

**MUNICIPAL STORMWATER MANAGEMENT PLAN
AND
2005 STORMWATER MANAGEMENT ANNUAL
REPORT**

Prepared for

THE BOROUGH OF PENNINGTON

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INTRODUCTION

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Borough of Pennington to address stormwater related impacts. The creation of this Plan is required by N.J.A.C. 7:14A-25, *Municipal Stormwater Regulations*, and contains 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 acres 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 waterbodies. The 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 Borough Master Plan, and other planning documents to allow for project designs that include low impact development techniques. Due to the Borough’s size, a build-out analysis has not been included in this Plan.

The final component of this plan is a mitigation strategy when a variance or exemption of the design and performance standards is required. 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 non-point 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 management controls addressing 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 C-1) of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion 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 thereby reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities also may compact the soil and diminish its infiltration ability and result in increased volumes and rates of stormwater runoff from a 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 aggravate, existing downstream flooding and erosion problems increasing 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 areas can also decrease opportunities for infiltration that, 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. (See Figure C-1 in appendix)

In addition to runoff peaks, volumes, and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that 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. Development is responsible for removal of 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 Borough of Pennington encompasses approximately 0.96 square miles of land and has approximately 2720 permanent residents. Seasonal population fluctuation is minimal. The Borough is situated in the Northwestern portion of Mercer County and is completely surrounded by the Township of Hopewell. The Borough is bisected by two watersheds one which flows to the Delaware River and the other which flows to the Raritan Bay. Figure C-2 illustrates the waterways in the Borough. Figure C-3 illustrates the Borough's topographic features.

The New Jersey Department of Environmental Protection (NJDEP) has established an Ambient Biomonitoring Network (AMNET) consisting of over 800 sites throughout the State to document the health of the State's waterways. 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. This 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. There are no AMNET sites in the Borough however there are some AMNET sites downstream of the Borough.

There are no major rivers in the Borough; the Borough occupies ground in 2 different sub-watersheds and two major watersheds. The major watershed management areas are the Central Delaware and the Millstone. The two sub-watersheds (HUC-14) are Stony Brook (74d46m dam to / include Baldwins Creek) and Jacobs Creek (below / including Woolsey Brook). The Millstone Watershed and Stony Brook (74d46m dam to / include Baldwins Creek) sub-watershed encompasses most of the Borough.

The Borough of Pennington is almost fully developed. Much of the Borough's land use is designated as urban by the 1995 Land-Use maps. The Borough consists almost entirely of single-family homes with a small central business district

Groundwater recharge areas provide base flow for streams and wetlands, water for vegetation, and drinking water for residents not connected to the municipal source. These special areas can be seen on figure C-4 with corresponding recharge amounts.

DESIGN AND PERFORMANCE STANDARDS

To the extent possible, the Borough of Pennington will adopt the design and performance standards for stormwater management measures as presented in NJAC 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 management rules at NJAC 7:8-5.8 Maintenance Requirements, and language for safety standards consistent with NJAC 7:8-6 Safety Standards for Stormwater Management Basins. The ordinances will be submitted to the county for review and approval by April 1, 2006.

As has previously been discussed with State and County representatives, the Borough has requested and will continue to request relief from certain conditions of the yard waste sections of the general permit.

Borough inspectors will observe construction projects to ensure that the stormwater management measures are constructed and function as designed.

Plan Consistency

The Borough of Pennington is not within a Regional Stormwater Management Planning Area and no TMDLs have been developed for waters within the Borough; therefore, this Plan does not need to be consistent with any Regional Stormwater Management Plan (RSWMP), nor any TMDLs. If any RSWMP or TMDLs are developed in the future, this Municipal Stormwater Management Plan will be updated.

This plan is consistent with the Residential Site Improvement Standards (RSIS) at NJAC 5:21. The Borough of Pennington will utilize the most current update of the RSIS in the stormwater management review of residential areas. This Plan will be updated to be current with any future updates to the RSIS.

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

NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES

The Borough of Pennington has reviewed the Master Plan and Ordinances, and has provided a list of sections in the Borough's 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 by April 1, 2006, (24 months of the effective date of the Stormwater Management Rules). A copy will be sent to the Department of Environmental Protection at the time of submission.

The Pennington Borough Code was reviewed with regard to incorporating non-structural stormwater management strategies. Several changes are necessary to incorporate these strategies. The following ordinances were reviewed and identified as complete, requiring change or introduction into Borough Code.

Ordinance	Changes Necessary
Stormwater Control Ordinance	Currently Does not Exist
Litter Control – Ordinance Chapter 127	Exists will be reviewed fro compliance
Pet Waste – Ordinance Chapter 67, Articles 14 through 18	Complete – No Changes Necessary
Wildlife Feeding	Currently Does not Exist
Yard Waste Collection Ordinance	Currently Does not Exist
Improper Disposal of Waste (Into Storm Sewers)	Currently Does not Exist
Illicit Connection	Currently Does not Exist
Containerized Yard Waste	Currently Does not Exist

LAND USE / BUILD-OUT ANALYSIS

A detailed land use analysis for the Borough of Pennington is not necessary. The Borough's undeveloped land is below the 1 square mile requirement outlined in the regulations. Figure C-5 illustrates the existing land use in the Township based on 1995/1997 GIS information from NJDEP and the HUC14s within the Borough. The Borough zoning map is shown in Figure C-6.

The following table shows the zoning labels used in the Borough.

Zone	Abbreviations
Residence Zone	R-80
Residence Zone	R-100
Apartment Townhouse Residence Zone	R-A
Office Residence Zone	O-R
Town Center Zone	TC
Town Center Buffer Zone	TCB
Highway Business Zone	B-H
Office Building Zone	O-B
Professional Office Zone	P-O
Education Zone	E-1
Education Zone	E-2
Mixed Use Zone 1	MU-1
Mixed Use Zone 2	MU-2
Mixed Use Zone 3	MU-3

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. Listed below 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 this 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 a project that is acceptable to the Borough. More detailed information on projects can be obtained from the Borough Engineer.
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.

The Borough of Pennington may allow a developer to provide funding or partial funding to the Borough for an Environmental Enhancement Project that has been identified in this 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 the long-term maintenance requirements of the mitigation measure.

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