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Municipal Stormwater Management Plan

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Municipal Stormwater Management Plan
Township of Barnegat

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I. Introduction

The following Municipal Separate Stormwater System (MS4) stormwater plan was prepared by Remington, Vernick & Vena Engineers for the Township of Barnegat. The New Jersey Department of Environmental Protection (NJDEP) "Sample Municipal Stormwater Management Plan" was used as a basis for preparation of the plan, as modified to provide specific information germane to the Township of Barnegat.

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Township of Barnegat to address stormwater-related impacts. The creation of this plan is required by N.J.A.C. 7:14A-25 (Municipal Stormwater Regulations). As required, this plan contains all of the required elements described in N.J.A.C. 7:8 (Stormwater Management Regulations).

The plan contained herein 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/quantity and the loss of groundwater recharge that provides base flow in receiving water bodies.

In addition, this plan describes long-term operation and maintenance measures for existing and future stormwater facilities. 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 are sought.

II. Goals

The goals of this MSWMP are as follows:

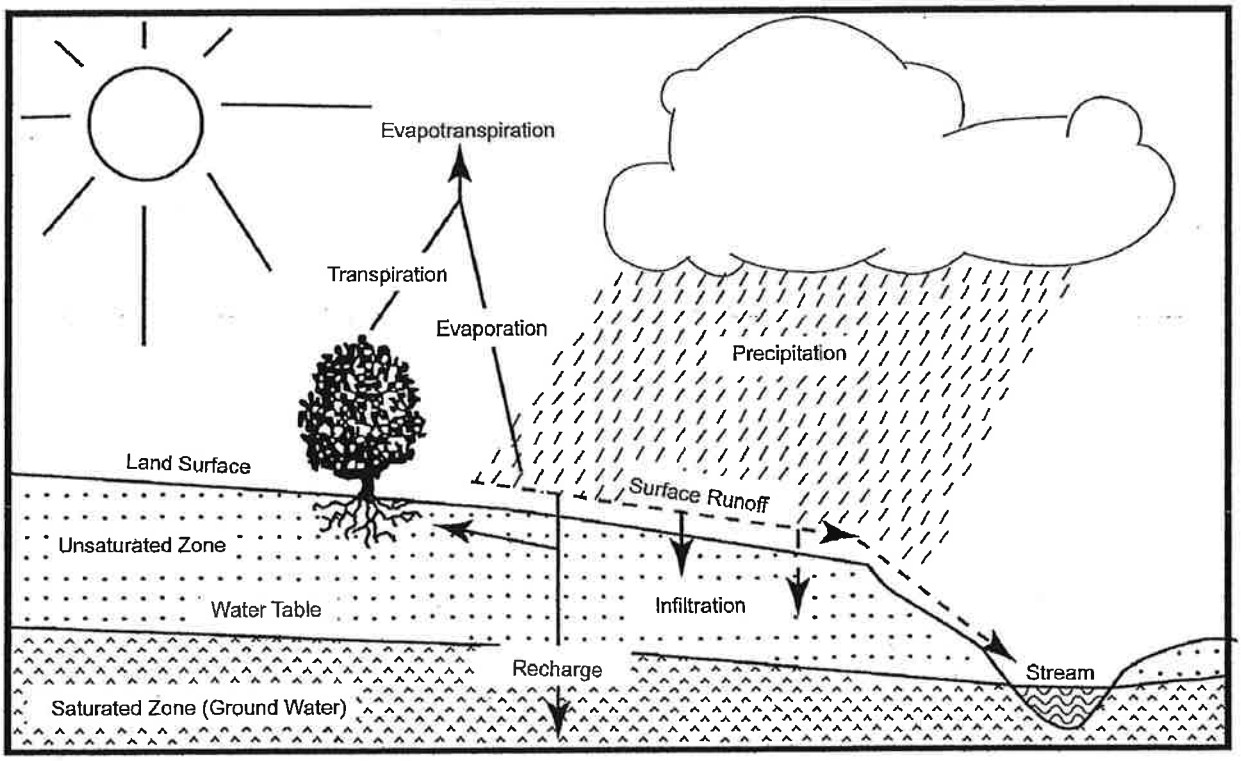
- Reduce flood damage, including damage to life and property;
- Minimize, to the extent practical, any increase in stormwater runoff from any new development;
- Reduce soil erosion from any development or construction project;
- Assure the adequacy of existing and proposed culverts, bridges and other 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, protect public health, safeguard fish and aquatic life and scenic and ecological values, enhance the domestic, municipal, recreational, industrial and other uses of water.
- Minimize pollutants in stormwater runoff from new and existing development to 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 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 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 lawns or impervious cover, thus 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.

Groundwater Recharge in the Hydrologic Cycle



In addition, 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 reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows.

Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt. In addition to increases in runoff peaks, volumes, and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate a variety of pollutants from the atmosphere, fertilizers, animal wastes, and leakage and wear from vehicles. Pollutants can include metals, suspended solids, hydrocarbons, pathogens, and nutrients.

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

IV. Background

The Township encompasses approximately 35 square miles in Ocean County, New Jersey. In recent years, the Township has been under significant development pressure. The population of the Township has increased from 12,235 in 1990 to an estimated population of 19,177 in 2004 (per Ocean County Data Book 2006). This population increase has resulted in considerable demand for new development; changes in the landscape have most likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality.

Per consultation with Ed Richard, Barnegat Township Director of Public Works, there are no significant stormwater or drainage issues in the Township. As referenced in this report, coliforms are the primary water quality concern for the Township and the remainder of the local Watershed Management Area (13).

As indicated on the "Township and its Waterways" Map and on the "HUC-14 Delineations Map", portions of the following waterways are present within Barnegat Township (west to east):

- Yellow Dam Branch;
- Plains Branch (tributary to Oswego River);
- Oswego River;
- Forked River;
- Mill Creek;
- Oyster Creek;
- Four Mile Branch (Mill Creek);
- Waretown Creek; and
- Bargenat Bay and tributaries.

The 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.

Only one (1) AMNET sampling location is located within Barnegat Township. The site ID is AN0603 and it is located on the Oswego River at Route 539. The site is classified as moderately impaired for benthic macroinvertebrates. No additional impairment data has been located for Barnegat Township.

In addition to the above AMNET site data, the following additional water bodies are listed as impaired per the NJDEP's 2004 Integrated List of Water Bodies (all data reported from NJDEP Shellfish Monitoring):

Site ID	Water Body	Impairment Description
1672,1672,A 1673,1673A	Double Creek Estuary	Total Coliform
Various	Barnegat Bay	Total Coliform
various	Barnegat Bay Coastal Tributaries	Total Coliform

In addition to the above, a Total Daily Maximum Daily Load (TMDL) was approved by NJDEP on September 27, 2006 for Fourteen Water bodies within Watershed Management Area (WMA) 13, which includes Barnegat Township.

A Total Maximum Daily Load (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 a NJPDES permit to discharge, and nonpoint source, which includes stormwater runoff from agricultural areas and residential areas, along with a margin of safety.

It is important to note that Barnegat Township does not have development conditions or uses within the above estuaries that traditionally contribute to total coliform exceedances (e.g., agricultural farms, malfunctioning septic systems, etc.). Only one horse farm exists within the Township, located on Ridgeway Street in the eastern part of the Township.

It should be noted that there are two relatively large mobile home parks in the portion of the Township that is within the Pinelands Area –Brighton at Barnegat and Pinewood Estates, which have been served by septic systems since their inception. The Township has contacted the Pinelands Commission regarding the feasibility of serving these developments with Public Sewer. Public sewerage of these areas would likely result in significant decreases in coliform counts within these areas.

Barnegat Township will address stormwater point sources through existing best Management Practices (BMPS) of the MS4 program, as practicable, and in accordance with its MS4 permit obligations.

The Township recently passed wildlife feeding and pet waste (pickup) ordinances which are enforced by the Township. If needed, geese control measures could also be implemented

It should also be noted that Barnegat Township will also attempt to manage waterward sources of coliforms as practicable, including the following:

- Enforcement of local No Discharge Zones (including Barnegat Bay).
- Endorsement of Clean Marina Programs.
- Marina Best management Practices (e.g., providing and managing Marina pumpout facilities, etc).

It should be noted that as part of the Township's Municipal Separate Storm Sewer Permit, as outlined in its Stormwater Pollution Prevention Plan, existing inlets and stormwater management facilities are inspected annually and repairs/maintenance are made. At that time, existing water quantity and erosion problems (if any) are assessed and abated to the maximum extent practicable.

In addition, future major development will comply with the new NJDEP Stormwater design standards (NJAC 7:8), including average annual recharge.

V. Design and Performance Standards

The Township has adopted 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/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 were submitted to the Ocean County for review and approval (within 24 months of the effective date of the Stormwater Management Rules). Current versions of the Township's existing stormwater ordinances are as follows:

- Non-Pinelands Ordinance #2006-08, adopted April 3, 2006.
- Pinelands Ordinance #2007-17, updated September 17, 2007 and adopted November 5, 2007.

As stated in this report, Township properties under Pinelands jurisdiction (i.e., the majority of the Township's land area) are subject to the Pinelands design standards as outlined in the Township's stormwater ordinance (#2007-17) for Pinelands properties (i.e., within the Pinelands Commission's jurisdiction).

In addition, all regulated stormwater BMP facilities will be subject to operation and maintenance requirements stipulated in the NJ Stormwater Rule, including not limited to the following:

- The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.
- The maintenance plan shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement).
- Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure(s), including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of non-vegetated linings.
- The person responsible for maintenance shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development,

including a record of all inspections and copies of all maintenance-related work orders.

- The person responsible for maintenance shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.
- The person responsible for maintenance shall retain and make available, upon request by any public entity with administrative, health, environmental, or safety authority over the site, the maintenance plan and the documentation required by the Borough's stormwater ordinances.
- In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, the municipality shall so notify the responsible person in writing. If the responsible person fails or refuses to perform such maintenance and repair, the municipality or County may immediately proceed to do so and shall bill the cost thereof to the responsible person.

During construction, 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. As stated previously, a Total Daily Maximum Daily Load (TMDL) was approved by NJDEP on September 27, 2006 for Fourteen Water bodies within Watershed Management area (WMA) 13, which includes Barnegat Township. This MSWMP is also in compliance with the Pinelands Commission's Comprehensive Management Plan (CMP).

As referenced previously, the Township adopted both Pinelands and non-Pinelands stormwater ordinances for respective properties within Barnegat that are regulated by their respective locations and agency jurisdiction.

Approximately 56% of the Township (i.e., westerly portion) is within the Pinelands National Reserve, and under jurisdiction of the Pinelands Commission.

Easterly portions of the Township are within the NJDEP Coastal Zone, and possibly subject to CAFRA regulations. For such areas, CAFRA rules incorporate the new Stormwater Rule(s) by reference. It should be noted that in such areas, where CAFRA development permits are submitted, the NJDEP could require a mitigation plan even if Barnegat Township does not.

If any Regional Stormwater Management Plans (RSWMPs) or additional 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 storm water 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 Ordinances require 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 Ocean County Soil Conservation District.

VII. Nonstructural Stormwater Management Strategies

Non-structural stormwater strategies for design of new developments, or redevelopment, as defined per the NJDEP Stormwater Design Regulations (NJAC - 5.3(b)), include the following objectives:

- Protection of areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.
- Minimizing impervious surfaces and breakup or disconnecting the flow of runoff over impervious surfaces.
- Maximum protection of natural drainage features and vegetation.
- Minimizing the decrease in the "time of concentration" from pre-construction conditions to post-construction conditions.
- Minimizing land disturbance during clearing and grading.
- Minimizing soil compaction.
- Providing low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides.
- Providing vegetated open channel conveyance systems discharging into and through stable vegetative areas.

Enclosed within Appendix D of this plan is a review of Barnegat's existing Master Plan and Ordinances for compliance with non-structural strategies, using the Checklist provided in the New Jersey Best Management Practices (NJBMP) manual. Ordinance changes for addition compliance will be made at the discretion of Barnegat Township.

In addition, as indicated previously, Township of Barnegat will adopt the NJDEP model stormwater control ordinance, as amended for use and enforcement within the Township of Barnegat. This ordinance includes methodologies for incorporating non-structural stormwater strategies identified above, in design, "to the maximum extent practicable".

If an applicant (or his/her Engineer) contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management strategies identified in (b) below into the design of a particular project, the applicant will identify the strategy and provide a basis for the contention. It is understood that any project requiring NJDEP Land Use Regulation Program permitting or approvals will also be subject to a similar stormwater review by the appropriate agency.

VIII. Land Use/Build-Out Analysis

A detailed land use analysis for the Township was conducted and all applicable mapping is included in Appendix A. The Existing Land Use Map illustrates the existing land use in the Township based on 1995/97 GIS information from NJDEP. The Hydrologic Units Map illustrates the HUC14s within the Township. The Township zoning map is also included. The Wetlands Map illustrates the constrained lands within the Township. The build-out calculations for impervious cover are shown in Table 1. Table 2 presents the pollutant loading coefficients by land cover. The pollutant loads at full build-out are presented in Table 3.

IX. Mitigation Plans

Per review of the optional MS4 mitigation plan requirement with Barnegat Township and Planning Board representatives, the Planning Board has deferred identifying any specific existing areas in need of mitigation at this time.

If a developer of a future project(s) presents a project deemed in the Township's interest, and is in need of a waiver, the Township may amend its stormwater management plan element to identify specific projects for which a waiver may be sought. Said amendment will be submitted to the County, Pinelands and/or NJDEP for review in accordance with the regulations.

Mitigation projects within the Pinelands, if proposed, will comply with applicable Pinelands regulations including applicable requirements of Section H, "Exceptions and Mitigation Requirements" of the Township's Pinelands Property Stormwater Ordinance (#2007-17).