

BOROUGH OF PALMYRA



MUNICIPAL STORMWATER MANAGEMENT PLAN

PREPARED FOR:

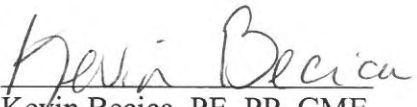
BOROUGH OF PALMYRA
20 West Broad Street
Palmyra, New Jersey 08065

NJPES #NJG 0152757
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Burlington County

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1.0 Introduction

In 1972, Congress amended the Federal Water Pollution Control Act (commonly referred to as the Clean Water Act) to prohibit the discharge of any pollutant to waters of the United States from a point source unless the discharge is authorized by a NPDES permit. This act established the goal of making our nation's waters suitable for: the propagation of fish, aquatic and wildlife; recreational purposes; and the use of these waters for the public water supply, agricultural, industrial and other purposes. The act recognized the damaging effects that unmanaged stormwater can have on these national goals.

In 1987, Congress amended the Clean Water Act to require implementation, in two phases, of a comprehensive national program for addressing storm water discharges. The first phase of the program, commonly referred to as "Phase I" was promulgated on November 16, 1990 and required permits for stormwater discharges from priority sources including municipal separate storm sewer systems generally serving populations of 100,000 or more and several categories of industrial activity, including construction sites that disturbed five or more acres of land.

The second phase of the program, commonly referred to as "Phase II" was promulgated by the Federal government on December 8, 1999 and became effective on February 7, 2000. "Phase II" expanded the program to include discharges from smaller municipalities in urbanized areas and from construction sites that disturbed between one and five acres of land. The federal regulation required the implementation of six minimum measures and best management practices.

As a result of the U.S Environmental Protection Agency Phase II rules, the State of New Jersey Department of Environmental Protection developed the Municipal Stormwater Regulation program. The program addresses pollutants entering waters from storm drain systems owned or operated by local, county, state, interstate or federal agencies. The regulations refer to the storm systems as Municipal Separate Storm Sewer Systems (MS4s). New Jersey Pollutant Discharge Elimination System (NJPDDES) permits have been issued to municipalities throughout the state as well as to public complexes and highway agencies. The Municipal Stormwater Regulation Program is being implemented through four types of NJPDDES Permits, a Tier A Permit, a Tier B Permit, a Public Complex Permit and a Highway Permit.

The Borough of Palmyra is considered a Tier A municipality under the New Jersey Pollution Discharge Elimination System (NJPDES). The regulations for the NJPDES Tier A Permits were issued on February 2, 2004 and became effective March 3, 2004. The Borough of Palmyra was required to submit a Request for Authorization, known as a RFA on March 31, 2004 and the permit authorizations were dated April 1, 2004. April 1, 2004 is known as the effective date of the permit authorization or the EDPA date.

Under Section E.2 of the Tier A NJPDES Permit, the Borough of Palmyra is required to prepare and implement a written stormwater pollution prevention plan within 12 months of the effective date of the permit authorization, or by April 1, 2005. The municipal stormwater pollution prevention plan is abbreviated as the SPPP. The basic SPPP consists of seventeen forms to be completed and implemented by the team members of the pollution prevention team. Maps of the municipality are required to plan the implementation of the pollution prevention plan. The pollution prevention plan for the Borough of Palmyra was completed by April 1, 2005 and a signed and certified copy of the plan is kept on file within the municipality for inspection by NJDEP. The pollution prevention plan forms, maps and lists are a "living document" that will change during the year and will track how the pollution prevention plan is being implemented by the municipality.

Under Section F.3.b.ii of the Tier A NJPDES Permit, the Borough of Palmyra is required to adopt a municipal stormwater management plan in accordance with NJAC 7:8-4 within 12 months of the effective date of the permit authorization, or by April 1, 2005. The municipal stormwater management plan is abbreviated as the MSWMP.

Under Section F.5 of the Tier A NJPDES Permit and as part of the municipal stormwater pollution prevention plan, the Borough of Palmyra must adopt the improper disposal of waste ordinances to prevent pollution from entering the inlets and streams within the municipality by October 1, 2005. These ordinances include pet waste, litter control, improper disposal of waste, wildlife feeding, yard waste, and illicit connection ordinances.

Under Section H.3.a of the Tier A NJPDES Permit, the Borough of Palmyra is required to file an Annual Report and Certification to the New Jersey Department of Environmental Protection on or before May 2, 2005 and every 12 months thereafter. The Annual Report and Certification shall be maintained by

the municipality for a period of five years. The Annual Report and Certification is the only report required to be sent to NJDEP.

Under Section F.3.b.iii of the Tier A NJPDES Permit, municipalities are required to adopt ordinances to implement the municipal stormwater management plan 12 months after the adoption of the municipal stormwater plan. In effect, municipalities have 24 months from the effective date of the permit authorization, or by April 1, 2006 to implement ordinances that set forth exact stormwater management design standards for development and redevelopment.

The municipal plan is required to conform to the regional stormwater management plan and must be reviewed and approved by the County review agency and NJDEP. For the Borough of Palmyra, the municipal stormwater management plan and ordinances must be reviewed and approved by Burlington County. There is no regional stormwater management plans currently established for the Borough to be consistent with.

Subchapter 4 of NJAC 7:8 sets forth the specific requirements of a Municipal Stormwater Management Plan. The more rigorous planning requirements of the municipal stormwater management plan, NJAC 7:8-4.2(c)8 and 9 requiring evaluation of the municipalities entire master plan, official map and development regulations, zoning ordinances, projected land use assuming full development, and future non-point source pollutant load assuming full build out are required for municipalities with more than one square mile of vacant or agricultural land within the municipality. The Borough of Palmyra is exempt from these requirements since there is less than one square mile of vacant or agricultural lands.

Subchapter 5 of NJAC 7:8 sets forth the groundwater recharge, water quantity, and water quality standards (reduction of total suspended solids). If any exceptions are required from the design and performance standards for development projects submitted to the Planning Board, the stormwater management plan identifies mitigation options to offset the exceptions. The Borough of Palmyra has unique characteristics as a river community and the mitigation plan provides the Borough with the power to correct and repair deficiencies that may be creating water quality impairments.

2.0 Overview of Borough of Palmyra Stormwater Management Plan

This Municipal Stormwater Management Plan documents the strategy for the Borough of Palmyra to address stormwater-related impacts. The creation of this plan is required by N.J.A.C. 7:1 4A-25 Municipal Stormwater Regulations. This plan contains all of the elements required as part of the Municipal Tier A MS4 permit as described in N.J.A.C. 7:8 Section 4.2 of the Stormwater Management Rules. The Borough of Palmyra contains 406 acres or 0.63 square miles of wooded, open space and agricultural land based on the Burlington County Data Book 2002. This does not take into account that much of this area is also constrained due to wetlands along the river. Because this is less than the one square mile it meets the conditions of N.J.A.C. 7:8-4.2 (10) and the Borough is requesting an exemption for the completion of elements N.J.A.C. 7:8-4.2 (c) 8 & 9 as part of this Stormwater Management Plan.

An aerial view of the Borough, which illustrates the major waterways, is provided in the Appendix, **Map 1, Existing Conditions**. This Municipal Stormwater Management 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. Note that the definition of major development for the Stormwater Management Plan does not include the increase of impervious area by more than one quarter acre. The implementation of these standards into the Borough of Palmyra Master Plan is intended to minimize the adverse impact of stormwater runoff on water quality and the loss of groundwater recharge that provides baseflow in receiving water bodies. The plan stresses best management practices with long-term operation and maintenance measures for existing and future stormwater facilities that perform well in the soil and water table conditions within the Borough of Palmyra and can be maintained by the Borough Public Works Department.

The Borough of Palmyra Land Use Ordinance has basic requirements in place for regulating stormwater management for non-residential development. Residential development is currently required to conform to the most current stormwater management requirements of N.J.A.C. 7:8 5.4 and 5.5 through conformance to the Residential Site Improvement Standards (RSIS).

For commercial development over one acre in size, the implementation of this plan will have an impact on the site stormwater design by implementing the required conformance to NJAC 7:8. For commercial development of less than one acre, the municipality has the discretion to determine the stormwater management requirements. For non-residential development of less than one acre in size, the stormwater management system will be required to maintain the peak rate of runoff from the 2, 10 and 100 year storm events to be equal or less than the pre-development peak rate of runoff and to attempt to meet the total suspended solid and recharge requirements.

The final component of this plan is a mitigation strategy for when an exemption of the stormwater design and performance standards is sought. As part of the mitigation section of the stormwater plan, specific stormwater management projects within the Borough of Palmyra are identified as alternative projects if a development cannot meet the stormwater design standards. Exemptions are provided to lessen the impact of redevelopment of existing sites within the Borough of Palmyra where the current stormwater standards cannot be imposed due to the lack of open space. Exemptions are not recommended for new development projects.

3.0 Goals

The goals of the Borough of Palmyra Municipal Stormwater Management Plan 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 future 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, a variety of management strategies are proposed for implementation. 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.

4.0 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.

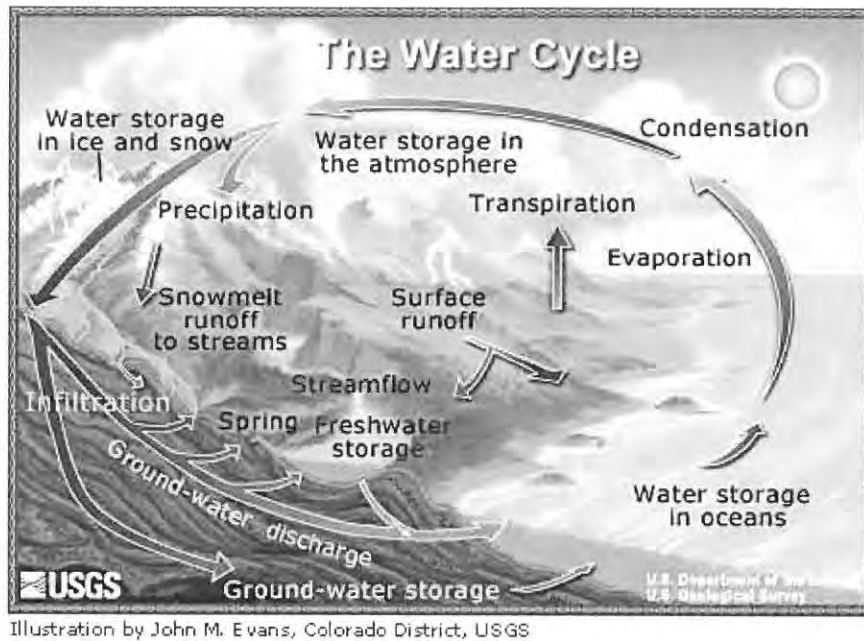


Figure 1. Hydrologic Cycle

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 drainage conditions and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Downstream erosion, sediment deposits can be seen in Photograph 1.



Photograph 1. Sediment Deposits

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.

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. Groundwater recharge and well head protection areas are located on the eastern side of the Borough as shown in the Appendix, on **Map 2, Groundwater Recharge and Wellhead Protection Areas (WPAs)**.

5.0 Borough of Palmyra

5.1 Population and Land Use

The Borough of Palmyra encompasses a 2.39 square mile area on the western side of Burlington County, New Jersey adjacent to the Delaware River. It is an established and relatively completely built out community due to its close to Philadelphia and Trenton. The population of the Borough has fluctuated by only 122 residents or by 1.2% of its total population since 1960. Table 1 below shows the Borough's actual population numbers taken from the Burlington County 2002 Databook. The number of new building permits issued since 1990 has been modest (see Table 2).

Table 1 - Borough of Palmyra Population	
Year	Residents
1960	7,036
1970	6,969
1980	7,085
1990	7,056
2000	7,091

Table 2 - New Residential Building Permits	
Year	Units
1990	31
1991	6
1992	5
1993	0
1994	2
1995	1
1996	1
1997	55
1998	59
1999	71
2000	123
2001	88

However, as of 2003 the Borough hosts a transit stop along the new Camden-Trenton Light Rail Line. The completion of the train line and the Borough's redevelopment efforts will likely create new redevelopment opportunities within the municipality. The Stormwater Management Plan anticipates and plans for this new development activity in order to mitigate any negative effects on the Borough's stormwater, such as increased stormwater runoff volumes and pollutant loads.

The majority of land use within the Borough of Palmyra is urban. Limited areas of forest, barren land and wetlands remain on the west side of the Borough adjacent to the Delaware River. The existing land uses within the Borough of Palmyra can be seen in the Appendix **Map 3, Land Use – Wetlands Designations**.

5.2 Description of Watershed

The Borough of Palmyra is bounded on the southern side by the North Branch of the Pennsauken Creek and to the west by the Delaware River. There are no other streams or creeks of any significance within the Borough itself. The United States Geologic Survey (USGS) uses a 14 digit Hydrologic Unit Code (HUC 14) to delineate and name each sub-watershed with each major watershed area. There are two separate sub-watershed drainage delineations within the Borough of Palmyra as shown in the Appendix on **Map 4, HUC-14 Delineation on USGS Quadrangle Map** essentially splitting the borough in half with one watershed to the north and one to the south. The sub-watersheds are located within Lower Delaware Watershed Management Area 18. The potential flood prone areas and flood prone areas are shown in the Appendix on **Map 5, Flood Prone/Constrained Areas**.

The two HUC-14 sub-watersheds within the Borough of Palmyra are:

- 02040202090030, Pompeston Creek (below Route 130/ Swede to 40d),
- 02040202100060, Pennsauken Creek (below NB / SB)

The HUC-14 mapping indicates that the southern half of the Borough of Palmyra drains to the North Branch of the Pennsauken Creek which then flows into the Delaware River. The northern HUC-14 area which is part of the Pompeston Creek drainage shed is developed and the storm drainage system drains directly to the Delaware River and not actually to the creek.

5.3 State Monitoring System

The NJDEP has established and maintains an Ambient Biomonitoring Network (AMNET) of monitoring sites 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 macro invertebrates by NJDEP on a five-year cycle. Benthic macro invertebrates include aquatic insects, worms, snails, crayfish and clams. Every five years, 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 bioethics related to benthic macroinvertebrate community dynamics. The AMNET sampling serves as an indicator of the stream health, but does not provide any information on the cause of the impairment. There are no AMNET sites within the Borough of Palmyra. The closest AMNET station along the North Branch of the Pennsauken Creek is located in Maple Shade Township at Fork Landing Road. Based on this location though, the North Branch of the Pennsauken Creek is listed as being severely impaired for macro invertebrates. The AMNET information is included in **Attachment 3**.

The total maximum daily load, abbreviated TMDL, is the amount of a pollutant that can be accepted by a water body without exceeding water quality standards or interfering with the ability to use a water body for one or more of its designated uses. A TMDL is a tool used to achieve water quality standards through mathematical analysis of the percent reduction of a pollutant from a particular source needed to meet the concentration specified in the water quality standards. The allowable load is allocated to the various sources of the pollutant, such as stormwater and wastewater discharges, which require a New Jersey Pollutant Discharge Elimination System (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 best management practices or BMPs.

There is a TMDL for fecal coliform along the North Branch of the Pennsauken Creek entitled Total Maximum Daily Load for Fecal Coliform to Address 27 Streams in the Lower Delaware Region dated April 21, 2005. This TMDL has been adopted and much of this MSWMP and the adopted Palmyra Stormwater Pollution Prevention Plan will meet the strategies recommended for reduction of fecal coliform. Specifically in Palmyra's situation the stormwater outfall mapping, illicit connection elimination program and the passage of the pet waste ordinance and wildlife feeding ordinance will meet the strategies identified in the TMDL.

Currently there are two TMDL's established for the Delaware River. One TMDL Report was issued by the NJDEP on September 2003 entitled Total Maximum Daily Loads for Polychlorinated Biphenyls (PCBs) for Zones 2-5 of the Tidal Delaware River as prepared by the Delaware River Basin Commission. The Delaware River Basin Authority has established that the river is above assimilative capacity for trichloroethene (TCE) and 1,2 dichloroethene (1,2 DCE). If numerical allocations are set in the future for these impairments, the Municipal Stormwater Management Plan will be amended to address the impairment and ordinances will be revised to implement the modifications.

This MSWMP will be updated as necessary in the future to incorporate any additional TMDL's that may be adopted not identified above for either the North Branch of the Pennsauken Creek or Delaware River.



Storm Inlet in Conformance with Attachment C of Stormwater Regulations

6.0 Design and Performance Standards

All residential development projects over one acre must meet the requirements of this MSWMP and the implementing ordinance listed in **Attachment 1** in conjunction with the storm water management design and performance standards of N.J.A.C. 7:8 through the State of New Jersey implementation of the Residential Site Improvement Standards. The Residential Site Improvement Standards supersede all Borough of Palmyra Standards and do not have to be adopted by the municipality.

All non-residential development over one acre will be required to conform to the design and performance standards of N.J.A.C. 7:8 through the implementation of the Borough of Palmyra stormwater management plan. The Borough of Palmyra stormwater management ordinance is provided as **Attachment 1**. As required by the New Jersey Department of Environmental Protection, alternative standards such as stormwater management plans from municipalities shall provide at least as much protection from stormwater-related loss of groundwater recharge, stormwater quantity and water quality impacts of major development projects as would be provided under the standards in N.J.A.C. 7:8-5.

Stormwater management facility safety standards are listed under Section 10 of the Borough's ordinance. All projects will be reviewed for compliance with these standards by the Planning Board as part of the approval process.

A maintenance plan submission as stipulated in Section 12 of the Borough's ordinance is required for all projects. This plan not only specifies the operation and maintenance requirements of the stormwater management facilities but also the ownership and record keeping requirements. Borough owned facilities are maintained by the Borough's Department of Public Works. The Borough's Code Enforcement Officer in conjunction with the Director of Public Works are responsible to ensure that privately owned facilities are properly operated and maintained. Penalties for non-compliance are as set forth in Section 13.

For non-residential development of less than one acre, the municipality has the discretion to determine the stormwater management requirements. For commercial development of less than one acre in size, the stormwater management system will be required to maintain the peak rate of runoff from the 2, 10 and 100 year storm events to be equal or less than the pre-development peak rate of runoff and to attempt to meet the total suspended solid and recharge requirements.

The Planning Board reviews development plans to ensure they meet all of the requirements of the Borough's ordinance. In addition all projects are also required to be designed in conformance with the Standards for Soil Erosion and Sediment Control in New Jersey even though a Soil Erosion and Sediment Control Plan Certification is only required for projects that disturb over 5,000 square feet. As part of any approval that may be granted by the Board it is standard procedure to include a condition for all outside agency approvals or permits to be obtained prior to the start of construction. Borough inspectors observe construction of all projects to ensure that they are constructed in accordance with the approved plans and any permits that may have been issued. This includes ensuring that stormwater management facilities are constructed properly and that soil erosion control measures are being maintained. Any deficiencies noted in the field by the Borough's inspector that can not be resolved with the contractor are reported to the appropriate agency, typically the NJDEP Bureau of Enforcement or the Burlington County Soil Conservation District for enforcement.

7.0 Nonstructural Stormwater Management Strategies

The evaluation of the entire master plan (including the land use element), official map and development regulations (including the zoning ordinance) is element 8 of NJAC 7:8-4.2. This evaluation is only required for municipalities with more than one square mile of open space and agricultural land. The Borough of Palmyra contains 406 acres or 0.63 square miles of wooded, open space and agricultural land based on the Burlington County Data Book 2002. This does not take into account that much of the 406 acres is constrained due to wetlands along the river so the actual developable land is much less. Because the developable land is less than the one square mile it meets the conditions of N.J.A.C. 7:8-4.2(c)10 and the Borough is requesting an exemption for the completion of element N.J.A.C. 7:8-4.2(c)8 as part of this Stormwater Management Plan.

8.0 Land Use/Build-Out Analysis

The Land Use/Build-Out Analysis is element 9 of NJAC 7:8-4.2. This analysis is only required for municipalities with more than one square mile of open space and agricultural land. As stated in Section 8 above the Borough has less than one square mile of wooded open space and agricultural land that can be developed. Because the developable land is less than the one square mile it meets the conditions of N.J.A.C. 7:8-4.2(c)10 and the Borough is requesting an exemption for the completion of element N.J.A.C. 7:8-4.2(c)9 as part of this Stormwater Management Plan.

9.0 Mitigation Plan

Exemptions are provided to lessen the impact of redevelopment of existing sites within the Borough of Palmyra where the current stormwater standards cannot be met. Exemptions are not to be granted for new development projects. Exemptions are to be granted only upon the condition that the applicant provides a mitigation project of equal value within the same sub-watershed as delineated by the HUC 14 that do not negatively impact sensitive receptors. Both the Delaware River and the North Branch of the Pennsauken Creek are sensitive receptors within the Borough of Palmyra based upon their TMDL's.

Mitigation Plan project submissions shall include for review:

1. A table to show the required values and the values provided in the project are equivalent
2. An alternatives analysis demonstrating that on-site compliance was maximized.
3. Narrative and supporting information regarding the need for the waiver.
4. Identify the sensitive receptor and demonstrate that the mitigation project contributes to the same sensitive receptor.
5. Design details to include but not be limited to drawings, calculations, and other information needed to evaluate the mitigation project.
6. List the party or parties responsible for the construction and the future operation and maintenance of the mitigation project. Submit ownership documentation or easements as applicable.
7. Maintenance Plan meeting the requirements of Section 12 of the Borough's drainage ordinance.
8. Construction schedule of the mitigation project and development project.

All mitigation projects are to be reviewed and approved by the Borough Engineer subject to all of the requirements of the Stormwater Ordinance. Proposed mitigation projects will be evaluated based on:

1. Project must be within the same area that would contribute to the receptor impacted by the project. If there is no specific sensitive receptor impacted, then the location of the mitigation project can be located anywhere within the Borough, preferably at a location that would provide the most benefit.
2. Legal authorization from the property owner must be obtained to construct the project at the location selected. This includes the maintenance and any access needs for the project in the future.
3. The project should be close to the location of the original project, and if possible, be located upstream at a similar distance from the identified sensitive receptor. This distance should not be based on actual location, but on a similar hydraulic distance to the sensitive receptor.
4. Preference is given to one location that addresses any and all of the performance standards waived, rather than separate locations for each performance standard.
5. The project location must demonstrate no adverse impacts to other properties.

The mitigation projects proposed within the Borough of Palmyra are:

1. Stormwater Outfall Retrofit

Provide Water Quality measures at existing stormwater outfalls within the same HUC14 under the guidance of the Borough Engineer. Review of each outfall condition should be reviewed with the Borough Engineer before selecting one or more of the following options:

- a. Outlet Structure Modifications (i.e.: Replacement of defective or installation of new Tide Gates to control floatable and suspended solids from entering the Borough's storm drainage system from the Delaware River)

- b. Installation of in-line or end-of-pipe Best Management Practice (BMP) as approved by the NJDEP to pretreat stormwater draining into an existing stormwater management basin

2. River Bank Stabilization

River Bank projects meeting the following criteria may be presented for review and approval by the Borough Engineer. Stabilization projects will be reviewed for the following benefits:

- a. Stabilization of eroded river banks where public or private property or structures are threatened.
- b. Reduced sediment deposition in the river.
- c. Improved water quality

3. Stormwater Recharge Systems

Construction of stormwater recharge systems in areas of the Borough with existing drainage problems can be addressed through compliance with the NJAC 7:8 Section 5 under the guidance of the Borough Engineer.

Appendix

Maps 1-7

EXISTING CONDITIONS

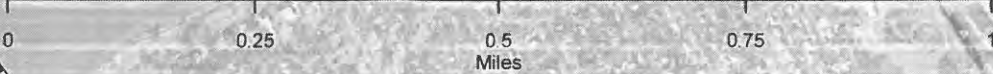


MUNICIPAL STORMWATER MANAGEMENT PLAN
BOROUGH OF PALMYRA
BURLINGTON COUNTY, NEW JERSEY

ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY

SOURCE:
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
EXPLORING NEW JERSEY'S WATERSHEDS
SERIES 2 VOLUME 2

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



1 inch equals 1,000 feet

DELAWARE RIVER

PENNSAUKEN CREEK (NORTH BRANCH)

GROUNDWATER RECHARGE AND WELLHEAD PROTECTION AREAS (WPAs)



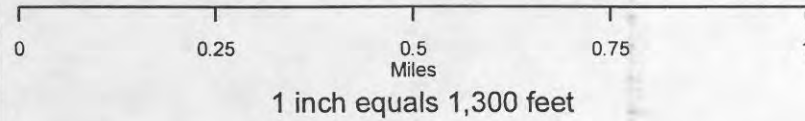
MUNICIPAL STORMWATER MANAGEMENT PLAN BOROUGH OF PALMYRA BURLINGTON COUNTY, NEW JERSEY

ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY

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Legend

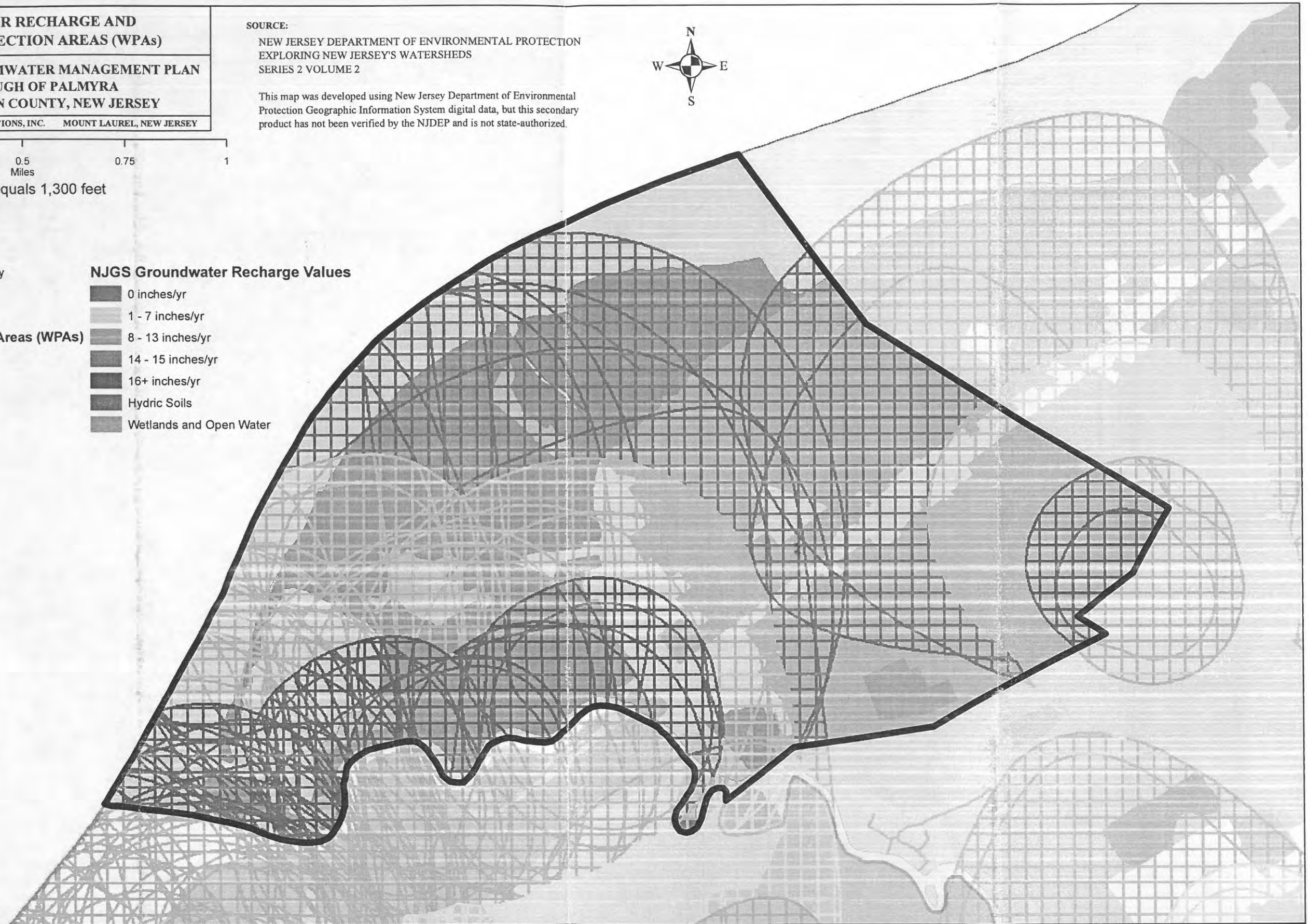
- Municipal Boundary
- Lakes
- Streams

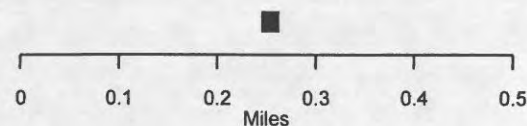
Wellhead Protection Areas (WPAs)

- Tier 1
- Tier 2
- Tier 3

NJGS Groundwater Recharge Values

- 0 inches/yr
- 1 - 7 inches/yr
- 8 - 13 inches/yr
- 14 - 15 inches/yr
- 16+ inches/yr
- Hydric Soils
- Wetlands and Open Water





1 inch equals 1,000 feet

Legend

Municipal Boundary

Streams

LAND USE - 1995

AGRICULTURE

BARREN LAND

FOREST

URBAN

WATER

WETLANDS



SOURCE: NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
EXPLORING NEW JERSEY'S WATERSHEDS
SERIES 2 VOLUME 2

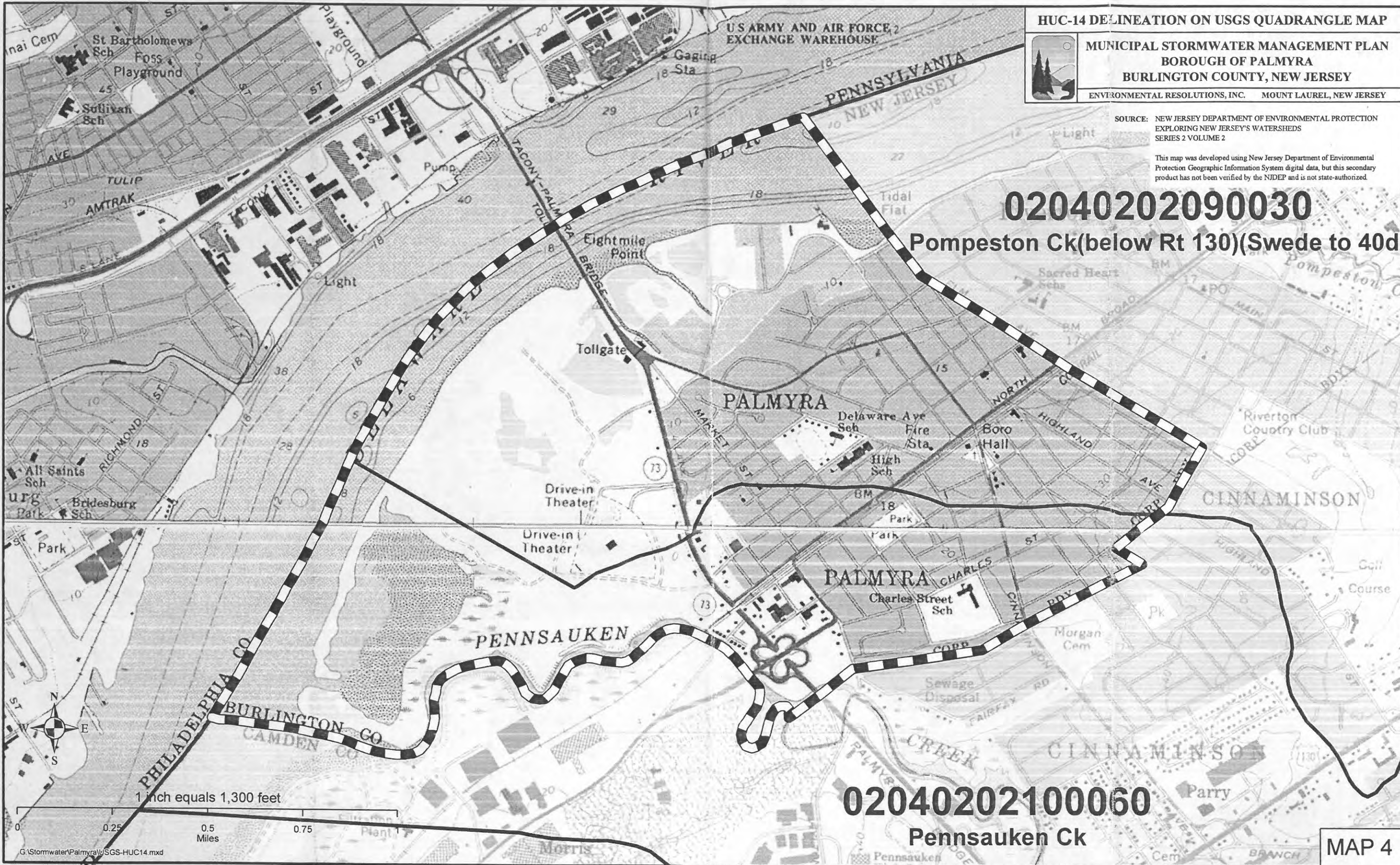
This map was developed using New Jersey Department of Environmental
Protection Geographic Information System digital data, but this secondary
product has not been verified by the NJDEP and is not state-authorized.

LAND USE - WETLANDS DESIGNATIONS



**MUNICIPAL STORMWATER MANAGEMENT PLAN
BOROUGH OF PALMYRA
BURLINGTON COUNTY, NEW JERSEY**

ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY



HUC-14 DELINEATION ON USGS QUADRANGLE MAP

 MUNICIPAL STORMWATER MANAGEMENT PLAN
BOROUGH OF PALMYRA
BURLINGTON COUNTY, NEW JERSEY

ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY

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02040202090030
Pompeston Ck(below Rt 130)(Swede to 40d)

02040202100060
Pennsauken Ck

MAP 4

AMNET & STREAM QUALITY MONITORING STATIONS



MUNICIPAL STORMWATER MANAGEMENT PLAN BOROUGH OF PALMYRA BURLINGTON COUNTY, NEW JERSEY

ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY

SOURCE:
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
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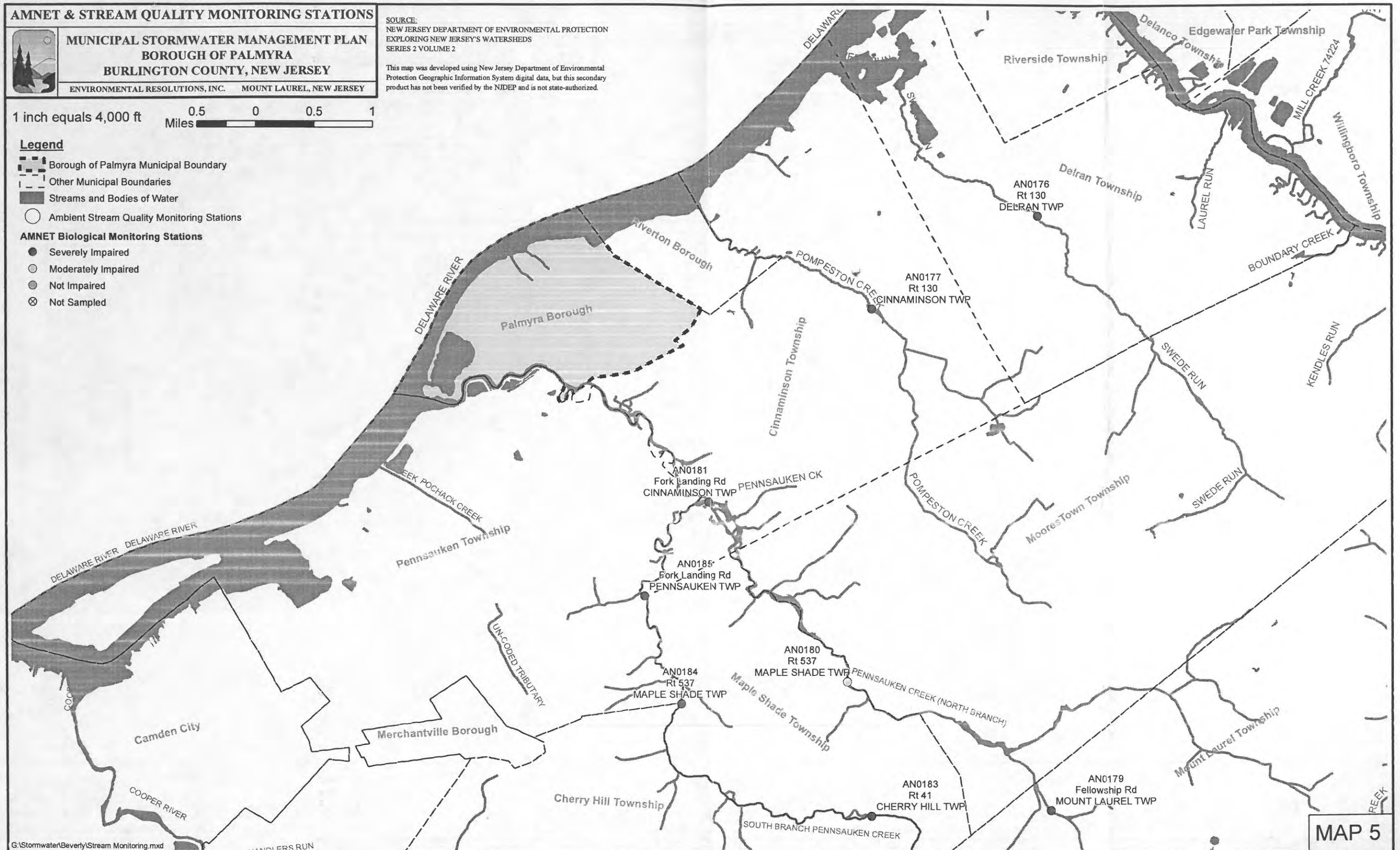
1 inch equals 4,000 ft
Miles 0.5 0 0.5 1

Legend

- Borough of Palmyra Municipal Boundary
- Other Municipal Boundaries
- Streams and Bodies of Water
- Ambient Stream Quality Monitoring Stations

AMNET Biological Monitoring Stations

- Severely Impaired
- Moderately Impaired
- Not Impaired
- Not Sampled



Legend - Soil Types

SSURGO Soil Types

- GabB, Galestown sand, 0 to 5 percent slopes
- GakB, Galloway fine sand, 0 to 5 percent slopes
- MamuAv, Mannington-Nanticoke-Udorthents complex, 0 to 1 percent slopes, very frequentl
- SabB, Sassafras loamy sand, 0 to 5 percent slopes
- URSAAB, Urban land, sandy, 0 to 8 percent slopes
- UddcB, Udorthents, dredged coarse materials, 0 to 8 percent slopes
- UdrB, Udorthents, refuse substratum, 0 to 8 percent slopes
- WATER, Water



SOURCE:
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
EXPLORING NEW JERSEY'S WATERSHEDS
SERIES 2 VOLUME 2

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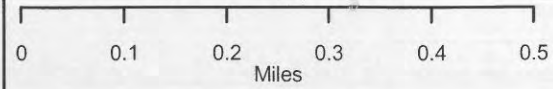
SOIL TYPES

**MUNICIPAL STORMWATER MANAGEMENT PLAN
BOROUGH OF PALMYRA
BURLINGTON COUNTY, NEW JERSEY**

ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY

G:\Stormwater\Palmyra\Soil.mxd

1 inch equals 1,000 feet



Legend

-  Municipal Boundary
-  Flood Plain per Flood Insurance Rate Maps prepared by FEMA
-  Water
-  Not a Floodprone Area
-  Streams



G:\Stormwater\Palmyra\Flood-prone.mxd

FLOOD-PRONE AREAS



**MUNICIPAL STORMWATER MANAGEMENT PLAN
BOROUGH OF PALMYRA
BURLINGTON COUNTY, NEW JERSEY**

ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY

MAP 7

Attachment 1

Borough of Palmyra Stormwater Management Ordinance

Borough of Palmyra Stormwater Ordinance

This ordinance is provided within the Stormwater Management Plan as a requirement of NJAC 7:8-4.1(c)12. This Ordinance may be further revised for the inclusion of specific details, specific mitigation plans and penalties for the Borough of Palmyra. This ordinance does not include a section on fees. The costs of reviewing development applications under this ordinance can be defrayed by fees charged for review of subdivisions and site plans under N.J.S.A. 40:55D-8.b.

Section 1: Scope and Purpose

A. Policy Statement

Flood control, groundwater recharge, and pollutant reduction through nonstructural or low impact techniques shall be explored before relying on structural BMPs. Structural BMPs should be integrated with nonstructural stormwater management strategies and proper maintenance plans. Nonstructural strategies include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site or from being exposed to stormwater. Source control plans should be developed based upon physical site conditions and the origin, nature, and the anticipated quantity or amount of potential pollutants. Multiple stormwater management BMPs may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge.

B. Purpose

It is the purpose of this ordinance to establish minimum stormwater management requirements and controls for "major development," as defined in Section 2.

C. Applicability

1. This ordinance shall be applicable to all site plans and subdivisions for the following major developments that require preliminary or final site plan or subdivision review:
 - a. Non-residential major developments; and
 - b. Aspects of residential major developments that are not pre-empted by the Residential Site Improvement Standards at N.J.A.C. 5:21.
2. This ordinance shall also be applicable to all major developments undertaken by the Borough of Palmyra.
3. This ordinance contains requirements specific to the Borough of Palmyra for site plans and subdivisions of less than one acre in disturbance that require preliminary or final site plan or subdivision review.
4. This ordinance does not apply to single family residential applications that do not meet the definition of major development.

D. Compatibility with Other Permit and Ordinance Requirements

Development approvals issued for subdivisions and site plans pursuant to this ordinance are to be considered an integral part of development approvals under the subdivision and site plan review process and do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance. In their interpretation

Borough of Palmyra Stormwater Ordinance

and application, the provisions of this ordinance shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare. This ordinance is not intended to interfere with, abrogate, or annul any other ordinances, rule or regulation, statute, or other provision of law except that, where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.

Section 2: Definitions

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application. The definitions below are the same as or based on the corresponding definitions in the Stormwater Management Rules at N.J.A.C. 7:8-1.2.

“CAFRA Planning Map” means the geographic depiction of the boundaries for Coastal Planning Areas, CAFRA Centers, CAFRA Cores and CAFRA Nodes pursuant to N.J.A.C. 7:7E-5B.3.

“CAFRA Centers, Cores or Nodes” means those areas within boundaries accepted by the Department pursuant to N.J.A.C. 7:8E-5B.

“Compaction” means the increase in soil bulk density.

“Core” means a pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

“County review agency” means an agency designated by the County Board of Chosen Freeholders to review municipal stormwater management plans and implementing ordinance(s). The county review agency may either be:

A county planning agency; or

A county water resource association created under N.J.S.A 58:16A-55.5, if the ordinance or resolution delegates authority to approve, conditionally approve, or disapprove municipal stormwater management plans and implementing ordinances.

“Department” means the New Jersey Department of Environmental Protection.

“Designated Center” means a State Development and Redevelopment Plan Center as designated by the State Planning Commission such as urban, regional, town, village, or hamlet.

“Design engineer” means a person professionally qualified and duly licensed in New Jersey to perform engineering services that may include, but not necessarily be limited to, development of project requirements, creation and development of project design and preparation of drawings and specifications.

“Development” means the division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, by any person, for which permission is required under the Municipal Land Use Law , N.J.S.A. 40:55D-1 et seq. In the case of development of agricultural lands, development means: any activity that requires a State permit; any activity reviewed by the County Agricultural Board (CAB) and the State Agricultural Development

Borough of Palmyra Stormwater Ordinance

Committee (SADC), and municipal review of any activity not exempted by the Right to Farm Act , N.J.S.A 4:1C-1 et seq.

“Drainage area” means a geographic area within which stormwater, sediments, or dissolved materials drain to a particular receiving waterbody or to a particular point along a receiving waterbody.

“Environmentally critical areas” means an area or feature which is of significant environmental value, including but not limited to: stream corridors; natural heritage priority sites; habitat of endangered or threatened species; large areas of contiguous open space or upland forest; steep slopes; and well head protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the Department’s Landscape Project as approved by the Department’s Endangered and Nongame Species Program.

“Empowerment Neighborhood” means a neighborhood designated by the Urban Coordinating Council “in consultation and conjunction with” the New Jersey Redevelopment Authority pursuant to N.J.S.A 55:19-69.

“Erosion” means the detachment and movement of soil or rock fragments by water, wind, ice or gravity.

“Impervious surface” means a surface that has been covered with a layer of material so that it is highly resistant to infiltration by water.

“Infiltration” is the process by which water seeps into the soil from precipitation.

“Major development” means any “development” that provides for ultimately disturbing one or more acres of land. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

“Municipality” means any city, borough, town, township, or village.

“Node” means an area designated by the State Planning Commission concentrating facilities and activities which are not organized in a compact form.

“Nutrient” means a chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

“Person” means any individual, corporation, company, partnership, firm, association, Borough of Palmyra, or political subdivision of this State subject to municipal jurisdiction pursuant to the Municipal Land Use Law , N.J.S.A. 40:55D-1 et seq.

“Pollutant” means any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.), thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff, or other residue discharged directly or indirectly to the land, ground waters or surface waters of the State, or to a domestic treatment works. “Pollutant” includes both hazardous and nonhazardous pollutants.

“Recharge” means the amount of water from precipitation that infiltrates into the ground and is not evapotranspired.

“Sediment” means solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

“Site” means the lot or lots upon which a major development is to occur or has occurred.

Borough of Palmyra Stormwater Ordinance

“Soil” means all unconsolidated mineral and organic material of any origin.

“State Development and Redevelopment Plan Metropolitan Planning Area (PA1)” means an area delineated on the State Plan Policy Map and adopted by the State Planning Commission that is intended to be the focus for much of the state’s future redevelopment and revitalization efforts.

“State Plan Policy Map” is defined as the geographic application of the State Development and Redevelopment Plan’s goals and statewide policies, and the official map of these goals and policies.

“Stormwater” means water resulting from precipitation (including rain and snow) that runs off the land’s surface, is transmitted to the subsurface, or is captured by separate storm sewers or other sewage or drainage facilities, or conveyed by snow removal equipment.

“Stormwater runoff” means water flow on the surface of the ground or in storm sewers, resulting from precipitation.

“Stormwater management basin” means an excavation or embankment and related areas designed to retain stormwater runoff. A stormwater management basin may either be normally dry (that is, a detention basin or infiltration basin), retain water in a permanent pool (a retention basin), or be planted mainly with wetland vegetation (most constructed stormwater wetlands).

“Stormwater management measure” means any structural or nonstructural strategy, practice, technology, process, program, or other method intended to control or reduce stormwater runoff and associated pollutants, or to induce or control the infiltration or groundwater recharge of stormwater or to eliminate illicit or illegal non-stormwater discharges into stormwater conveyances.

“Tidal Flood Hazard Area” means a flood hazard area, which may be influenced by stormwater runoff from inland areas, but which is primarily caused by the Atlantic Ocean.

“Urban Coordinating Council Empowerment Neighborhood” means a neighborhood given priority access to State resources through the New Jersey Redevelopment Authority.

“Urban Enterprise Zones” means a zone designated by the New Jersey Enterprise Zone Authority pursuant to the New Jersey Urban Enterprise Zones Act, N.J.S.A. 52:27H-60 et. seq.

“Urban Redevelopment Area” is defined as previously developed portions of areas:

- (1) Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1), Designated Centers, Cores or Nodes;
- (2) Designated as CAFRA Centers, Cores or Nodes;
- (3) Designated as Urban Enterprise Zones; and
- (4) Designated as Urban Coordinating Council Empowerment Neighborhoods.

“Waters of the State” means the ocean and its estuaries, all springs, streams, wetlands, and bodies of surface or ground water, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

“Wetlands” or “wetland” means an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

Borough of Palmyra Stormwater Ordinance

Section 3: General Standards

A. Design and Performance Standards for Stormwater Management Measures

1. Stormwater management measures for major development shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards in Section 4. To the maximum extent practicable, these standards shall be met by incorporating nonstructural stormwater management strategies into the design. If these strategies alone are not sufficient to meet these standards, structural stormwater management measures necessary to meet these standards shall be incorporated into the design.
2. The standards in this ordinance apply only to new major development and are intended to minimize the impact of stormwater runoff on water quality and water quantity in receiving water bodies and maintain groundwater recharge. The standards do not apply to new major development to the extent that alternative design and performance standards are applicable under a regional stormwater management plan or Water Quality Management Plan adopted in accordance with Department rules.

Section 4: Stormwater Management Requirements for Major Development

- A. The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with Section 10.
- B. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department's Landscape Project or Natural Heritage Database established under N.J.S.A. 13:1B-15.147 through 15.150, particularly *Helonias bullata* (swamp pink) and/or *Clemmys muhlnebergi* (bog turtle).
- C. The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Sections 4.F and 4.G:
 1. The construction of an underground utility line provided that the disturbed areas are revegetated upon completion;
 2. The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable; and
 3. The construction of a public pedestrian access, such as a sidewalk or trail with a maximum width of 14 feet, provided that the access is made of permeable material.
- D. A waiver from strict compliance from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Sections 4.F and 4.G may be obtained for the enlargement of an existing public roadway or railroad; or the construction or enlargement of a public pedestrian access, provided that the following conditions are met:
 1. The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;
 2. The applicant demonstrates through an alternatives analysis, that through the use of nonstructural and structural stormwater management strategies and measures, the option selected complies with the requirements of Sections 4.F and 4.G to the maximum extent practicable;

Borough of Palmyra Stormwater Ordinance

3. The applicant demonstrates that, in order to meet the requirements of Sections 4.F and 4.G, existing structures currently in use, such as homes and buildings, would need to be condemned; and
4. The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under D.3 above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of Sections 4.F and 4.G that were not achievable on-site.

E. Nonstructural Stormwater Management Strategies

1. To the maximum extent practicable, the standards in Sections 4.F and 4.G shall be met by incorporating nonstructural stormwater management strategies set forth at Section 4.E into the design. The applicant shall identify the nonstructural measures incorporated into the design of the project. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management measures identified in Paragraph 2 below into the design of a particular project, the applicant shall identify the strategy considered and provide a basis for the contention.
2. Nonstructural stormwater management strategies incorporated into site design shall:
 - a. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
 - b. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;
 - c. Maximize the protection of natural drainage features and vegetation;
 - d. Minimize the decrease in the "time of concentration" from pre-construction to post construction. "Time of concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the watershed to the point of interest within a watershed;
 - e. Minimize land disturbance including clearing and grading;
 - f. Minimize soil compaction;
 - g. Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
 - h. Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas;
 - i. Provide other source controls to prevent or minimize the use or exposure of pollutants at the site, in order to prevent or minimize the release of those pollutants into stormwater runoff. Such source controls include, but are not limited to:
 - (1) Site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Section 4.E.3. below;
 - (2) Site design features that help to prevent discharge of trash and debris from drainage systems;

Borough of Palmyra Stormwater Ordinance

- (3) Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and
 - (4) When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules.
3. Site design features identified under Section 4.E.2.i.(2) above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see Section 4.E.3.c below.
 - a. Design engineers shall use either of the following grates whenever they use a grate in pavement or another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:
 - (1) The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or
 - (2) A different grate, if each individual clear space in that grate has an area of no more than seven (7.0) square inches, or is no greater than 0.5 inches across the smallest dimension.

Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of spacer bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater basin floors.
 - b. Whenever design engineers use a curb-opening inlet, the clear space in that curb opening (or each individual clear space, if the curb opening has two or more clear spaces) shall have an area of no more than seven (7.0) square inches, or be no greater than two (2.0) inches across the smallest dimension. This type of curb opening inlet is only required in areas of the Borough that are outside of the floodplain.
 - c. This standard does not apply:
 - (1) Where the review agency determines that this standard would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets that meet these standards;
 - (2) Where flows from the water quality design storm as specified in Section 4.G.1 are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:
 - (a) A rectangular space four and five-eighths inches long and one and one-half inches wide (this option does not apply for outfall netting facilities); or
 - (b) A bar screen having a bar spacing of 0.5 inches.

Borough of Palmyra Stormwater Ordinance

- (3) Where flows are conveyed through a trash rack that has parallel bars with one-inch (1") spacing between the bars, to the elevation of the water quality design storm as specified in Section 4.G.1;
 - (4) Where the New Jersey Department of Environmental Protection determines, pursuant to the New Jersey Register of Historic Places Rules at N.J.A.C. 7:4-7.2(c), that action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property; or
4. Any land area used as a nonstructural stormwater management measure to meet the performance standards in Sections 4.F and 4.G shall be dedicated to a government agency, subjected to a conservation restriction filed with the appropriate County Clerk's office, or subject to an approved equivalent restriction that ensures that measure or an equivalent stormwater management measure approved by the reviewing agency is maintained in perpetuity.
 5. Guidance for nonstructural stormwater management strategies is available in the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 7, or found on the Department's website at www.njstormwater.org.

F. Erosion Control, Groundwater Recharge and Runoff Quantity Standards

1. This subsection contains minimum design and performance standards to control erosion, encourage and control infiltration and groundwater recharge, and control stormwater runoff quantity impacts of major development.
 - a. The minimum design and performance standards for erosion control are those established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq. and implementing rules.
 - b. The minimum design and performance standards for groundwater recharge are as follows:
 - (1) The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at Section 5, either:
 - (a) Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100 percent of the average annual pre-construction groundwater recharge volume for the site; or
 - (b) Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the 2-year storm is infiltrated.
 - (2) This groundwater recharge requirement does not apply to projects within the "urban redevelopment area," or to projects subject to (3) below. An "Urban Redevelopment Area" is defined as previously developed portions of areas delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1). The entire Borough of Palmyra is located in Metropolitan Planning Area (PA1) on the New Jersey State Plan and Redevelopment Plan Map.

Borough of Palmyra Stormwater Ordinance

- (3) The following types of stormwater shall not be recharged:
- (a) Stormwater from areas of high pollutant loading. High pollutant loading areas are areas in industrial and commercial developments where solvents and/or petroleum products are loaded/unloaded, stored, or applied, areas where pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than "reportable quantities" as defined by the United States Environmental Protection Agency (EPA) at 40 CFR 302.4; areas where recharge would be inconsistent with Department approved remedial action work plan or landfill closure plan and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities; and
 - (b) Industrial stormwater exposed to "source material." "Source material" means any material(s) or machinery, located at an industrial facility, which is directly or indirectly related to process, manufacturing or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to, raw materials; intermediate products; final products; waste materials; by-products; industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.
- (4) The design engineer shall assess the hydraulic impact on the groundwater table and design the site so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonally high water table so as to cause surficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems and other subsurface structures in the vicinity or down gradient of the groundwater recharge area.
- c. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at Section 5, complete one of the following:
- (1) Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the two, 10, and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;
 - (2) Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the two, 10, and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area;
 - (3) Design stormwater management measures so that the post-construction peak runoff rates for the 2, 10 and 100 year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed. The percentages shall not be applied to post-

Borough of Palmyra Stormwater Ordinance

construction stormwater runoff into tidal flood hazard areas if the increased volume of stormwater runoff will not increase flood damages below the point of discharge; or

- (4) In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with (1), (2) and (3) above shall only be applied if the increased volume of stormwater runoff could increase flood damages below the point of discharge.

The applicant shall use the Federal Emergency Management Association (FEMA) maps to determine if the site is located in the tidal flood hazard area within the Borough of Palmyra.

G. Stormwater Runoff Quality Standards

1. Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff by 80 percent of the anticipated load from the developed site, expressed as an annual average. Stormwater management measures shall only be required for water quality control if an additional 1/4 acre of impervious surface is being proposed on a development site. The requirement to reduce TSS does not apply to any stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the New Jersey Pollution Discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A, or in a discharge specifically exempt under a NJPDES permit from this requirement. The water quality design storm is 1.25 inches of rainfall in two hours. Water quality calculations shall take into account the distribution of rain from the water quality design storm, as reflected in Table 1. The calculation of the volume of runoff may take into account the implementation of non-structural and structural stormwater management measures.

Table 1: Water Quality Design Storm Distribution			
Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
0	0.0000	65	0.8917
5	0.0083	70	0.9917
10	0.0166	75	1.0500
15	0.0250	80	1.0840
20	0.0500	85	1.1170
25	0.0750	90	1.1500
30	0.1000	95	1.1750
35	0.1330	100	1.2000
40	0.1660	105	1.2250
45	0.2000	110	1.2334
50	0.2583	115	1.2417
55	0.3583	120	1.2500
60	0.6250		

Borough of Palmyra Stormwater Ordinance

2. For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 7, or found on the Department's website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in Section 7. TSS reduction shall be calculated based on the removal rates for the BMPs in Table 2 below. Alternative removal rates and methods of calculating removal rates may be used if the design engineer provides documentation demonstrating the capability of these alternative rates and methods to the review agency. A copy of any approved alternative rate or method of calculating the removal rate shall be provided to the Department at the following address: Division of Watershed Management, New Jersey Department of Environmental Protection, PO Box 418 Trenton, New Jersey, 08625-0418.
3. If more than one BMP in series is necessary to achieve the required 80 percent TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:

$$R = A + B - (AXB)/100$$

Where

R = total TSS percent load removal from application of both BMPs, and

A = the TSS percent removal rate applicable to the first BMP

B = the TSS percent removal rate applicable to the second BMP

Table 2: TSS Removal Rates for BMPs	
Best Management Practice	TSS Percent Removal Rate
Bioretention Systems	90
Constructed Stormwater Wetland	90
Extended Detention Basin	40-60
Infiltration Structure	80
Manufactured Treatment Device	See Section 6.C
Sand Filter	80
Vegetative Filter Strip	60-80
Wet Pond	50-90

4. If there is more than one onsite drainage area, the 80 percent TSS removal rate shall apply to each drainage area, unless the runoff from the subareas converge on site in which case the removal rate can be demonstrated through a calculation using a weighted average.

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5. Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include nonstructural strategies and structural measures that optimize nutrient removal while still achieving the performance standards in Sections 4.F and 4.G.
6. Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Section 7.
7. In accordance with the definition of FW1 at N.J.A.C. 7:9B-1.4, stormwater management measures shall be designed to prevent any increase in stormwater runoff to waters classified as FW1.
8. Special water resource protection areas shall be established along all waters designated Category One at N.J.A.C. 7:9B, and perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the USGS Quadrangle Maps or in the County Soil Surveys, within the associated HUC14 drainage area. These areas shall be established for the protection of water quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:
 - a. The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:
 - (1) A 300-foot special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the waterway from the top of the bank outwards or from the centerline of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession is provided.
 - (2) Encroachment within the designated special water resource protection area under Subsection (1) above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or maintained lawn area). The encroachment shall only be allowed where applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable. In no case shall the remaining special water resource protection area be reduced to less than 150 feet as measured perpendicular to the top of bank of the waterway or centerline of the waterway where the bank is undefined. All encroachments proposed under this subparagraph shall be subject to review and approval by the Department.
 - b. All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the Standard for Off-Site Stability in the "Standards For Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act , N.J.S.A. 4:24-39 et seq.
 - c. If stormwater discharged outside of and flowing through the special water resource protection area cannot comply with the Standard For Off-Site Stability in the "Standards for Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act , N.J.S.A. 4:24-39 et seq., then the stabilization measures in accordance with the requirements of the above standards may be placed within the special water resource protection area, provided that:

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- (1) Stabilization measures shall not be placed within 150 feet of the Category One waterway;
 - (2) Stormwater associated with discharges allowed by this section shall achieve a 95 percent TSS post-construction removal rate;
 - (3) Temperature shall be addressed to ensure no impact on the receiving waterway;
 - (4) The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable;
 - (5) A conceptual project design meeting shall be held with the appropriate Department staff and Soil Conservation District staff to identify necessary stabilization measures; and
 - (6) All encroachments proposed under this section shall be subject to review and approval by the Department.
- d. A stream corridor protection plan may be developed by a regional stormwater management planning committee as an element of a regional stormwater management plan, or by a municipality through an adopted municipal stormwater management plan. If a stream corridor protection plan for a waterway subject to Section 4.G(8) has been approved by the Department of Environmental Protection, then the provisions of the plan shall be the applicable special water resource protection area requirements for that waterway. A stream corridor protection plan for a waterway subject to G.8 shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in G.8.a.(1) above. In no case shall a stream corridor protection plan allow the reduction of the Special Water Resource Protection Area to less than 150 feet as measured perpendicular to the waterway subject to this subsection.
- e. Paragraph G.8 does not apply to the construction of one individual single family dwelling that is not part of a larger development on a lot receiving preliminary or final subdivision approval on or before February 2, 2004 , provided that the construction begins on or before February 2, 2009.

Section 5: Stormwater Management Requirements for Non-Residential Development of less than one acre.

For non-residential development of less than one acre in size, the stormwater management system will be evaluated by the municipal engineer based on the location of the site in relation to the flood plain and the recharge requirements based on the definition under NJAC 7:8-1.2 of "urban redevelopment area" as a previously developed portion of an area delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1). Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

Section 6: Calculation of Stormwater Runoff and Groundwater Recharge

A. Stormwater runoff shall be calculated in accordance with the following:

1. The design engineer shall calculate runoff using one of the following methods:
 - a. The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in the NRCS

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National Engineering Handbook Section 4 – Hydrology and Technical Release 55 – Urban Hydrology for Small Watersheds; or

- b. The Rational Method for peak flow and the Modified Rational Method for hydrograph computations.
 2. For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the pre-construction condition of a site or portion thereof is a wooded land use with good hydrologic condition. The term “runoff coefficient” applies to both the NRCS methodology at Section 5.A.1.a and the Rational and Modified Rational Methods at Section 5.A.1.b. A runoff coefficient or a groundwater recharge land cover for an existing condition may be used on all or a portion of the site if the design engineer verifies that the hydrologic condition has existed on the site or portion of the site for at least five years without interruption prior to the time of application. If more than one land cover have existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations. In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is pasture, lawn, or park), with good cover (if the land use type is woods), or with good hydrologic condition and conservation treatment (if the land use type is cultivation).
 3. In computing pre-construction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts, which may reduce pre-construction stormwater runoff rates and volumes.
 4. In computing stormwater runoff from all design storms, the design engineer shall consider the relative stormwater runoff rates and/or volumes of pervious and impervious surfaces separately to accurately compute the rates and volume of stormwater runoff from the site. To calculate runoff from unconnected impervious cover, urban impervious area modifications as described in the NRCS Technical Release 55 – Urban Hydrology for Small Watersheds and other methods may be employed.
 5. If the invert of the outlet structure of a stormwater management measure is below the flood hazard design flood elevation as defined at N.J.A.C. 7:13, the design engineer shall take into account the effects of tailwater in the design of structural stormwater management measures.
- B. Groundwater recharge may be calculated in accordance with the following:
1. The New Jersey Geological Survey Report GSR-32 A Method for Evaluating Ground-Water Recharge Areas in New Jersey, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual; at <http://www.state.nj.us/dep/njgs/>; or at New Jersey Geological Survey, 29 Arctic Parkway, P.O. Box 427 Trenton, New Jersey 08625-0427; (609) 984-6587.

Section 7: Standards for Structural Stormwater Management Measures

A. Standards for structural stormwater management measures are as follows:

1. Structural stormwater management measures shall be designed to take into account the existing site conditions, including, for example, environmentally critical areas, wetlands; flood-prone

Borough of Palmyra Stormwater Ordinance

areas; slopes; depth to seasonal high water table; soil type, permeability and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone).

2. Structural stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure as appropriate, and shall have parallel bars with one-inch (1") spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than one-third (1/3) the width of the diameter of the orifice or one-third (1/3) the width of the weir, with a minimum spacing between bars of one-inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of Section 10.B.
 3. Structural stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement.
 4. At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half inches in diameter.
 5. Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Section 10.
- B. Stormwater management measure guidelines are available in the New Jersey Stormwater Best Management Practices Manual. Other stormwater management measures may be utilized provided the design engineer demonstrates that the proposed measure and its design will accomplish the required water quantity, groundwater recharge and water quality design and performance standards established by Section 4 of this ordinance.
- C. Manufactured treatment devices may be used to meet the requirements of Section 4 of this ordinance provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.

Section 8: Sources for Technical Guidance

- A. Technical guidance for stormwater management measures can be found in the documents listed at 1 and 2 below, which are available from Maps and Publications, New Jersey Department of Environmental Protection, 428 East State Street, P.O. Box 420, Trenton, New Jersey, 08625; telephone (609) 777-1038.
1. Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended. Information is provided on stormwater management measures such as: bioretention systems, constructed stormwater wetlands, dry wells, extended detention basins, infiltration structures, manufactured treatment devices, pervious paving, sand filters, vegetative filter strips, and wet ponds.
 2. The New Jersey Department of Environmental Protection Stormwater Management Facilities Maintenance Manual, as amended.
- B. Additional technical guidance for stormwater management measures can be obtained from the following:

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1. The "Standards for Soil Erosion and Sediment Control in New Jersey" promulgated by the State Soil Conservation Committee and incorporated into N.J.A.C. 2:90. Copies of these standards may be obtained by contacting the State Soil Conservation Committee or any of the Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey 08625; (609) 292-5540;
2. The Rutgers Cooperative Extension Service, 732-932-9306; and
3. The Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey, 08625, (609) 292-5540.

Section 9: Mitigation Plan

A. Variance or Exemption from Stormwater Design Standards

1. A variance or exemption from the design standards for stormwater management basins may be granted only upon a finding by the Borough of Palmyra Planning Board that the variance or exemption will be mitigated by the construction of a stormwater project of equal construction value within the same subdrainage area (HUC-14).

2. In order to be granted a variance or exemption a development must demonstrate that the design standard cannot be met due to unusual circumstances on the existing property. Variances or exemptions are not recommended for properties that have not been previously developed.

3. In order to be granted a variance or exemption, the applicant will be required to perform a preliminary stormwater management design and cost analysis of the stormwater system that would be required to meet all the stormwater management requirements of NJAC 7:8 Subchapter 5. This analysis will be utilized to determine and select the mitigation project to be constructed by the applicant.

B. Mitigation Projects

Variances or exemptions are to be granted only upon the condition that the applicant provides a mitigation project of equal value within the same sub-watershed as delineated by the HUC 14. All mitigation projects are to be under the review and approval of the Borough Engineer. The mitigation projects proposed within the Borough of Palmyra are:

1. Stormwater Outfall Retrofit

Provide Water Quality measures at existing stormwater outfalls within the same HUC14 under the guidance of the Borough Engineer. Review of each outfall condition should be reviewed with the Borough Engineer before selecting one or more of the following options:

- a. Outlet Structure erosion stabilization
- b. Installation of in-line or end-of-pipe Best Management Practice (BMP) as approved by the NJDEP to pretreat stormwater draining into an existing stormwater management basin

2. River Bank Stabilization

River Bank projects meeting the following criteria may be presented for review and approval by the Borough Engineer. Stabilization projects will be reviewed for the following benefits:

Borough of Palmyra Stormwater Ordinance

- a. Stabilization of eroded river banks where public or private property or structures are threatened.
- b. Reduced sediment deposition in the river.
- c. Improved water quality

3. Stormwater Recharge Systems

- a. Construction of stormwater recharge systems in areas of the Borough with existing drainage problems can be addressed through compliance with the NJAC 7:8 Section 5 under the guidance of the Borough Engineer.

Section 10: Safety Standards for Stormwater Management Basins

A. This section sets forth requirements to protect public safety through the proper design and operation of stormwater management basins. This section applies to any new stormwater management basin.

B. Requirements for Trash Racks, Overflow Grates and Escape Provisions

1. A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures. Trash racks shall be installed at the intake to the outlet from the stormwater management basin to ensure proper functioning of the basin outlets in accordance with the following:
 - a. The trash rack shall have parallel bars, with no greater than six inch spacing between the bars.
 - b. The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure.
 - c. The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack.
 - d. The trash rack shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs/ft sq.
2. An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:
 - a. The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.
 - b. The overflow grate spacing shall be no less than two inches across the smallest dimension.
 - c. The overflow grate shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs./ft sq.
3. For purposes of this paragraph 3, escape provisions means the permanent installation of ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management basins. Stormwater management basins shall include escape provisions as follows:
 - a. If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Section 10.C a free-standing outlet structure may be exempted from this requirement.

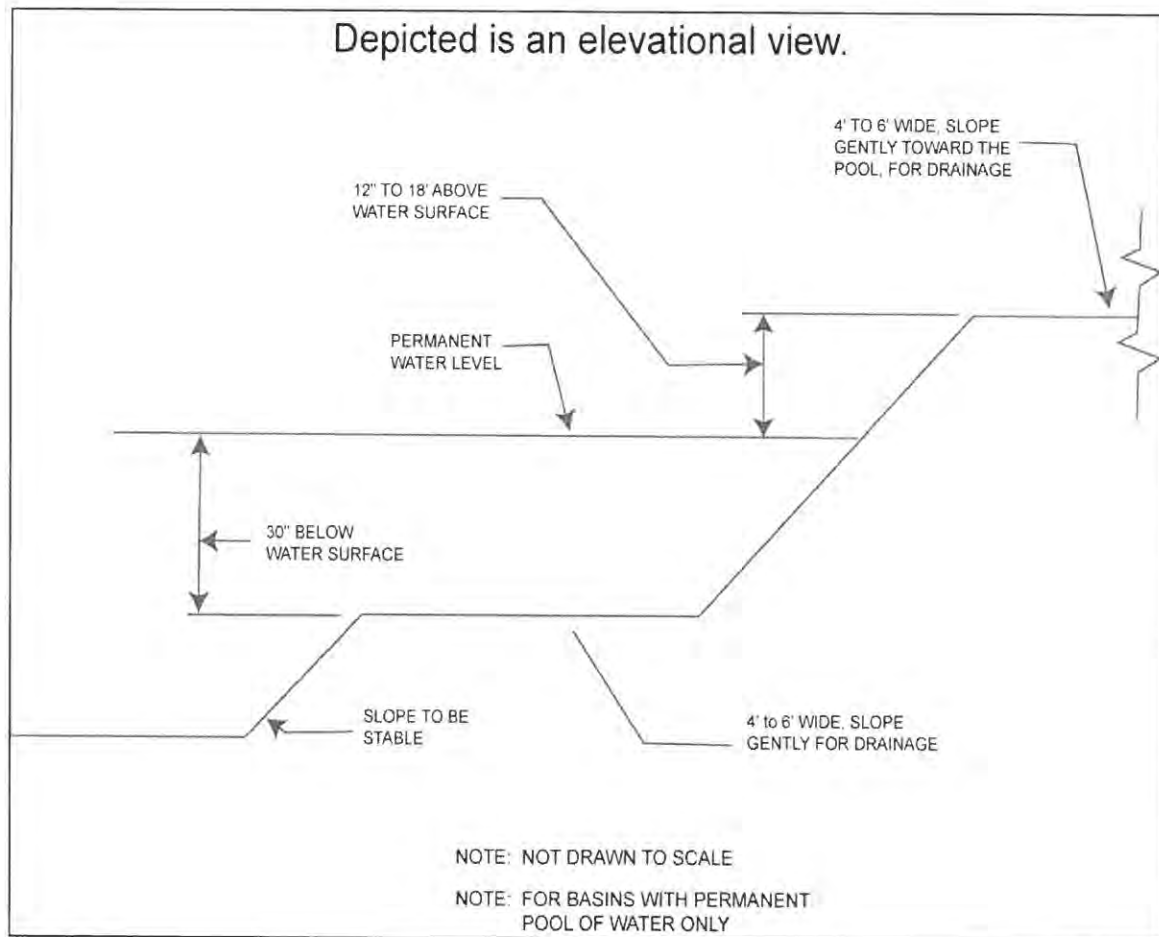
Borough of Palmyra Stormwater Ordinance

- b. Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half feet. Such safety ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall be located approximately two and one-half feet below the permanent water surface, and the second step shall be located one to one and one-half feet above the permanent water surface. See Section 10.D for an illustration of safety ledges in a stormwater management basin.
- c. In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than 3 horizontal to 1 vertical.

C. Variance or Exemption from Safety Standards

- 1. A variance or exemption from the safety standards for stormwater management basins may be granted only upon a written finding by the appropriate reviewing agency (municipality, county or Department) that the variance or exemption will not constitute a threat to public safety.

D. Illustration of Safety Ledges in a New Stormwater Management Basin



Borough of Palmyra Stormwater Ordinance

Section 11: Requirements for a Site Development Stormwater Plan

A. Submission of Site Development Stormwater Plan

1. Whenever an applicant seeks municipal approval of a development subject to this ordinance, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan at Section 11.C below as part of the submission of the applicant's application for subdivision or site plan approval.
2. The applicant shall demonstrate that the project meets the standards set forth in this ordinance.
3. The applicant shall submit 15 copies of the materials listed in the checklist for site development stormwater plans in accordance with Section 11.C of this ordinance.

B. Site Development Stormwater Plan Approval

The applicant's Site Development project shall be reviewed as a part of the subdivision or site plan review process by the municipal board or official from which municipal approval is sought. That municipal board or official shall consult the engineer retained by the Land Use Board to determine if all of the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this ordinance.

C. Checklist Requirements

The following information shall be required:

1. Topographic Base Map

The reviewing engineer may require upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of 200 feet beyond the limits of the proposed development, at a scale of 1"=200' or greater, showing 2-foot contour intervals. The map as appropriate may indicate the following: existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category One waters, wetlands and flood plains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces, existing man-made structures, roads, bearing and distances of property lines, and significant natural and manmade features not otherwise shown.

2. Environmental Site Analysis

A written and graphic description of the natural and man-made features of the site and its environs is required. This description should include a discussion of soil conditions, slopes, wetlands, waterways and vegetation on the site. Particular attention should be given to unique, unusual, or environmentally sensitive features and to those that provide particular opportunities or constraints for development.

3. Project Description and Site Plan(s)

A map (or maps) at the scale of the topographical base map indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural facilities for stormwater management and sediment control, and other permanent structures. The map(s) shall also clearly show areas where alterations occur in the natural terrain and cover, including lawns and other landscaping,

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and seasonal high ground water elevations. A written description of the site plan and justification of proposed changes in natural conditions may also be provided.

4. Land Use Planning and Source Control Plan

This plan shall provide a demonstration of how the goals and standards of Sections 3 through 6 are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater recharge, stormwater quality and stormwater quantity problems at the source by land management and source controls whenever possible.

5. Stormwater Management Facilities Map

The following information, illustrated on a map of the same scale as the topographic base map, shall be included:

- a. Total area to be paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.
- b. Details of all stormwater management facility designs, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention and emergency spillway provisions with maximum discharge capacity of each spillway.

6. Calculations

- a. Comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in Section 4 of this ordinance.
- b. When the proposed stormwater management control measures (e.g., infiltration basins) depends on the hydrologic properties of soils, then a soils report shall be submitted. The soils report shall be based on onsite boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soils present at the location of the control measure.

7. Maintenance and Repair Plan

The design and planning of the stormwater management facility shall meet the maintenance requirements of Section 12.

8. Waiver from Submission Requirements

The municipal official or board reviewing an application under this ordinance may, in consultation with the municipal engineer, waive submission of any of the requirements in Sections 11.C.1 through 11.C.6 of this ordinance when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

Borough of Palmyra Stormwater Ordinance

Section 12: Maintenance and Repair

A. Applicability

1. Projects subject to review as in Section 1.C of this ordinance shall comply with the requirements of Sections 12.B and 12.C.

B. General Maintenance

1. The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.
2. 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). Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual. If the maintenance plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's agreement to assume this responsibility, or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.
3. Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.
4. If the person responsible for maintenance identified under Section 12.B.2 above is not a public agency, the maintenance plan and any future revisions based on Section 12.B.7 below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
5. Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, 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 nonvegetated linings.
6. The person responsible for maintenance identified under Section 12.B.2 above 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.
7. The person responsible for maintenance identified under Section 12.B.2 above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.
8. The person responsible for maintenance identified under Section 12.B.2 above 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 Sections 12.B.6 and 12.B.7 above.

Borough of Palmyra Stormwater Ordinance

9. The requirements of Sections 12.B.3 and 12.B.4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.
 10. 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. Upon receipt of that notice, the responsible person shall have fourteen (14) days to effect maintenance and repair of the facility in a manner that is approved by the municipal engineer or his designee. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. 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.
- B. Nothing in this section shall preclude the municipality in which the major development is located from requiring the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53.

Section 13: Penalties

Any person who erects, constructs, alters, repairs, converts, maintains, or uses any building, structure or land in violation of this ordinance shall be subject to the following penalties: [Palmyra to Specify].

Section 14: Effective Date

This ordinance shall take effect immediately upon the approval by the county review agency, or sixty (60) days from the receipt of the ordinance by the county review agency if the county review agency should fail to act.

Section 15: Severability

If the provisions of any section, subsection, paragraph, subdivision, or clause of this ordinance shall be judged invalid by a court of competent jurisdiction, such order of judgment shall not affect or invalidate the remainder of any section, subsection, paragraph, subdivision, or clause of this ordinance.

**Borough of Palmyra
Summary of Resolution 2006-11**

BOROUGH OF PALMYRA STORMWATER ORDINANCE

Pursuant to N.J.S.A. 7:8-4.1 (c) 12, this Ordinance establishes minimum stormwater management requirements, maintenance measures and controls.

This Ordinance shall apply to major developments that require site plan and/or subdivision approval as follows:

- a) Non-residential major developments
- b) Aspects of residential major developments that are not pre-empted by the Residential Site Improvement Standards

This Ordinance shall not apply to single family residential applications that do not meet the definition of major developments or to new major developments to the extent that alternate design and performance standards apply under a regional Stormwater Management Plan or Water Quality Management Plan.

The Ordinance establishes standards to address the following issues: erosion control, ground water recharge, stormwater runoff quantity and stormwater runoff quality. Technical guidance sources for stormwater management measures are provided.

The Ordinance provides for variances or exemptions from the design standards for stormwater basins upon a finding by the Palmyra Planning Board that the variance or exemption will be mitigated by the construction of a stormwater project of equal construction of a stormwater project of equal construction value within the same sub-drainage are.

There are both structure and non-structure management measures established by this Ordinance.

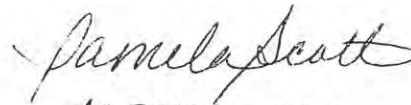
Safety standards are established for the proper design and operation of stormwater management basins.

The technical requirements for a site development stormwater plan are set forth.

Finally, fees, penalties for violation, and the effective date of the Ordinance are specified.

I, Pamela Scott, Acting Clerk in the Borough of Palmyra, county of Burlington, State of New Jersey, do hereby certify the foregoing is a summary of an ordinance introduced by the Borough Council at a regular meeting of said Council held on March 6, 2006. And finally adopted on March 22, 2006 after a public hearing.

(Only the summary was published in the newspaper)


ACTING CLERK

Attachment 2

NJAC 7:8

Subchapter 4

Municipal Stormwater Management Planning

THIS IS A COURTESY COPY OF THIS RULE ADOPTION. THE OFFICIAL VERSION WILL BE PUBLISHED IN THE FEBRUARY 2, 2004 NEW JERSEY REGISTER. SHOULD THERE BE ANY DISCREPANCIES BETWEEN THIS TEXT AND THE OFFICIAL VERSION OF THE ADOPTION, THE OFFICIAL VERSION WILL GOVERN.

3. In accordance with the Residential Site Improvement Standards at N.J.A.C. 5:21-7, if a stormwater management plan for the region has been approved by the Department, stormwater management systems must conform with that plan.

4. The Department shall not issue a permit for a project or activity that conflicts with an Areawide Water Quality Management Plan pursuant to N.J.A.C. 7:15-3.1.

SUBCHAPTER 4. MUNICIPAL STORMWATER MANAGEMENT PLANNING

7:8-4.1 Scope

This subchapter describes stormwater management planning and implementation at the municipal level, including plan elements, county review and technical assistance, the schedule for adoption of the plan and ordinances, and variance or exemption from design and performance standards for stormwater management measures.

7:8-4.2 Municipal stormwater management plan and elements

(a) A municipal stormwater management plan shall address stormwater-related water quality, groundwater recharge and water quantity impacts of major development, and may also address stormwater-related water quality, water quantity and groundwater recharge impacts of existing land uses. For purposes of this subchapter, major development is limited to projects that ultimately disturb one or more acres of land.

(b) A municipal stormwater management plan and stormwater control ordinance(s) shall conform with applicable regional stormwater management plan(s).

(c) A municipal stormwater management plan shall, at a minimum:

1. Describe how the municipal stormwater management plan will achieve the goals of stormwater management planning set forth at N.J.A.C. 7:8-2.3;

2. Include maps showing water bodies based on Soil Surveys published by the U.S. Department of Agriculture; the U.S. Geological Survey Topographic Map, 7.5 minute quadrangle series; or other sources of information depicting water bodies in similar or greater detail;

3. Map groundwater recharge areas and well head protection areas based on maps prepared by the Department under N.J.S.A. 58:11A-13 or a municipal ordinance;

4. Describe how the municipal stormwater management plan incorporates design and performance standards in N.J.A.C.7: 8-5 or alternative design and performance standards adopted as a part of a regional stormwater management plan or water quality management plan;

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5. Describe how adequate long-term operation as well as preventative and corrective maintenance (including replacement) of the selected stormwater management measures will be ensured;
6. Describe how the plan will ensure compliance with Safety Standards for Stormwater Management Basins at N.J.A.C. 7:8-6;
7. Describe how the municipal stormwater management plan is coordinated with the appropriate Soil Conservation District and any other stormwater management plans, including any adopted regional stormwater management plan, prepared by any stormwater management planning agency related to the river basins or drainage areas to which the plans and/or ordinances apply;
8. Evaluate the extent to which the municipality's entire master plan (including the land use plan element), official map and development regulations (including the zoning ordinance) implement the principles expressed in N.J.A.C. 7:8-5.3(b). This evaluation shall also be included (with updating as appropriate) in the reexamination report adopted under N.J.S.A. 40:55D-89;
9. Include a map of the municipality showing:
 - i. Projected land uses assuming full development under existing zoning, and
 - ii. The hydrologic unit code 14 (HUC14) drainage areas as defined by the United States Geological Survey; and an estimate, for each HUC14 drainage area, of the total acreage in the municipality of impervious surface and associated future nonpoint source pollutant load assuming full build out of the projected land uses.
10. At the option of the municipality, document that it has a combined total of less than one square mile of vacant or agricultural lands rather than provide the information required in (c)8 and 9 above. Agricultural lands may be excluded if the development rights to these lands have been permanently purchased or restricted by covenant, easement or deed. Vacant or agricultural lands in environmentally constrained areas may be excluded if the documentation also includes an overlay map of these areas at the same scale as the map under (c)10i below.
 - i. Documentation shall include an existing land use map at an appropriate scale to display the land uses of each parcel within the municipality. Such a map shall display the following land uses: residential (which may be divided into single family, two-to-four family, and other multi-family), commercial, industrial, agricultural, parkland, other public uses, semipublic uses, and vacant land;

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11. In order to grant a variance or exemption from the design and performance standards in N.J.A.C. 7:8-5, include a mitigation plan that identifies what measures are necessary to offset the deficit created by granting the variance or exemption. The mitigation plan shall ensure that mitigation is completed within the drainage area and for the performance standard for which the variance or exemption was granted;

12. Include a copy of the recommended implementing stormwater control ordinance(s) requiring stormwater management measures, and

13. The municipal stormwater management plan may also include a stream corridor protection plan to address protection of areas adjacent to waterbodies. For waterbodies subject to N.J.A.C. 7:8-5.5(h), the plan shall provide, at a minimum, protections equivalent to those provided at N.J.A.C. 7:8-5.5(h) and be approved by the Department.

7:8-4.3 Schedule for adoption of municipal stormwater management plan and ordinances

(a) A municipality shall adopt a municipal stormwater management plan as an integral part of its master plan and official map in accordance with the schedule in (a)1 or 2 below, whichever is sooner. The requirements in N.J.A.C. 7:8-4.2(c)8 and 9 are not operative until February 2, 2006.

1. By the deadline established in a New Jersey Pollutant Discharge Elimination System permit obtained by the municipality for a municipal separate storm sewer system under N.J.A.C. 7:14A; or

2. By the next reexamination of the master plan under N.J.S.A. 40:55D-89, if a grant for 90 percent of the costs for the preparation of the municipal stormwater management plan has been made available to a municipality by the Department;

(b) Within one year after the municipality adopts the municipal stormwater management plan, the municipality shall adopt stormwater control ordinance(s) to implement the adopted plan and shall submit the adopted municipal stormwater management plan and ordinance(s) to the county review agency for approval. The adopted municipal stormwater management plan and ordinance(s) shall not take effect without approval by the county review agency.

(c) The municipality shall amend the municipal stormwater management plan and stormwater control ordinance(s) as necessary and submit the amended plan and amended ordinance(s) to the county review agency for approval.

(d) The municipality shall reexamine the municipal stormwater management plan at each reexamination of the municipality's master plan in accordance with N.J.S.A. 40:55D-89.

Attachment 3

New Jersey AMNET

Round 2 Data

North Branch of Pennsauken Creek

AN0304	Papakating Ck	Rt 565 & Pelltown Rd	Frankford Twp	Sussex	6/16/1998	12	Moderate	122	Suboptimal
AN0305	W Br Papakating Ck	Rt 519 & Rt 628	Wantage Twp	Sussex	6/16/1998	27	Non-Impaired	184	Optimal
AN0306	W Br Papakating Ck	Rt 565	Wantage Twp	Sussex	6/16/1998	21	Moderate	190	Optimal
AN0307	Papakating Ck	Rt 565	Wantage Twp	Sussex	6/10/1998	18	Moderate	90	Marginal
AN0308	UNT to Clove Bk	Rose Marrow Ave nr Rt 651	Wantage Twp	Sussex	6/17/1998	18	Moderate	167	Optimal
AN0309	Clove Bk	Loomis Ave	Sussex Boro	Sussex	6/10/1998	15	Moderate	113	Suboptimal
AN0309A	Clove Bk	Unionville Rd	Wantage Twp	Sussex	6/17/1998	30	Non-Impaired	196	Optimal

Lower Delaware Basin - Round 2 Data

Station	Waterbody	Location	Municipality	County	Sample Date	NJIS	Impairment	Habitat Score	Habitat Rating
AN0119	Jumping Bk	Bunting Bridge Rd	North Hanover Twp	Burlington	1/11/2001	18	Moderate	156	Suboptimal
AN0119A	South Run	Browns Mills-Cookstown Rd	New Hanover Twp	Burlington	2/13/2001	3	Severe	117	Suboptimal
AN0120	North Run	Main St	North Hanover Twp	Burlington	1/11/2001	12	Moderate	120	Suboptimal
AN0121	Crosswicks Ck	Rt 537	Plumsted Twp	Ocean	1/11/2001	21	Moderate	150	Suboptimal
AN0122	Lahaway Ck	Rt 537 outlt of Prospertown Lk	Upper Freehold Twp	Monmouth	1/9/2001	6	Severe	115	Suboptimal
AN0123	Ivanhoe Bk	Millers Mill Rd	Upper Freehold Twp	Monmouth	1/9/2001	9	Moderate	148	Suboptimal
AN0124	Lahaway Ck	New Egypt-Allentown Rd (Holms Mill Rd CR27)	Upper Freehold Twp	Monmouth	1/9/2001	21	Moderate	147	Suboptimal
AN0125	Crosswicks Ck	Extonville Rd USGS Gauge	Chesterfield Twp	Burlington & Mercer	1/17/2001	15	Moderate	118	Suboptimal
AN0125B	Miry Run	Holmes Mill Rd	Upper Freehold Twp	Monmouth	2/15/2001	21	Moderate	125	Suboptimal
AN0126	Crosswicks Ck	Main St	Chesterfield Twp	Burlington & Mercer	1/10/2001	21	Moderate	125	Suboptimal
AN0126A	UNT to Crosswicks Ck	Iron Bridge Rd	Chesterfield Twp	Burlington	2/15/2001	9	Moderate	125	Suboptimal
AN0126B	Pleasant Run	Extonville Rd	Hamilton Twp	Mercer	2/15/2001	12	Moderate	138	Suboptimal
AN0127	Doctors Ck	Rt 526 Red Valley Rd outlet of Red Valley Lk	Upper Freehold Twp	Monmouth	1/9/2001	15	Moderate	131	Suboptimal
AN0128	Negro Run	Red Valley Rd	Allentown Boro	Monmouth	1/10/2001	15	Moderate	145	Suboptimal
AN0129	Doctors Ck	Breza Rd	Allentown Boro	Monmouth	1/9/2001	15	Moderate	123	Suboptimal
AN0130	Doctors Ck	Rt 130	Hamilton Twp	Mercer	1/10/2001	21	Moderate	137	Suboptimal
AN0131	Crosswicks Ck	Point Breeze	Bordentown Twp	Burlington & Mercer	5/23/2001	9	Moderate	166	Optimal
AN0131A	Back Ck	Yardville-Hamilton Square Rd	Hamilton Twp	Mercer	2/15/2001	18	Moderate	155	Suboptimal
AN0132	Blacks Ck	Chesterfield-Georgetown Rd	Chesterfield Twp	Burlington	1/16/2001	15	Moderate	145	Suboptimal
AN0133	Bacons Run	White Pine Rd nr Kuser Pond	Chesterfield Twp	Burlington	1/16/2001	12	Moderate	129	Suboptimal
AN0134	Blacks Ck	Rt 130	Bordentown	Burlington	1/10/2001	15	Moderate	138	Suboptimal
AN0135	Crafts Ck	Gaunts Bridge Rd	Mansfield Twp	Burlington	1/16/2001	12	Moderate	101	Marginal
AN0136	Crafts Ck	Island Rd	Mansfield Twp	Burlington	1/16/2001	12	Moderate	125	Suboptimal

AN0137	Crafts Ck	Old York Rd	Florence Twp	Burlington	1/17/2001	27	Non-Impaired	122	Suboptimal
AN0138	Assiscunk Ck	Columbus-Georgetown Rd	Mansfield Twp	Burlington	1/16/2001	15	Moderate	106	Marginal
AN0139	Annaricken Bk	Island Rd	Springfield Twp	Burlington	1/16/2001	18	Moderate	120	Suboptimal
AN0140	North Br Barkers Bk	Georgetown-Juliestown Rd	Springfield Twp	Burlington	1/17/2001	6	Severe	109	Marginal
AN0141	Assiscunk Ck	Jacksonville Rd	Springfield Twp	Burlington	1/17/2001	21	Moderate	152	Suboptimal
AN0141O	Barkers Bk	Jacksonville-Smithville Rd	Springfield Twp	Burlington	2/20/2001	24	Non-Impaired	139	Suboptimal
AN0142	Assiscunk Ck	Neck Rd Skeales	Burlington Twp	Burlington	5/23/2001	9	Moderate	158	Suboptimal
AN0142C	UNT to Assiscunk Ck	Oxmead Rd	Burlington Twp	Burlington	2/20/2001	15	Moderate	132	Suboptimal
AN0143	North Br Rancocas Ck	outlet of Hanover Lk	Pemberton Twp	Burlington	2/13/2001	27	Non-Impaired	159	Suboptimal
AN0144	Pole Bridge Br	Split Rock Rd; Off Country Lk	Pemberton Twp	Burlington	2/8/2001	9	Moderate	163	Optimal
AN0145	Mt Misery Bk	Rt 70	Pemberton Twp	Burlington	2/8/2001	30	Non-Impaired	181	Optimal
AN0146	McDonalds Br	Lebanon St For (Butterworth Rd) USGS Gauge	Woodland Twp	Burlington	12/13/2000	24	Non-Impaired	173	Optimal
AN0147	Bisphams Mill Ck	Turkey Buzzard Bridge Rd	Pemberton Twp	Burlington	2/8/2001	24	Non-Impaired	182	Optimal
AN0148	Greenwood Br	New Lisbon Rd	Pemberton Twp	Burlington	2/7/2001	18	Moderate	166	Optimal
AN0149	North Br Rancocas Ck	Main St	Pemberton	Burlington	1/11/2001	24	Non-Impaired	168	Optimal
AN0149A	Ong Run	West Lakeshore Dr.	Pemberton Twp	Burlington	2/13/2001	21	Moderate	148	Suboptimal
AN0149B	Jacks Run	Range Rd	New Hanover Twp	Burlington	2/13/2001	12	Moderate	148	Suboptimal
AN0150	Budds Run	Hanover St (Main St)	Pemberton	Burlington	2/8/2001	21	Moderate	150	Suboptimal
AN0151	North Br Rancocas Ck	Iron Works Park (upstream of dam)	Mount Holly Twp	Burlington	5/3/2001	15	Moderate	126	Suboptimal
AN0151A	Indian Run	Birmingham Rd	Pemberton Twp	Burlington	2/7/2001	18	Moderate	142	Suboptimal
AN0152	Friendship Ck	Friendship Rd (Powell Place Rd)	Tabernacle Twp	Burlington	3/15/2001	21	Moderate	173	Optimal
AN0153	Burrs Mill Bk	Sooy Place/Hedgerhouse Rd	Woodland Twp	Burlington	3/15/2001	6	Severe	164	Optimal
AN0154	Burrs Mill Bk	Sooy Place Rd Off Rt 70	Pemberton Twp	Burlington	3/15/2001	15	Moderate	171	Optimal
AN0155	Friendship Ck	Retreat Rd	Southampton Twp	Burlington	3/15/2001	24	Non-Impaired	159	Suboptimal
AN0156	South Br Rancocas Ck	Ridge Rd(Buddtown-Beaverville Rd)	Southampton Twp	Burlington	3/15/2001	18	Moderate	158	Suboptimal
AN0157	Jade Run	A Farm Rd off Rt 206 past Jade Run Sod Frn	Southampton Twp	Burlington	3/8/2001	18	Moderate	177	Optimal
AN0157A	Jade Run	Stockton Bridge Rd	Pemberton Twp	Burlington	2/8/2001	3	Severe	173	Optimal
AN0158	Little Ck	Rt 70	Medford Twp	Burlington	3/8/2001	30	Non-Impaired	178	Optimal

AN0159	Bear Swamp River	Rt 70		Medford Twp	Burlington	3/8/2001	18	Moderate	158	Suboptimal
AN0160	Little Ck	Eayrestown Rd		Lumberton Twp	Burlington	3/8/2001	21	Moderate	132	Suboptimal
AN0161	South Br Rancocas Ck	Mt Holly-Eayrestown Rd		Lumberton Twp	Burlington	4/12/2001	18	Moderate	185	Optimal
AN0162	Southwest Br Rancocas Ck	Elmwood Rd Next to S T P		Evesham Twp	Burlington	4/5/2001	12	Moderate	107	Marginal
AN0163	UNT to Barton Run	Braddock Mill Rd & Rt 73 Oult of Kresson Lk		Voorhees Twp	Camden	4/5/2001	18	Moderate	134	Suboptimal
AN0164	Black Run	Kettle Run Rd Pipe		Evesham Twp	Burlington	4/5/2001	27	Non-Impaired	180	Optimal
AN0165	UNT to Black Run	Braddock Mill Rd		Evesham Twp	Burlington	4/5/2001	12	Moderate	159	Suboptimal
AN0166	Barton Run	Tuckerton Rd & Christopher Mill Rd		Medford Twp	Burlington	4/5/2001	24	Non-Impaired	133	Suboptimal
AN0167	Kettle Run	Hopewell Rd Oult of Marlton Lk		Evesham Twp	Burlington	4/3/2001	18	Moderate	135	Suboptimal
AN0168	Haynes Ck	Himmelein Rd		Medford Twp	Burlington	4/5/2001	21	Moderate	148	Suboptimal
AN0169	Southwest Br Rancocas Ck (Haynes Ck)			Medford Twp	Burlington	4/12/2001	21	Moderate	143	Suboptimal
AN0170	Sharps Run	Rt 70		Medford Twp	Burlington	4/12/2001	18	Moderate	170	Optimal
AN0171	Bobbys Run	Newbolds Corner Rd (Landing St)		Lumberton Twp	Burlington	4/12/2001	9	Moderate	158	Suboptimal
AN0171A	Bobbys Run	Smithville Rd		Mt Holly	Burlington	4/17/2001	9	Moderate	120	Suboptimal
AN0172	UNT to Masons Ck	Ark Rd nr. Fenimore Rd		Lumberton Twp	Burlington	4/10/2001	9	Moderate	129	Suboptimal
AN0173	Masons Ck	Rt 38		Hainesport Twp	Burlington	4/10/2001	15	Moderate	121	Suboptimal
AN0174	Parkers Ck	Creek Rd		Mt Laurel Twp	Burlington	4/26/2001	9	Moderate	128	Suboptimal
AN0175	Mill Ck	Levitt Pkwy		Willingboro Twp	Burlington	1/17/2001	9	Moderate	111	Suboptimal
AN0176	Swedes Run	Rt 130		Delran Twp	Burlington	4/10/2001	3	Severe	78	Marginal
AN0176R	Rancocas Ck	just upstream of Turnpike Bridge		Mt Laurel Twp	Burlington	4/19/2001	3	Severe	172	Optimal
AN0176S	S Br Rancocas Ck	Rt 38		Hainesport Twp	Burlington	4/19/2001	3	Severe	115	Suboptimal
AN0177	Pompeston Ck	Rt 130		Cinnaminson Twp	Burlington	4/10/2001	6	Severe	104	Marginal
AN0178	North Br Pennsauken Ck	Church Rd		Mt Laurel Twp	Burlington	3/1/2001	6	Severe	127	Suboptimal
AN0179	North Br Pennsauken Ck	Fellowship Rd nr I-295		Mt Laurel Twp	Burlington	3/8/2001	3	Severe	88	Marginal
AN0180	North Br Pennsauken Ck	Rt 537		Maple Shade Twp	Burlington	3/1/2001	9	Moderate	93	Marginal
AN0181	North Br Pennsauken Ck	Fork Landing Rd		Maple Shade Twp	Burlington	3/1/2001	0	Severe	97	Marginal
AN0182	South Br Pennsauken Ck	Greentree Rd		Cherry Hill Twp	Camden & Burlington	3/8/2001	12	Moderate	111	Suboptimal
AN0183	South Br Pennsauken Ck	Rt 41		Maple Shade Twp	Burlington & Camden	3/1/2001	6	Severe	81	Marginal

AN0184	South Br Pennsauken Ck	Rt 537		Maple Shade Twp	Burlington & Camden	3/1/2001	6 Severe	84	Marginal
AN0185	South Br Pennsauken Ck	Park Ave		Pennsauken Twp	Camden & Burlington	3/1/2001	0 Severe	86	Marginal
AN0186	North Br Cooper River	Kresson Rd		Voorhees Twp	Camden	4/5/2001	9 Moderate	139	Suboptimal
AN0187	North Br Cooper River	Springdale Rd		Cherry Hill Twp	Camden	4/10/2001	9 Moderate	116	Suboptimal
AN0188	North Br Cooper River	River Dr Penny Packer Pk		Cherry Hill Twp	Camden	4/3/2001	9 Moderate	100	Marginal
AN0189	South Br Cooper River	Gibbsboro Rd		Gibbsboro Boro	Camden	4/3/2001	6 Severe	120	Suboptimal
AN0190	South Br Cooper River	Evesham Rd		Magnolia Boro	Camden	4/3/2001	18 Moderate	102	Marginal
AN0191	South Br Cooper River	Rt 41 USGS Gauge at Foot Br nr Dam		Cherry Hill Twp	Camden	4/3/2001	12 Moderate	104	Marginal
AN0653	Newton Ck	Rt 168		Haddon Twp	Camden	7/6/2000	9 Moderate	117	Suboptimal
AN0654	S Br Newton Ck	Rt 168		Mt Ephraim Boro	Camden	7/6/2000	12 Moderate	115	Suboptimal
AN0655	UNT to Stone Bridge Br	Waddell Farm		Gloucester Twp	Camden	7/6/2000	9999 not sampled		
AN0656	UNT to S Br Big Timber Ck (Turners Run)	Ganttown Rd		Washington Twp	Gloucester	7/18/2000	15 Moderate	153	Suboptimal
AN0657	UNT to S Br Big Timber Ck (Turners Run)	Grenloch Terrace (last bridge)		Washington Twp	Gloucester	7/18/2000	9 Moderate	129	Suboptimal
AN0658	S Br Big Timber Ck	Turnersville-Sicklerville Rd		Washington Twp	Gloucester	7/18/2000	21 Moderate	160	Optimal
AN0659	S Br Big Timber Ck	Almonesson Rd		Gloucester Twp	Camden	7/18/2000	9 Moderate	135	Suboptimal
AN0660	Pines Run	Lower Landing Rd		Gloucester Twp	Camden	7/6/2000	9 Moderate	137	Suboptimal
AN0661	N Br Big Timber Ck	W Park Ave		Lindenwold Boro	Camden	7/25/2000	9 Moderate	112	Suboptimal
AN0662	Mason Run	Chews Landing Rd		Lindenwold Boro	Camden	7/25/2000	15 Moderate	142	Suboptimal
AN0663	N Br Big Timber Ck	Rt 168		Gloucester Twp	Camden	7/6/2000	12 Moderate	151	Suboptimal
AN0664	Big Timber Ck	Clements Bridge Rd (Rt 41)		Runnemede Boro	Camden	7/6/2000	9 Moderate	117	Suboptimal
AN0665	Almonesson Ck	Clements Bridge Rd (Rt 544)		Deptford Twp	Gloucester	7/18/2000	6 Severe	123	Suboptimal
AN0666	Little Timber Ck	Devon Rd		Bellmawr Boro	Camden	7/6/2000	12 Moderate	118	Suboptimal
AN0667	Woodbury Ck	Woodbury Ck Park (downstream of Rt 45)		Woodbury	Gloucester	7/21/2000	9 Moderate	118	Suboptimal
AN0668	Mantua Ck	Greentree Rd		Washington Twp	Gloucester	7/21/2000	24 Non-Impaired	176	Optimal
AN0669	Mantua Ck	Lambs Rd		Mantua Twp	Gloucester	7/21/2000	18 Moderate	174	Optimal
AN0670	Chestnut Br	Lambs Rd		Pitman Boro	Gloucester	7/21/2000	21 Moderate	181	Optimal
AN0671	Chestnut Br	Mantua Blvd		Mantua Twp	Gloucester	7/11/2000	18 Moderate	135	Suboptimal
AN0672	Mantua Ck	Mantua Ave		Mantua Twp	Gloucester	7/11/2000	18 Moderate	139	Suboptimal
AN0673	Edwards Run	Pitman-Jefferson Rd		Harrison Twp	Gloucester	7/11/2000	12 Moderate	128	Suboptimal
AN0674	Edwards Run	Jessups Mill Rd		Mantua Twp	Gloucester	7/11/2000	12 Moderate	116	Suboptimal
AN0675	Still Run	Quaker Rd		East Greenwich Twp	Gloucester	7/25/2000	9 Moderate	123	Suboptimal
AN0676	Rattling Run	Tomlin Rd		East Greenwich Twp	Gloucester	7/11/2000	12 Moderate	142	Suboptimal
AN0677	Pargy Ck	Swedesboro Ave		East Greenwich Twp	Gloucester	8/15/2000	21 Moderate	157	Suboptimal