost of implementing and maintaining the Stormwater Management measures for which an exception is granted. The Township must expend any contributions collected within 5 years of receipt.

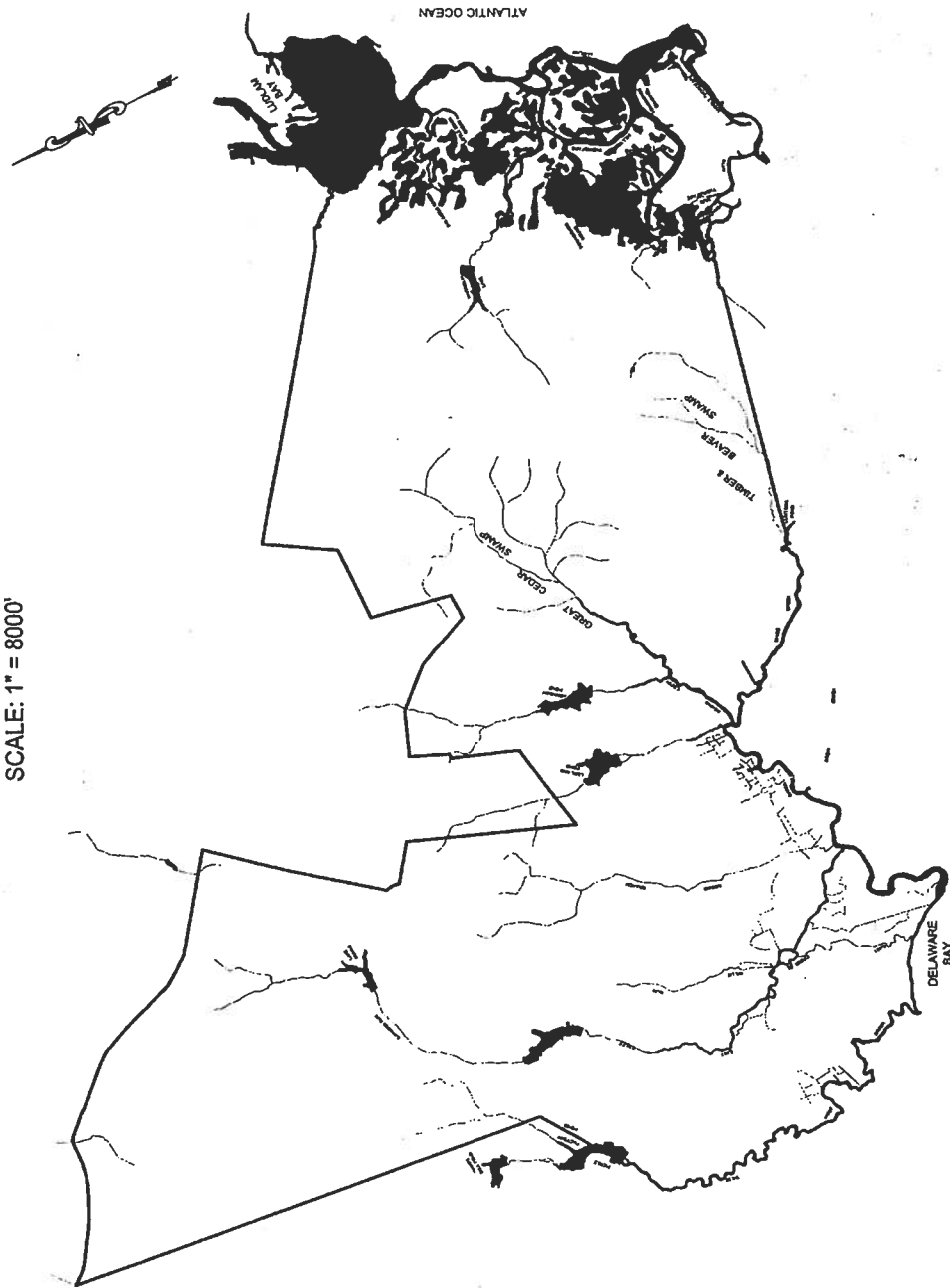
MUNICIPAL STORMWATER MANAGEMENT PLAN  
FIGURE 2 - TOWNSHIP BOUNDARY ON U.S.C.&G.S. QUADRANGLES

SCALE: 1" = 8000'



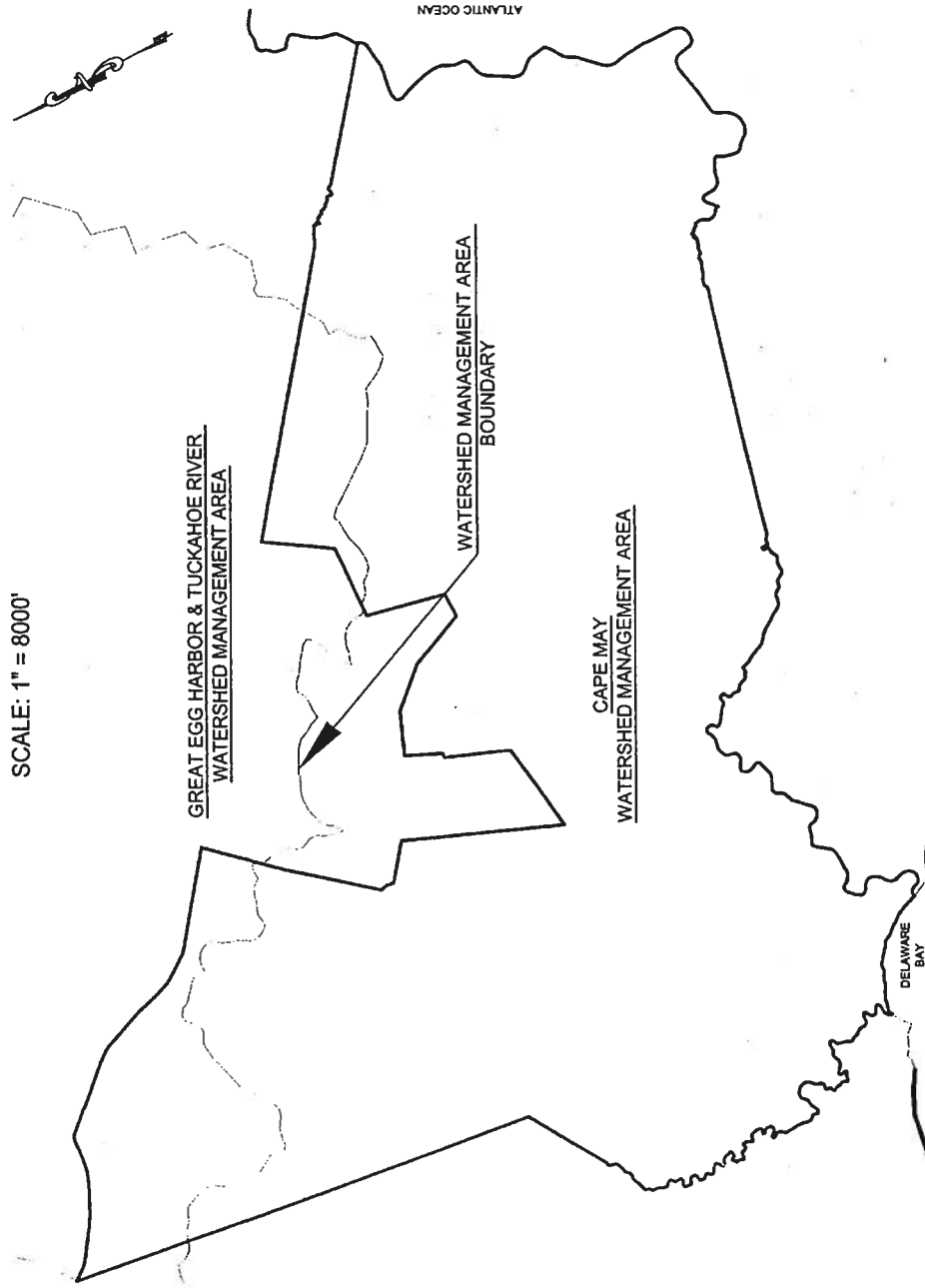
**MUNICIPAL STORMWATER MANAGEMENT PLAN**  
**FIGURE 3 - WATERWAYS**

SCALE: 1" = 8000'



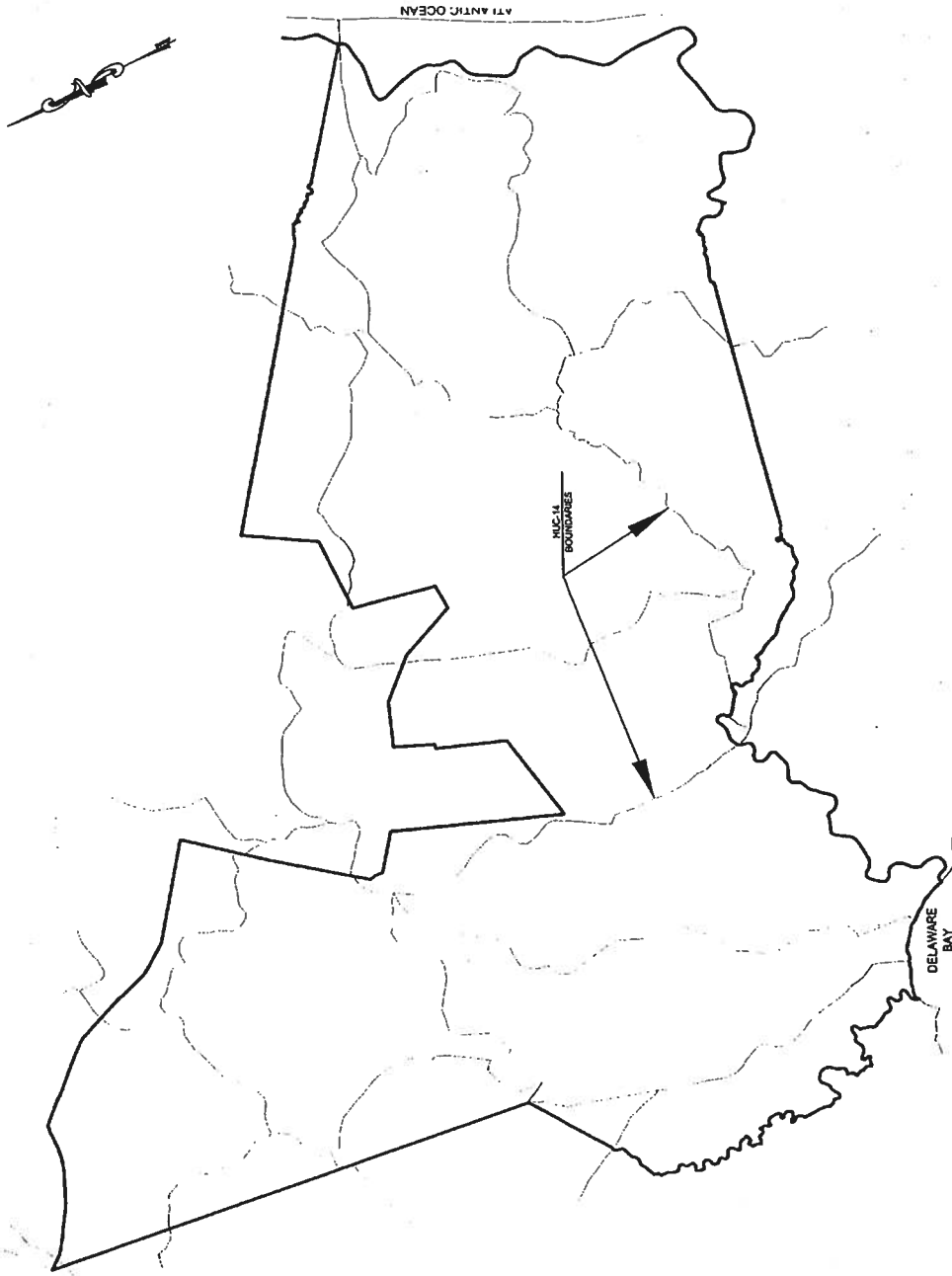


MUNICIPAL STORMWATER MANAGEMENT PLAN  
FIGURE 4 - WATERSHED MANAGEMENT AREAS



**MUNICIPAL STORMWATER MANAGEMENT PLAN**  
**FIGURE 5 - HYDRAULIC UNIT DRAINAGE AREAS, HUC-14S**

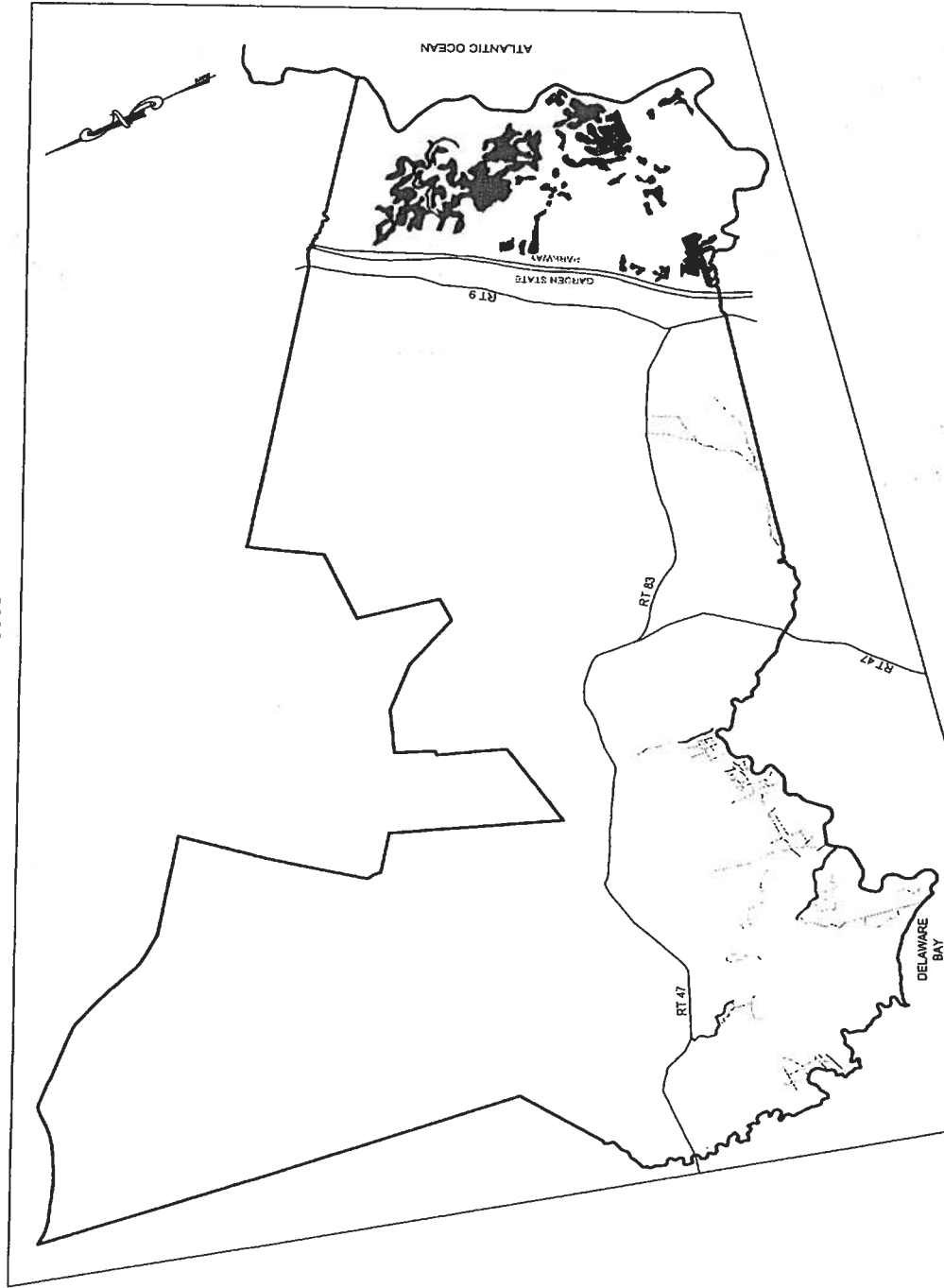
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MUNICIPAL STORMWATER MANAGEMENT PLAN

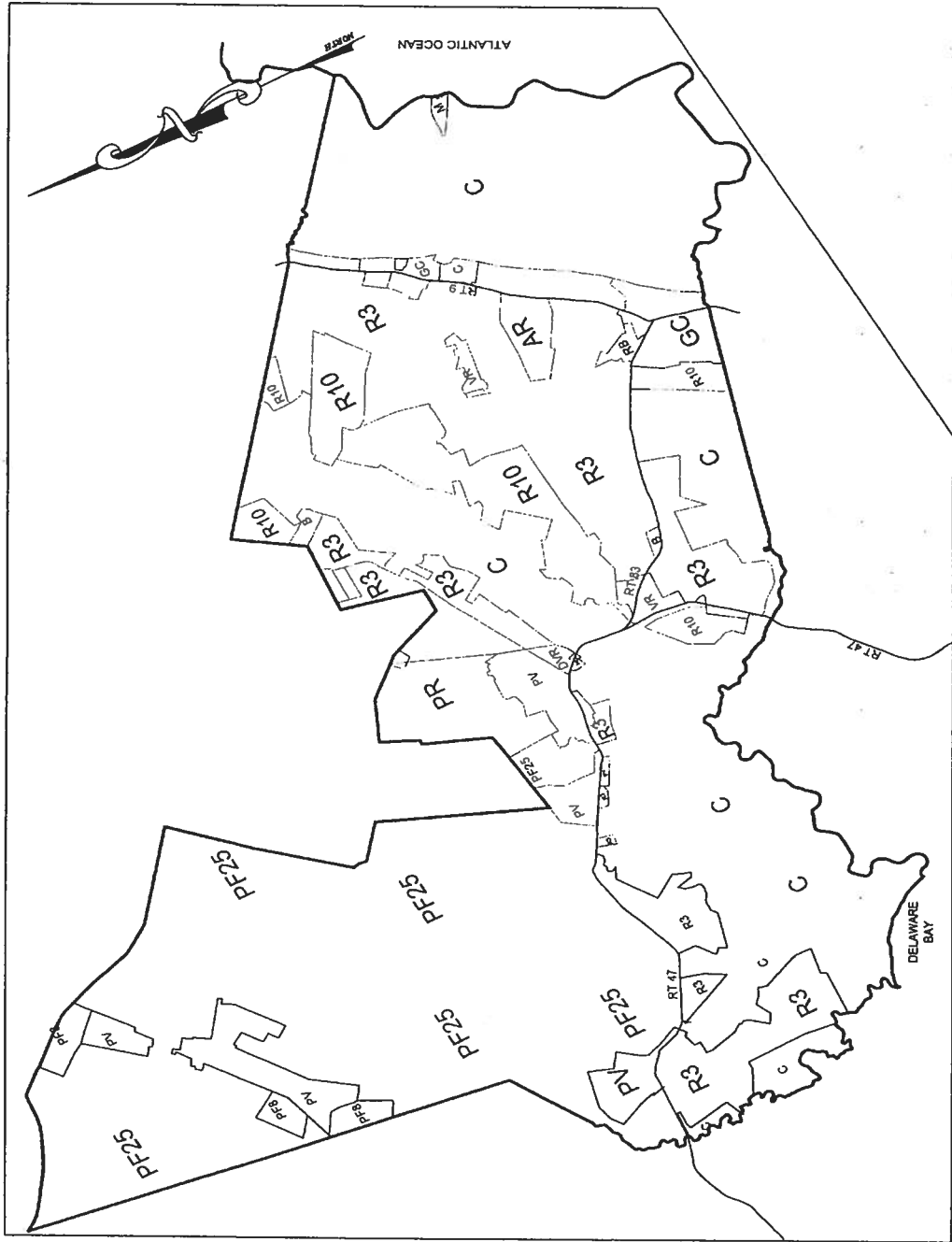
FIGURE 6 - CLASS 1 WATERS

SCALE: 1" = 8000'



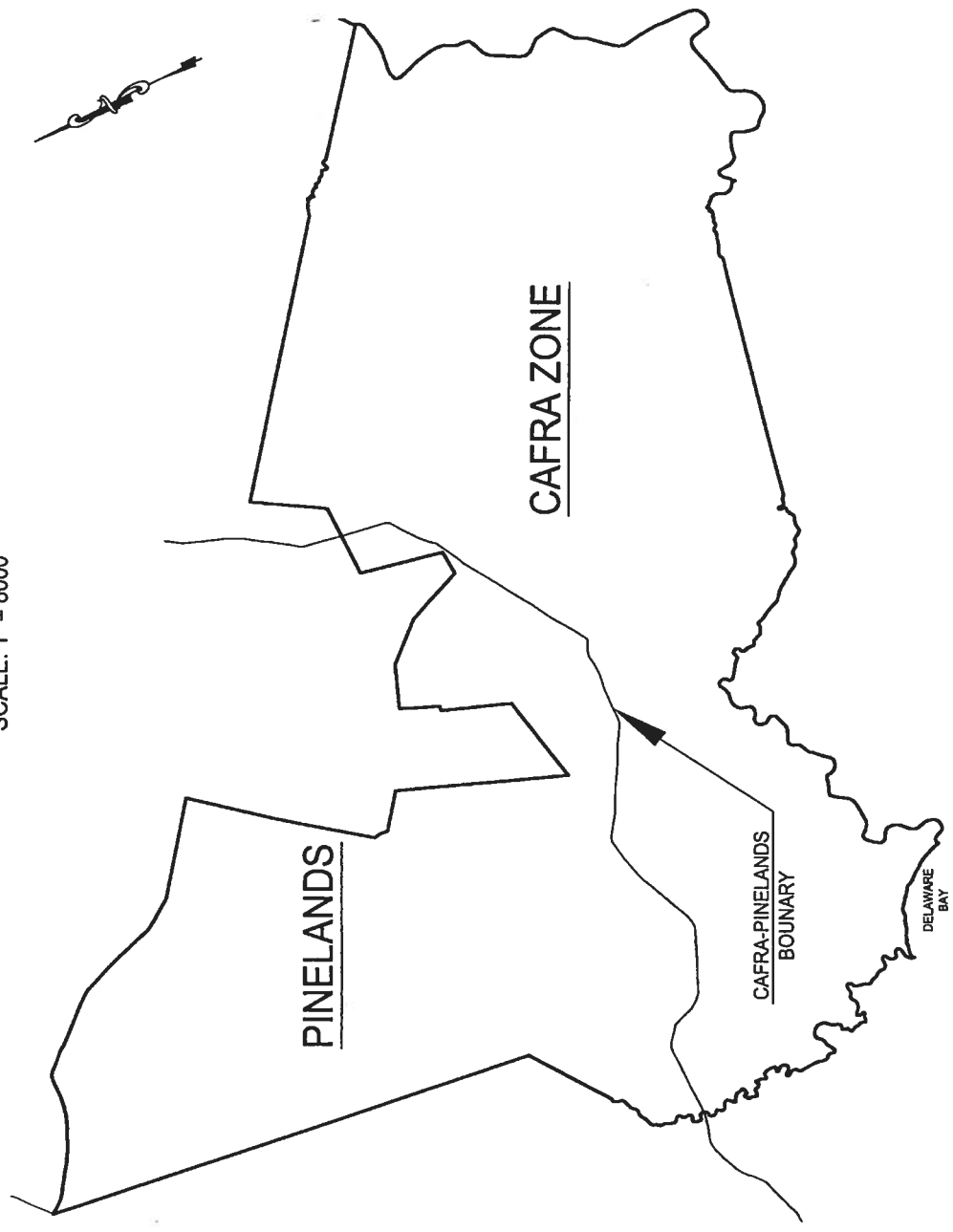
**MUNICIPAL STORMWATER MANAGEMENT PLAN**  
**FIGURE 7 - TOWNSHIP ZONING BOUNDARIES**

SCALE: 1" = 8000'



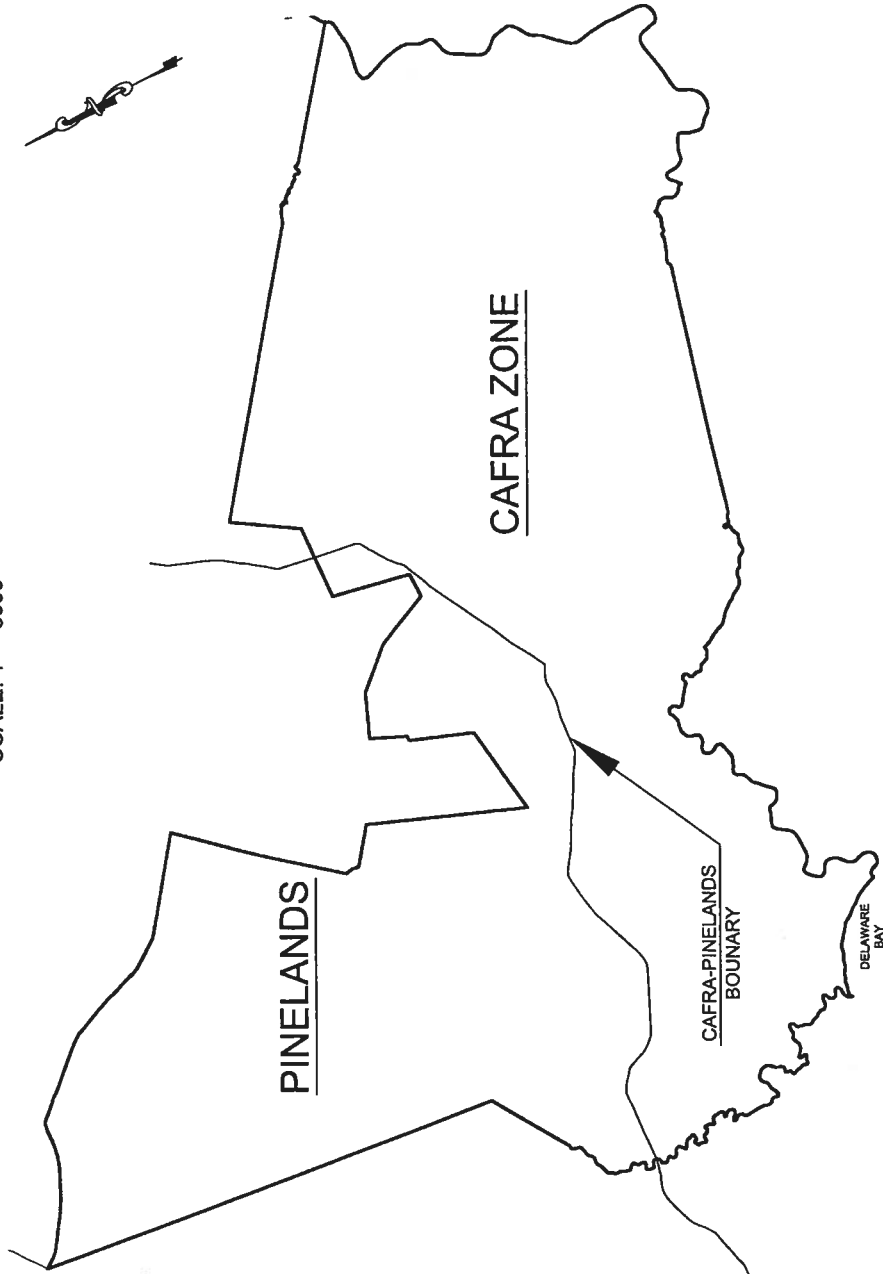
MUNICIPAL STORMWATER MANAGEMENT PLAN  
FIGURE 8 - PINELANDS-CAFRA ZONE BOUNDARY

SCALE: 1" = 8000'



MUNICIPAL STORMWATER MANAGEMENT PLAN  
FIGURE 8 - PINELANDS- CAFRA ZONE BOUNDARY

SCALE: 1" = 8000'



TOWNSHIP OF DENNIS PLANNING BOARD

COUNTY OF CAPE MAY  
STATE OF NEW JERSEY

RESOLUTION NO. 08-03

A RESOLUTION REGARDING A PROPOSED AMENDMENT  
TO THE STORMWATER MANAGEMENT PLAN

Whereas the Dennis Township Planning Board previously adopted a Stormwater Management Plan; and

Whereas, to maintain consistency with the Comprehensive Management Plan, the Pinelands Commission has recommended certain minor modifications in the stormwater plan, and in particular in sections V. (Design and Performance Standards); VI. (Plan Consistency); and IX. (Mitigation Plans); and

Whereas, the board believes these modifications are appropriate and in the township's best interest;

NOW, THEREFORE, on this 24<sup>th</sup> day of January, 2008, be it resolved by the Planning Board of the Township of Dennis as follows:

1. The averments of the preamble are incorporated herein by reference.
2. The board hereby adopts the amended Stormwater Management Plan, in the form attached to this resolution as Exhibit A, as the township's stormwater management plan.

3. This amended plan supersedes all previous versions of the plan.

4. This resolution shall take effect immediately.

  
\_\_\_\_\_  
LAWRENCE STEVENS, Chairman

  
\_\_\_\_\_  
DAVID WATSON, Vice Chairperson

Presented By: Watson

Seconded By: Turner

Passed: 8-0

This is to certify that this is a true copy of a Resolution adopted verbally by the Dennis Township Planning Board at their regular meeting held on <sup>1/24</sup> at 7:00 p.m. at the Dennis Township Court Building and memorialized on January 24, 2008.

ATTEST

\_\_\_\_\_  
Carla A. Coffey  
SECRETARY