CHARACTERIZATION AND ASSESSMENT OF THE REGIONAL STORMWATER MANAGEMENT PLANNING AREA FOR THE POMPESTON CREEK WATERSHED

FINAL
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Completed by the
Rutgers Cooperative Extension
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Table of Contents

Page

List of Tables

List of Figures

I. Introduction

The New Jersey Stormwater Management Regulations have been used as a framework to present a functional characterization and assessment of the stormwater processes of the Pompeston Creek Watershed. This characterization and assessment is intended to represent areas of the watershed affected by the improper drainage of stormwater and to position the objectives of concerned parties with the purpose of creating solutions.

To identify features and processes within the watershed that could affect the stormwater drainage processes, various methods of analysis have been employed. Extensive field surveys, literature reviews, data collection and the use of Geographical Information System (GIS) were among the techniques used to qualify the watershed.

According to N.J.A.C. 7:8-3.4(a), the regional stormwater management plan shall include a characterization and assessment that covers a series of specific components, including the mapping and analysis of a watershed. These components have been outlined and presented in this text. Rationale for not including a component is determined by the committee if that component is not found to be appropriate for the regional stormwater management area.

II. Maps

A. Regional Stormwater Management Plan (RSWMP) Boundary

The Pompeston Creek Watershed, located in Burlington County, New Jersey is approximately 8.6 square miles in size. The watershed system discharges to the Delaware River and contains part of the municipalities of Moorestown, Delran, Riverton, and Cinnaminson. The Pompeston Creek Watershed is comprised of 10 to 13 miles of river and more than 13 acres of lakes. The largest bodies of water in the drainage area include the pond at Lakeview Memorial Park, which lies behind the dam at Route 130 in Cinnaminson, and an impoundment on the Whitesell property which lies northwest of Tom Brown Road in Moorestown. The stream is tidal to about 0.75 miles upstream of its discharge point to the Delaware River which includes a freshwater tidal marsh.

The Regional Stormwater Management Planning Area Boundary was originally defined through the use of the United States Geological Survey's (USGS) delineation of HUC 14 boundaries. These drainage basins are denoted by the use of a 14-digit hydrologic unit code (HUCs) and are delineated from 1:24,000-scale (7.5-minute) USGS quadrangles.

The drainage area was fully refined to represent only that land area that drained to the Pompeston Creek and not to the Delaware River.

A map representing the regional stormwater boundary of the Pompeston Creek Watershed can be found in Appendix B, Map 1. This boundary is also illustrated on Map 2, Appendix B, over the NJDEP 2002 Digital Orthophotographs.

B. Land Use/Land Cover

The land use in the Pompeston Creek Watershed is composed of residential, commercial and industrial development with some minor open space. Refer to Map 3 in Appendix B for the map of the Pompeston Creek Watershed's Existing Land Uses. Map 4 in the same appendix depicts the Open Space and Vegetation of the watershed.

According to 1995/97 data collected by the NJDEP, the land use of the Pompeston Creek Watershed is 71.2% urbanized. Land use information is shown in Table 1. Based on aerial photography taken in 1995, the NJDEP has created a data set describing land use across the state. This land use/land cover information is available in GIS and can be useful in the analysis of a watershed. The NJDEP has since performed a LULC data set update to the year 2002. However, this dataset has not been released for this watershed as of this writing.

Table 1: NJDEP 1995/97 Land Use Data

Land Use	Area Square Miles	Percentage of Watershed Area %
Agriculture	0.62	7.2
Barren Land	0.27	3.2
Forest	0.74	8.6
Urban	**6.14**	**71.2**
Water	0.02	0.2
Wetlands	0.83	9.6
Total	*8.62*	*100*

The 71.2% urban land use can further be broken down to several subcategories.

Table 2 describes the different types of urban land within the Pompeston Creek watershed.

Table 2: NJDEP 1995/97 Urban Land Use Types

Urban Land Use Type	Area (Square Miles)	Percent of Urban Land Use (%)
Residential, Single Unit, Low Density: Residences on ½ to 1 acre lots. Impervious cover is approximately 20 to 25%.	**1.67**	**27.2**
Residential, Single Unit, Medium Density: Urban/suburban residences on 1/8 to ½ acre lots. Impervious coverage is approximately 30 to 35%.	**1.50**	**24.5**
Other Urban or Built-Up Land: Generally characterized by intensive land uses.	0.64	10.5
Residential, Rural, Single Unit: Residences on 1 to 2 acre lots. Generally, impervious cover is between 15 to 20%.	0.63	10.2
Commercial/Services: Areas that contain structures used for the sale of products and services.	0.56	9.1
Industrial: May include manufacturing, assembly, or processing of products or power generation. Generally have a high impervious coverage.	0.43	7.0
Recreational: Includes areas specifically developed for recreational activities, such as golf courses, picnic grounds, stadiums, and so forth.	0.38	6.2
Transportation/Communication/Utilities: Generally high percentage of impervious surface coverage.	0.16	2.6
Residential, High Density, Multiple Dwelling: Contains either high density single units of multiple dwelling units on 1/8 to 1/5 acre lots. Impervious coverage is approximately 65%.	0.09	1.4
Athletic Fields (Schools)	0.06	1.0
Mixed Urban or Built-Up Land: Uses considered in mixed urban include primarily residential, commercial/service, industrial and transportation/communication/utility.	0.02	0.3
Total	*6.14*	*100*

Data Source: "A Land Use and Land Cover Classification System for Use with Remote Sensor Data", USGS Professional Paper 964, 1976; edited by NJDEP.

C. Projected Land Uses

The four municipalities that compose the Pompeston Creek Watershed are approaching build out conditions, and are in the process of reviewing zoning ordinances to address their respective municipal stormwater management plans. N.J.A.C. 7:8-4.2(c) 10 defines an area to be at build out conditions if there is a combined total of less than one square mile of vacant or agricultural lands.

For purposes of evaluating the impact of the increase in impervious area, the water quantity models evaluated scenarios depicting the resulting stream flows using an increase of 10% in the curve number (See Section IV and Table 19). Curve numbers roughly correlate with the runoff potential of a land use and will increase with additional impervious area. The increase in curve number was used to account for the potential increase in imperviousness from redevelopment and knock down/rebuilds. In addition, the benefits of reducing the extent of impervious area were evaluated through the use of a curve number that was lowered by 10%. The 10% goal represents an amount of land use alteration that is considered achievable.

D. Soil

The Pompeston Creek Watershed may further be characterized by its soils (Figure 1). Within the Pompeston Creek Watershed, soils are predominantly in the Sassafras and Woodstown series. The Sassafras soil series, found mostly in the lower half of the watershed, consists of well-drained and very deep soils formed from sandy marine and old alluvial sediments (USDA/NRCS, 2002). The Woodstown series is mostly found in the upper portion of the Pompeston Creek Watershed and follows the stream corridor. This series consist of very deep, moderately well-drained soils in upland marine terraces and old stream terraces (USDA/NRCS 2002). The Woodstown series are characterized by their moderate infiltration rates and shallow water table (18–42 inches). Potential for surface water runoff is considered slow to moderate for this soil series (USDA/NRCS, 2002). Slopes can be variable, from 0 to 30 percent slopes. The Galestown series is found along the main stem of the lower Pompeston Creek. Galestown soils are characterized as very deep, somewhat excessively drained soils with deep water tables (greater than 72 inches) (USDA/NRCS, 2002). Finally, soils classified as “Made Land” are located at the mouth of the creek, where it drains into the Delaware River. Made lands are defined by the NJDEP as dredged coarse material with a slope ranging from 0 to 5 percent.

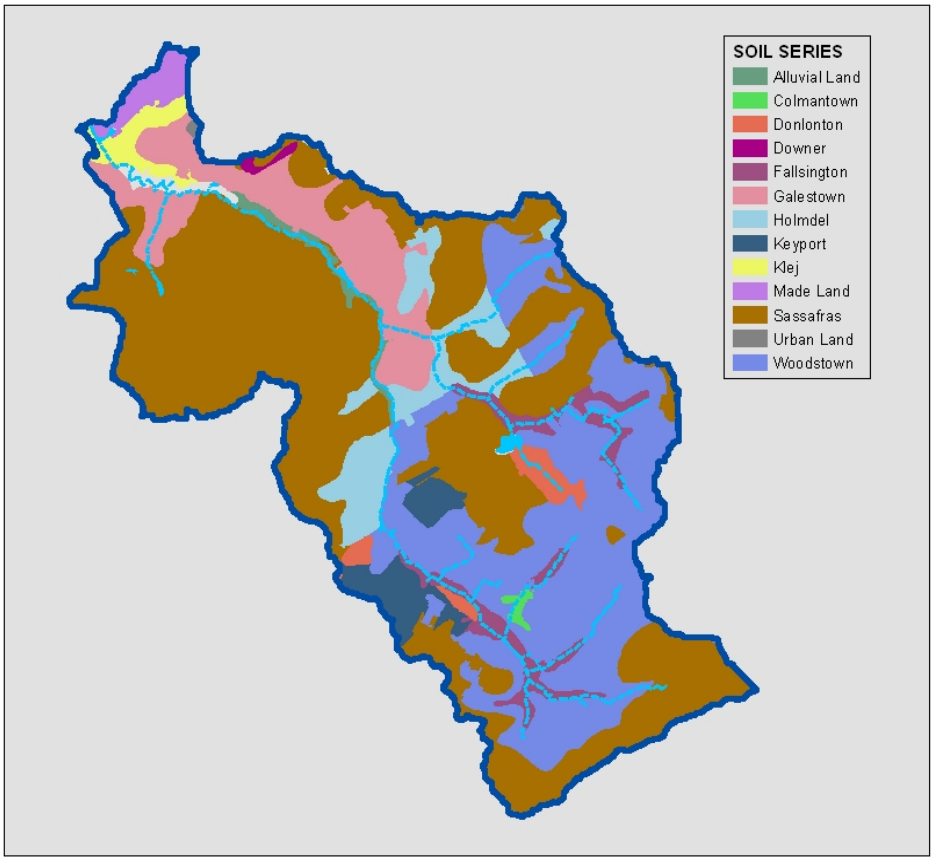

Figure 1: Dominant Soil Series in the Pompeston Creek Watershed

Soils can also be classified according to their potential to infiltrate water. The Natural Resource Conservation Service (NRCS) categorizes soils that have high infiltration rates, "A" soils, to those that have very slow infiltration rates, or "D" soils. The soils that possess intermediate qualities are classified in a continuum. Map 5 in Appendix B shows the soils of the Pompeston Creek Watershed as defined by their hydrologic soil group. Most of the watershed has the capacity for slow to moderate infiltration of water, with areas around the main branch upstream able to infiltrate at a high rate.

Furthermore, each soil type has a related erodibility factor which quantifies the susceptibility of the soil particles to detach and move with the interception with water. Erodibility factors, or k factors, below 0.23 depict soils with low erodibility, whereas those with a k factor above 0.36 would indicate soils with low resistance to erosion. Map 6 in Appendix B illustrates the erodibility potential of the soils within the Pompeston Creek Watershed. The middle and lower sections of the Pompeston Creek Watershed show areas of high erodibility, particularly along East and West Branches of Pompeston

Creek. Much of the watershed is covered by areas of moderate erodibility (green hatched areas), making much of the area susceptible to erosion.

Figure 2 shows areas of soils that are typically known for high erodibility. This moderate to high erodibility strongly relates to the low infiltration rates of the surrounding area and the characteristic particle size within the soil.

High stormwater velocities through highly erodible soils will erode stream banks and downcut streams at an increased rate. In the Pompeston Creek Watershed, erosion is likely to occur in areas where the stream corridor is not well-vegetated or some form of channelization has occurred. Examples include the eroded areas near road crossings, outfalls, and concrete channels. Areas of high erosion do exist in the Pompeston Creek Watershed, but are not widespread. Regional stormwater management planning will effectively locate areas of high infiltration that can be used to decrease the amount of stormwater that is piped to the Pompeston Creek, thus lessening the chances of erosion and stream degradation.

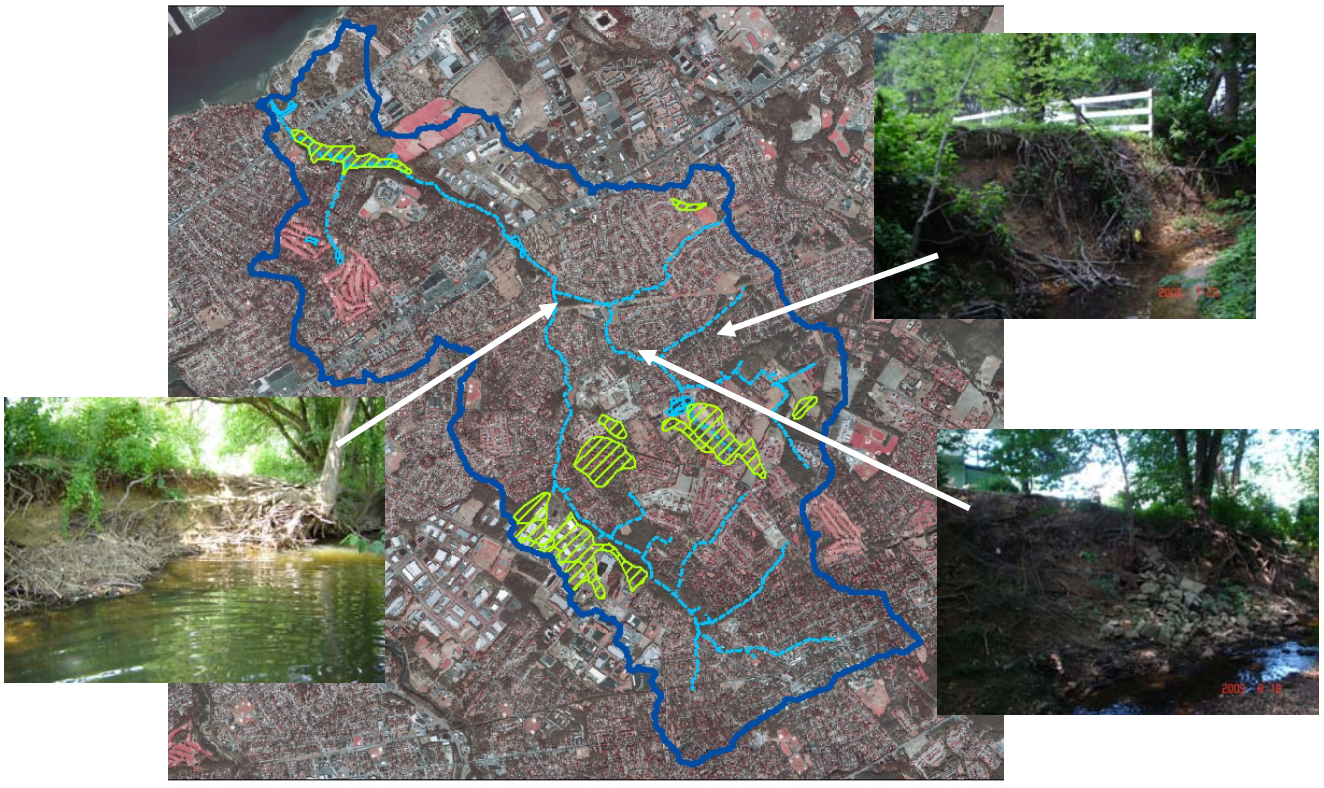

Figure 2: Highly Erodible Soils

Figure 2 depicts two areas of eroded stream banks in the Pompeston Creek Watershed and overall high erodible area. This discussion will continue in Sections IV and V. The incidence of severe erosion within the Pompeston Creek Watershed does not appear to

correlate with the location of the highly erodible soils, but tends to occur in areas of increased, and typically denser, development.

See Section 2.I. for a discussion on the infiltration properties of the clay and glauconite infused soils within the watershed.

E. Topography

The Pompeston Creek Watershed is situated within the Coastal Plain Province, the largest physiographic province in New Jersey. Covering an area of nearly 5,000 square miles, the Coastal Plain Province includes all of Burlington County, as well as Atlantic, Camden, Cape May, Cumberland, Gloucester, Monmouth, Ocean, and Salem Counties, along with parts of Middlesex and Mercer. The Coastal Plain is composed of unconsolidated deposits which slope gently to the southeast. East of the depression that runs from Raritan Bay to Trenton is the drainage divide between water that drains to the Delaware and that water that drains to the Atlantic. Slopes in the Pompeston Creek Watershed fall within a range of 0 to 11.79%, and elevations range from 0 to 102.23 feet above sea level.

Map 7 in Appendix B is the USGS Quadrangle map which contains topographic contour lines that portray the shape and elevation of the land. This map also provides information on lakes, rivers, and roads along with a variety of other natural and manmade features.

F. Waterbodies

The Pompeston Creek Watershed includes approximately 13 river miles and 13 acres of freshwater lakes. As it nears the Delaware, the mouth of the Pompeston Creek opens into a tidal marsh. The Pompeston Creek has two branches, the East Branch and the West Branch. Both branches find their headwaters in Moorestown. The West Branch is fed by four tributaries: Teaberry Run, Baker Tributary, Farmdale Tributary, and an unnamed tributary that begins at Chester Ave, flows along Bartram Rd. and meets the West Branch at Pepperbush Lane. The East Branch is fed by two tributaries in the more rural area of Moorestown, and then flows through Cinnaminson where it is met by two tributaries that drain the Tenby Chase Development. The East Branch meets the West Branch just upstream of the Willow Dr. bridge and flows through Fountain Farms Park and Lakeview Memorial Park. The main stem of the Pompeston Creek then flows through Cinnaminson toward the Delaware River. Jack's Run is the most downstream tributary to the Pompeston Creek. It drains Riverton, including the Riverton Country Club and golf course, and ultimately discharges to the main stem of the Pompeston Creek at the tidal marsh.

The largest bodies of water in the drainage area include the pond at Lakeview Memorial Park, which lies behind the dam at Route 130 in Cinnaminson, and an impoundment on the Whitesell property which lies northwest of Tom Brown Road in Moorestown. There are various other smaller bodies of water throughout the watershed. Most are large drainage basins with pond-like characteristics, such as those on Tom Brown Road and several along Bartram Road. There is an irrigation pond at Hunter's Farm in the tidal marsh. There is also a small impoundment downstream of River Road in Cinnaminson named Lippincott Pond, which is a small cove that used to serve the Lippincott Boat Works. A bermed impoundment adjacent to the tidal marsh remains, which was once an irrigation pond for Dreer's Nursery in the 1800's.

Map 8 in Appendix B illustrates the locations of these waterbodies.

G. Freshwater Wetlands

Based on the NJDEP database, the locations of the wetlands that are contained in the Pompeston Creek Watershed can be viewed on Map 9 in Appendix B. Upon viewing this map, one can see that some of the landscape is covered by deciduous scrub/shrub wetlands, wooded wetlands and agricultural wetlands (modified). Many of the wetlands are located along the stream corridors. Despite the urban setting, these isolated wetlands provide important functions in the watershed, including the support of biodiversity, the protection of water quality, the storage of flood waters and the maintenance of stream baseflow. Isolated wetlands are also known to provide natural areas for passive recreation, education and aesthetic enjoyment (Ehrenfeld, 2004).

H. Flood Hazard Areas

The NJDEP is in the process of mapping flood hazard areas based on delineations under the Flood Hazard Area Control Act, N.J.S.A. 58:16A-50 et seq. Under this act, the Department is authorized to regulate the development of land in flood hazard areas and to protect the encroachment of streams. The area of delineation is based on the water surface elevation produced by the "flood hazard area design flood" used in State Adopted Flood Studies. This is the flood that is expected to result from the 100-year storm discharge increased by 25 percent.

Mr. John Scordato of the Dam Safety Division within the Department advised Rutgers Water Resources Program on which maps were complete and available. The flood hazard area around the Pompeston Creek has not yet been determined, but is scheduled to be performed by the NJDEP.

I. Groundwater Recharge/Wellhead Protection

Groundwater Recharge

GIS coverage of the groundwater recharge data was assembled by the New Jersey Geological Survey and can be found with the Pompeston Creek Watershed boundary in Map 11 in Appendix B. The geology of the watershed area can be found in Map 11B. An additional attribute to consider when determining the infiltration capacity of the soils in the Pompeston Creek Watershed is the bedrock geology (Figure 3). The coverage of glauconitic soils and fine grained sand embedded with clay will be a significant determinant of recharge rates and infiltration capacity that will tend to be lower than general soils.

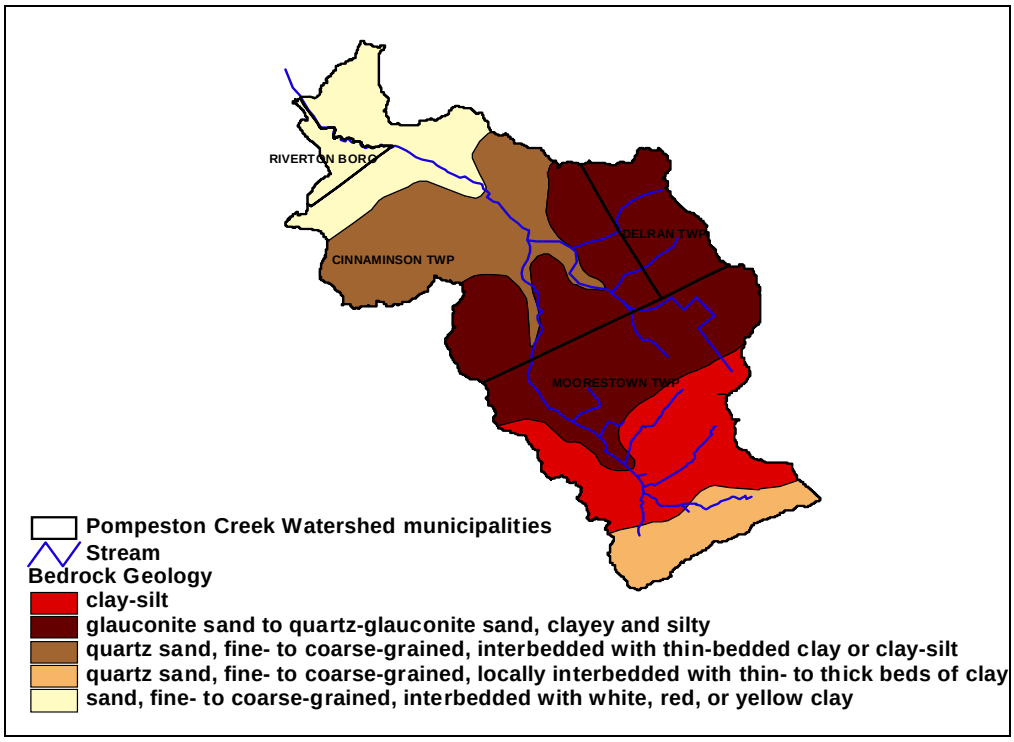

Figure 3: Soils and Geology

Groundwater recharge is defined as that water that can penetrate the ground and will reach the groundwater table not considering the underlying geology. The methodology that is employed to calculate the potential recharge of a system is taken from the New Jersey Geological Survey report GSR-32, "A Method of Evaluating Ground-Water-Recharge Areas in New Jersey" (Charles, et al., 1993).

The recharge coverages were generated by overlaying the soil, land use/land cover (LULC) and the municipality coverages. The values that represent the ability of the ground to recharge precipitation were determined through the use of the following equation:

groundwater recharge = (recharge factor x climate factor) - recharge constant

The recharge factor and constant are established through the examination of the LULC and the soils series. The climate factor is governed by the location of the municipality and is a ratio of precipitation to potential evapotranspiration (French, 2003).

Wellhead Protection

The Wellhead Protection Area Map, Map 12 in Appendix B, denotes those areas where groundwater is drawn from in a two, five and twelve year period given a certain pumping rate. The delineation is performed by a qualified hydrologist by using several approved methods put forth in the open-file report put out by the New Jersey Geological Survey (Spayd and Johnson, 2003).

A large number of wells in the Pompeston Creek Watershed serve an increasing population density with significant pumpage. This makes this area critical to obtaining sustainability in the future. Wellhead protection area within the Pompeston Creek Watershed covers 3.3 square miles of the entire land mass within the watershed.

J. Environmentally Constrained and Critical Areas

The definitions of "Environmentally Constrained" and "Environmentally Critical Areas" are contained in N.J.A.C. 7:8-1.2. Environmentally constrained areas refers to areas where the physical alteration of the land is in some way restricted, such as through regulation, easement or deed restriction. These could include floodplains, threatened and endangered species sites and parks and preserves, among others. An environmentally critical area defines an area that is of significant environmental value, such as stream corridors, large areas of contiguous open space or groundwater recharge areas.

In Appendix B, Map 13 and 13A depict the Environmentally Constrained areas of the Pompeston Creek Watershed. A wetland buffer of fifty feet was prepared to denote the constrained area related to a wetland, as per the Freshwater Wetland regulations (N.J.A.C. 7:7A). In addition, the 100-year floodplain from the FEMA Q3 data layer was included.

NJDEP's Division of Fish and Wildlife has developed The Landscape Project, a planning tool to help land managers, planners and regulatory agencies integrate wildlife protection into their overall land use goals. The Landscape Project establishes accurate boundaries around critical wildlife habitats and then comparatively ranks them to offer prioritization options for varying levels of conservation and management (Niles *et al.*, 2004). The ranking is based upon the presence or absence of animal species of concern, state threatened and endangered species, and federally threatened and endangered species. A rank of three (3) is assigned to patches of land containing one or more occurrences of at

least one State threatened species (Niles *et al.*, 2004). Rank four (4) is for those patches that have one or more occurrences of at least one State endangered species and rank five (5) patches contain at least one occurrence of Federally listed threatened or endangered species (Niles *et al.*, 2004). Those lands that ranked three and above (ranks three through five) for any Landscape Project Data were used to represent the Threatened and Endangered Species that occupy lands that fall within the watershed boundary. For the Pompeston Creek Watershed, no areas fall within this category. Map 13A provides the aerials of the Pompeston Creek Watershed with a single coverage of the Environmentally Constrained Areas in total.

Map 14 and 14A in Appendix B presents the Environmentally Critical Areas. To represent the locations that are of significant environmental value several GIS layers were evaluated. For the large areas of contiguous open space or upland forest, the critical habitat layer was used. In this layer, the NJDEP located all contiguous forest and bisected the areas by major road ways. However, this information is from 1995 land use and development since that time should be considered. Stream Encroachment Regulations and the Flood Hazard Area Control Act for F2 waters regulate a stream corridor buffer of twenty-five feet around the streams, using FW2 as a general surface water classification applied to those fresh waters that are not designated FW1 or Pinelands Waters (N.J.A.C. 7:9B-1.4). To represent water supplies, the areas of high groundwater recharge for WMA18 (areas Ranked A) were used along with the NJGS Wellhead Protection Areas GIS layer. Map 14A provides the aerials of the Pompeston Creek Watershed with a single coverage of the Environmentally Critical Areas in total.

Note: The lower portion of the Pompeston Creek is expected to be designated a Category One status by the New Jersey Department of Environmental Protection by May 21, 2008 in the Federal Register. Category One protections intend to guard the stream from an increase in pollution levels. This designation is one of the highest antidegradation standards in New Jersey.

K. Wild and Scenic Rivers

In 1968, Congress created the National Wild and Scenic Rivers System to protect rivers that possess "outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values." There are no waterways in the Pompeston Creek watershed that have been assigned this designation.

L. Waterbody Classification: N.J.A.C. 7:9B-1.15

The surface water classifications for the waters of the State of New Jersey can be found in N.J.A.C. 7:9B-1.15, with the designated uses of these classifications defined in N.J.A.C. 7:9-1.12. The streams of the Pompeston Creek Watershed have been classified as FW2-NT. FW2 is a general surface water classification applied to fresh waters which states that the designated uses are maintenance, migration and propagation of the natural and established biota; primary and secondary contact recreation; industrial and agricultural water supply; and as a public potable water supply after conventional filtration treatment and disinfection (N.J.A.C. 7:9-1.12). NT refers to the "Non-trout Maintenance Water". Map 15 in Appendix B presents the Water body Classification of the Pompeston Creek Watershed.

M. Water Quality Limited Surface Water

One goal of watershed management is to ensure that the existing water quality meets all water quality standards and criteria. Under the Federal Clean Water Act (CWA), Section 303(d) and 305(b), each state is mandated to identify impaired waters where designated uses of the waterway are not supported by the water quality. Pursuant to the CWA, the N.J.A.C. 7:9B Surface Water Quality Standards set the required water quality for each waterbody according to its designated use. The NJDEP then compares measured water quality data to the standards to determine which waterways are impaired and require the development of a Total Maximum Daily Load (TMDL). Through the TMDL process, the necessary reductions of the pollutant or pollutants will be calculated so that the designated uses can be met.

Pursuant to the Federal Clean Water Act, the NJDEP summarized water quality in the State in its biennial report entitled "New Jersey's Water Quality Inventory Report," or 305(b) Report. The State also prepared a list of impaired waterbodies to meet 303(d) requirements; this report was entitled "Identification and Setting of Priorities for 303(d)

requirements under Section 303(d)(1)(A) of the Federal Clean Water Act" and was most recently submitted in 1998.

In 2002, the USEPA recommended that each state produce an integrated list combining both 305(b) and 303(d). The resulting report is known as the *New Jersey 2004 Integrated Water Quality Monitoring and Assessment Report* (Integrated Report). This report summarizes the Integrated List as it pertains to use classifications set for the waterbodies of New Jersey. The Integrated List is comprised of unique Sublists 1 through 5 and adds a priority recommendation to each impaired reach. Waterbodies are placed on Sublists based on NJDEP's results when they compare observed water quality data to water quality standards. The various Sublists are as follows:

Sublist 1 suggests that a waterbody is meeting water quality standards.

Sublist 2 states that a waterbody is attaining some of the designated uses, and no use is threatened. Furthermore, Sublist 2 suggests that data are insufficient to declare if other uses are being met.

Sublist 3 maintains a list of waterbodies where there exists a lack of data or information to support an attainment determination.

Sublist 4 lists waterbodies where use attainment is threatened and/or a waterbody is impaired; however, a TMDL will not be required to restore the waterbody to meet its use designation.

Sublist 4a includes waterbodies that have a TMDL developed and approved by the USEPA, that when implemented, will result in the waterbody reaching its designated use.

Sublist 4b establishes that the impaired reach will require pollutant control measurements taken by local, state, or federal authorities that will result in full attainment of use.

Sublist 4c states that the impairment is not caused by a pollutant, but is due to factors such as instream channel condition and so forth. It is recommended by the USEPA that this list be a guideline for water quality management actions that will address the cause of impairment.

Sublist 5 clearly states that the water quality standard is not being attained and requires a TMDL.

This report also includes a schedule of TMDLs and other actions to be undertaken in the following two-year period, a list of waterbodies delisted in 2004, and a Comparison Document, which summarizes changes between the 2002 and 2004 Sublists.

In assembling the Integrated List, the NJDEP reviews all existing and available data as required. The NJDEP is committed to using only data with acceptable quality assurance to develop the Integrated Report (NJDEP, 2003). Further information regarding the quality assurance needed for data inclusion in the Integrated Report can be found in the General Data Requirements section of *Integrated Water Quality Monitoring and Assessment Methods*

In the Pompeston Creek Watershed, there has been a limited amount of chemical monitoring data available for inclusion in the Integrated List. However, one active biomonitoring station exists. This biomonitoring stations is one of approximately 800 stations monitored by the NJDEP's Bureau of Freshwater & Biological Monitoring known as the Ambient Biomonitoring Network (AMNET) (NJDEP, 2000). Data collected from this monitoring location are used to evaluate streams for biological impairment as indicated by New Jersey Impairment Score (NJIS).

Table 3 lists this AMNET location within the Pompeston Creek Watershed and their assessment results. Assessment results can be defined as non-impaired, moderately impaired, and severely impaired.

> **Non-impaired** is defined by a benthic community comparable to other undisturbed streams within the region. The community is characterized by maximum taxa richness, balanced taxa groups, and good representation of intolerant individuals.
>
> **Moderately impaired** describes a macroinvertebrate community whose richness has been reduced, in particular pollutant-intolerant species. There may also be a reduced community balance and numbers of pollutant-intolerant taxa.
>
> **Severely impaired** refers to a benthic community dramatically different from those in less impaired situations; macroinvertebrates are dominated by a few taxa with many individuals and only pollutant-tolerant individuals are present (NJDEP, 2000).

Table 3: Location of AMNET Station in the Pompeston Creek Watershed

Site ID	Station Name	1993 Result	1998 Result	2001 Result
AN0177	Pompeston Creek at Route 130 in Cinnaminson Township	Moderately Impaired	Moderately Impaired	Severely Impaired

The Pompeston Creek is cited at the Pompeston Creek at Route 130 in Cinnaminson Township (AMNET site number AN0177) as impaired for aquatic life on Sublist 5 of the "New Jersey 2002 Integrated Water Quality Monitoring and Assessment Report (305(b)

and 303(d)". The Pompeston Creek was determined to be a severely impaired waterbody based on the 2001 macroinvertebrate sampling, which lists Station AN0177 as severely impaired with a NJIS Rating of 6 (NJDEP, 2001). Previous sampling had ranked the stream as moderately impaired, with a 1998 NJIS rating of 9. The NJIS rating ranges from 0 to 6 for the severely impaired classification and 9 to 26 for the moderately impaired classification.

There are no lakes within the Pompeston Creek Watershed that have been monitored under the 305(b) and 303(d) monitoring program, and therefore no lakes have been placed on the Integrated List.

As stated earlier in this section, Sublist 5 waterbodies are not meeting water quality standards, and a TMDL is necessary to determine pollutant removal needed for standards to be met. However, the USEPA has classified this impairment as a low priority with no targeted flag. An anticipated TMDL submittal date was noted on the USEPA website as being December 31, 2002, but no TMDL's have been reported to the USEPA by the state of New Jersey.

Map 16 in Appendix B of this report spatially describes the information given above.

N. Stormwater Conveyance

Map 19 in Appendix B presents thirteen delineated subbasins of the Pompeston Creek Watershed. These thirteen drainage areas were used to evaluate the stormwater runoff potential presented in Section IV of this report. An extensive reconnaissance survey of the Pompeston Creek Watershed identified all outfalls that discharge to the Pompeston Creek. This data set will prove useful in analyzing stormwater contributions to the stream, bringing volume, velocity and non-point pollution with it. A sampling of culverts, detention basins and swales are also geographically referenced on this map.

O. Source Water Areas of Potable Public Surface Waters

There are no known potable public surface water supply intakes or public water supply reservoirs within the Pompeston Creek Watershed. However, surface water is withdrawn from the Delaware River after the Pompeston Creek empties into the larger river.

P. Jurisdictional Boundaries

The Pompeston Creek Regional Stormwater Management Planning Area has several agencies responsible for implementing stormwater management. The primary jurisdiction is the municipality. The water purveyor boundary corresponds with the municipal boundary of Moorestown, with the Moorestown Township Municipal Water providing water to Moorestown and New Jersey American Water Company providing for the remainder of the watershed. The municipalities and their extent are quantified in Table 4. The boundaries can be viewed on Map 17 in Appendix B.

Other entities that are considered relevant to the stormwater management planning of the Pompeston Creek Watershed cover the entire watershed. These entities include Burlington County, Burlington County Soil Conservation District, and the Pompeston Creek Watershed Association.

Table 4: Municipal Land Area in the Pompeston Creek Watershed

Municipality	**Total Area of Municipality** (Square Miles)	**Area within the Watershed Boundary** (Square Miles)	**Percent of Watershed Land Area Contributed by the Municipality** **(%)**	**Percent of Municipality that includes the Pompeston Creek Watershed** **(%)**
Riverton Borough	0.95	0.2	2.4	21.1
Cinnaminson Township	8.02	3.9	47.6	48.6
Delran Township	7.29	0.7	7.3	8.2
Moorestown Township	14.92	3.5	42.7	23.5

III. Identification of Physical Characteristics

Physical characteristics of the Pompeston Creek Regional Stormwater Management Planning Area that are pertinent to the management of the stormwater include significant slopes, swales and impoundments. Stream contours are also critically important when determining the hydraulics of the system. Through a combination of GIS, field surveys and data acquisition, the physical characteristics of the Pompeston Creek Watershed have been mapped or modeled.

A map of the slopes within the Pompeston Creek Watershed can be found in Appendix B, Map 18. There are no significantly steep slopes present in the watershed. Maximum slope is 11.79%.

The Pompeston Creek Watershed has several areas of stormwater detention/retention. These areas have been primarily identified through field reconnaissance surveys. The Stormwater Conveyance Map, Map 19 in Appendix B, shows where some areas of detention were determined. This map also represents the geographic location of outfalls detected in the field during reconnaissance. For the most part, the more recently developed areas in the Pompeston Creek Watershed have better stormwater management. Many of the newer developments integrate vegetated detention basins or retention ponds into the stormwater system. These developments are found at Paddock Lane and Parry Road, Allison Court, New Albany Road and Matlack Avenue, Riverton Road and Jersey Belle Drive, Pheasant Fields Lane, and Tom Brown Road east of New Albany Road. Some of the older developments in the area have more traditional detention basins with low flow channels and mowed turf grass. Basins of this nature can be found at Mill Street, Fernwood Drive, Fernwood Road, and Willow Point. There are large basins to control storm flow in the industrial areas of the watershed. A large basin drains the industries on Whitendale Road discharges to the West Branch. The Beaver Basin on Twosome Drive also discharges to the West Branch. There are a number of large basins along Industrial Highway in Cinnaminson that deal with stormwater from the surrounding industrial park. A new basin was recently built at the Wal-Mart shopping center on Route 130 to recharge stormwater overflow.

In the older developments, the storm sewer conveyance system discharges directly to the stream without any treatment mechanisms. Many of the outfalls are characterized by adjacent eroded banks and sedimentation in the stream channel. The West Branch through Cinnaminson, and the East Branch through Delran and Cinnaminson have this type of a stormwater system. The stormwater conveyance at the headwaters of the East Branch through Moorestown is in the form of swales and drainage ditches along the roads. There are no storm sewers in Cinnaminson east of the tidal marsh, nor in some areas of Riverton.

IV. Water Quality, Groundwater Recharge, Water Quantity Hydrologic and Hydraulic Model or Analysis

Water Quality

As discussed previously, the *2004 Integrated List of Impaired Waterbodies* has enabled watershed managers to prioritize water quality problems according to high quality, readily available data with multiple data points and oftentimes a series of parameters. The NJDEP does not have a water quality monitoring site anywhere along the Pompeston Creek, but NJDEP does have an Ambient Biomonitoring Network (AMNET) site on Pompeston Creek approximately ½ mile upstream from the head of tide at the outlet of Memorial Lake at the Route 130 Bridge crossing (Figure 4). As demonstrated previously, the benthic community has been monitored three times in the past 12 years.

Based on this information, the monitoring site on the Pompeston Creek at Route 130 in Cinnaminson (ANO177) has had its status lowered from "moderately impaired" to "severely impaired" in 2001 (NJDEP, 2001)".

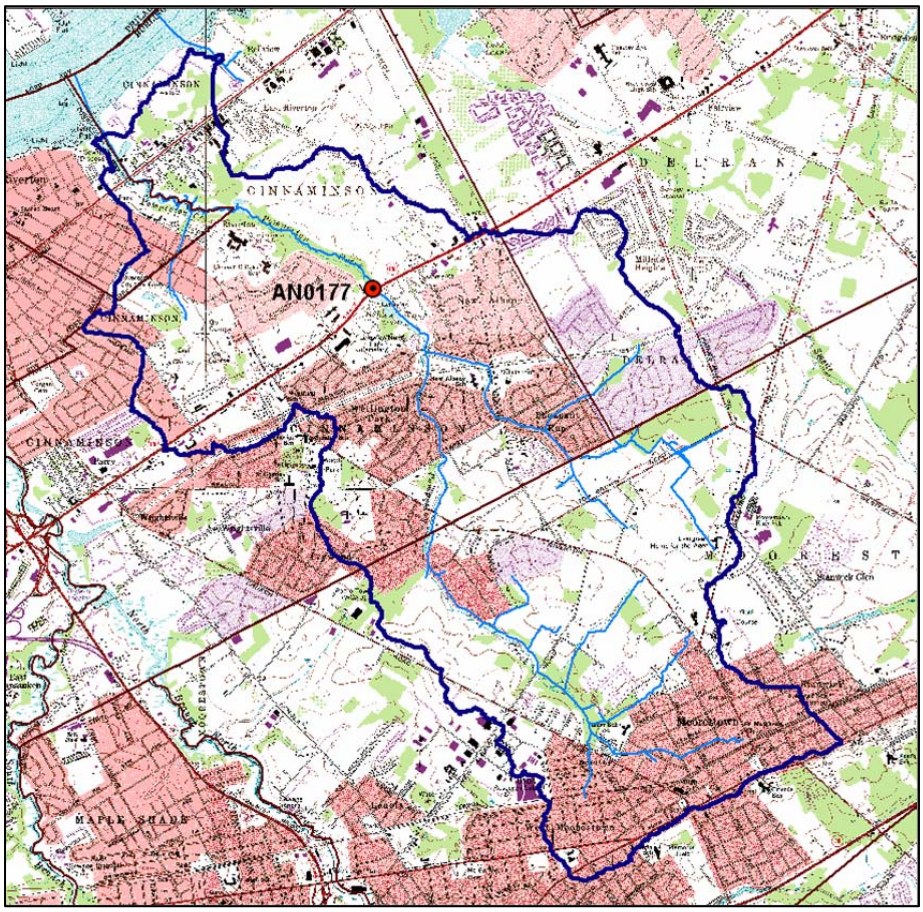

Figure 4: AMNET Station in the Pompeston Creek Watershed

Pompeston Creek at Route 130 in Cinnaminson (ANO177) was placed on Sublist 5 of the 2004 Integrated List of Waterbodies (NJDEP, 2000) for non-attainment of the biological parameters, benthic macroinvertebrates.

Pompeston Creek Watershed Association Water Quality Monitoring

Water quality data has been acquired by the Pompeston Creek Watershed Association (PCWA). Two sites along the Pompeston Creek have been monitored for a varying amount of time (Figure 5).

The first site, PM002 is located at the headwaters of the West Branch, approximately 700 feet downstream of New Albany Road in Moorestown. This site has been monitored for fecal coliform and fecal streptococcus dating back to October of 1998. In October of 2004, with an official QAPP in place, enterococci replaced fecal streptococci as an accompanying parameter to fecal coliform.

The second site, PM003, is located on the main stem of the Pompeston Creek, approximately 572 feet upstream of the upper bridge crossing of Memorial Lake in Cinnaminson. Initiated in September 2003, this site has water quality data for such parameters as fecal coliform and Enterococci. When the QAPP was confirmed in October 2004, fecal coliform, enterococci as well as E. coli have been sampled.

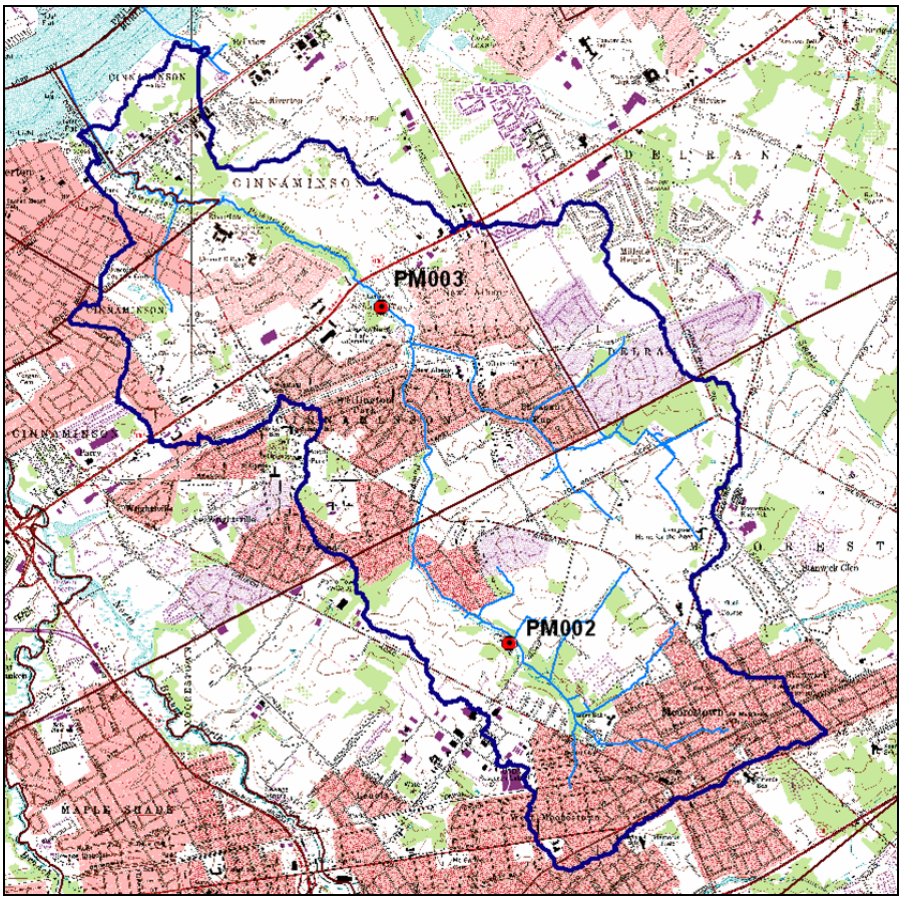

Figure 5: PCWA Water Quality Monitoring Sites

Data that was acquired previous to official QAPP gave the indication of significant bacterial contamination in the stream. Of the 43 samples analyzed for fecal coliform between October 1998 and January 2003, 40% exceeded the surface water quality standard for fecal coliform. From October 1998 through May 2001, the surface water quality standard was exceeded only three times. From July 2001 through January 2003,

the surface water quality standard was exceeded in 74% of the samples collected, indicating that fecal coliform levels had increased, and degradation was occurring.

Several samples were analyzed by Eric Feerst of the NJDEP Marine Monitoring Program using coliphage serotyping to source track bacteria. Mr. Feerst analyzed these samples which were collected after a storm event in November 2002, and determined that the bacteria was not of human origin.

From October of 2004 to October of 2005, the Pompeston Creek Watershed has collected and submitted samples for analysis under an approved QAPP. Data submission and summary report on this data was submitted to the NJDEP in August of 2007.

Data collected showed that fecal coliform values at location PM002 ranged from <10 to 45,000 col/100 ml. The geometric mean at this site for the five fecal coliform samples collected weekly from 7-12-06 through 8-8-06 was 2,044 col/100 ml. At location PM003, fecal coliform values ranged from 30 to 80,000 col/100 ml. The geometric mean for the five fecal coliform samples collected weekly from 7-12-06 through 8-8-06 at PM003 was 1,978 col/100 ml. NJDEP uses the geometric mean of five samples taken within a thirty day period to determine the status of the waterbody. Although fecal coliform has been found to be a less reliable indicator of pathogens, before e.coli became the indicator of choice, the water quality standard for fecal coliform in FW-2 streams was 200org/100ml.

E. coli values at location PM002 ranged from 2 to 42,200 CFU/100 ml. At PM002, *E. coli* values exceeded the surface water quality standard (SWQS) for a single sample (235 CFU/100 ml) in 15 of the 26 samples analyzed. The geometric mean for the five *E. coli* samples collected weekly from 7-12-06 through 8-8-06 was 960 CFUs/100 ml, which exceeds the SWQS of 126 CFU/100 ml. At location PM003, values ranged from 2 to 24,900 CFU/100 ml. At PM003, *E. coli* values exceeded the surface water quality standard (SWQS) for a single sample (235 CFU/100 ml) in 14 of the 26 samples analyzed. The geometric mean for the five *E. coli* samples collected weekly from 7-12-06 through 8-8-06 was 928 CFUs/100 ml, which exceeds the SWQS of 126 CFU/100 ml.

Nitrate-N values at PM002 ranged from 0.72 to 3.22 mg/l, and at PM003 nitrate-N ranged from non-detect to 2.42 mg/l. Reported values were not in violation of the SWQS of 10 mg/l. Nitrate-N values were always greater at PM002 (upstream in Moorestown) than at PM003 (downstream in Cinnaminson).

Orthophosphate as P was essentially non-detected at both monitoring locations. Total phosphorus as P ranged from non-detect to 0.210 mg/l at PM002, exceeding the SWQS of 0.1 mg/l in 4 of 20 samples analyzed (20%). At location PM003, total phosphorus ranged from non-detect to 0.250 mg/l, exceeding the SWQS of 0.1 mg/l in 6 of 20 samples analyzed (30%).

Total suspended solids at PM002 ranged from non-detect to 22.3 mg/l, and at PM003,

total suspended solids ranged from non-detect to 38.5 mg/l. All reported values were less than the SWQS of 40 mg/l. Elevated values usually appear to be associated with rain events (the value of 38.5 mg/l at PM003 on 9/21/05 after a dry period was an exception).

Discussion

The *E .coli* and fecal coliform intensive sampling data (summer 2006) and the monthly monitoring data collected to date demonstrate that bacteria levels are elevated, and the surface water quality standards for fecal coliform and *E. coli* are exceeded within the Pompeston Creek Watershed. In addition, total phosphorus concentrations often exceed the surface water quality standard of 0.1 mg/l for total phosphorus.

Aquatic Life TMDL Development in the Watershed

Biological assessments have become an important tool for managing water quality to meet the goals of the Clean Water Act (i.e., to maintain the chemical, physical, and biological integrity of the nation's water). For the Pompeston Creek Watershed, TMDLs will be required to address the biological impairments that were observed in the watershed as determined by benthic macroinvertebrate sampling conducted at AN0177. Currently, the NJDEP is working on creating a protocol to develop TMDLs for biological impaired waterways. The first step in developing these TMDLs is to identify the stressor that is causing the biological impairment.

Although biological assessments are a critical tool for detecting impairment, they do not identify the cause or causes of the impairment. In response to this issue, the USEPA developed a process, known as the Stressor Identification (SI) process, to accurately identify any type of stressor or combination of stressors that might cause biological impairment (see Figure 6). The SI process involves the critical review of available information, the formation of possible stressor scenarios that may explain the observed impairment, the analysis of these possible scenarios, and the formation of conclusions about which stressor or combination of stressors are causing the impairment. The SI process is iterative, and in some cases additional data may be needed to identify the stressor(s). In addition, the SI process provides a structure or a method for assembling the scientific evidence needed to support any conclusions made about the stressor(s). When the cause of a biological impairment is identified, the stakeholders are then in a better position to locate the source(s) of the stressor(s) and are better prepared to implement the appropriate management actions to improve the biological condition of the impaired waterway.

Once the stressor is identified, TMDLs can be developed for that stressor in each of these reaches in the Pompeston Creek Watershed.

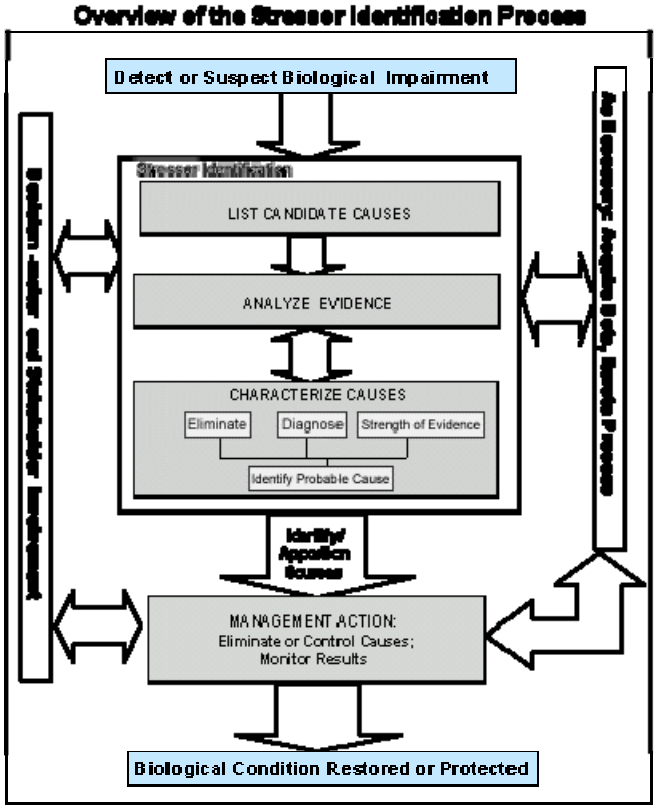

Figure 6: Overview of the Stressor Identification Process

Aerial Loading Analysis

In the Pompeston Creek Watershed, as in other watersheds, the quality of the water is affected by both point and nonpoint sources. Point sources are regulated by the New Jersey Department of Environmental Protection (NJDEP) and must meet stringent water quality standards. Stormwater sewers, however, have long been considered non-point sources because the origin of the stormwater and accompanying pollutants is typically a large land area. Stormwater, which is water that flows overland as a result of a storm event, is often discharged through manmade stormwater conveyance facilities directly into streams and can carry high levels of pollutants including nutrients, pathogens, metals, and organic chemicals. NJDEP currently regulates municipal separate sewer systems (MS4s) as point sources through a general New Jersey Pollutant Discharge Elimination System (NJPDES) permit program. The effect of non-point source (NPS) pollution and storm sewer pollution on water quality is vital to the understanding of the watershed and to the development of a cogent watershed restoration plan.

As a portion of the water quality analysis, an Aerial Load Analysis was conducted on the Pompeston Creek Watershed using the Army Corps of Engineers' HEC-GeoHMS

hydrological modeling software to delineate the watershed into thirteen subbasins that represent areas draining to significant tributaries or significant reaches of the stream. Figure 7 represents the subbasin delineation used for the purpose of aerial loading evaluations. The subbasins are numbered and are the same as the delineations used for the hydrologic analysis.

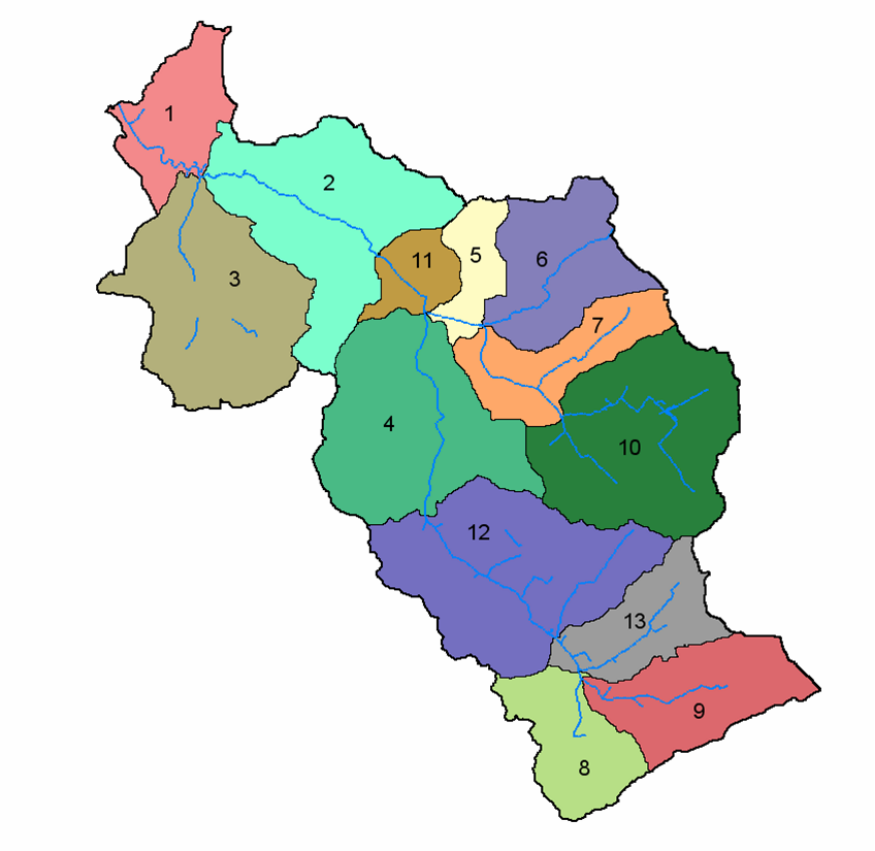

Figure 7: Subbasin Delineation Used in Aerial Loading Analysis

The Aerial Load Analysis was based on aerial pollutant export loading coefficients, UL_c. These coefficients were used to estimate pollutant loads for various land uses within the Pompeston Creek Watershed. The pollutant export loading coefficient for each pollutant and each land use are shown in Appendix D. These values were compiled from the New Jersey Stormwater Best Management Practices Manual and from current literature sources (NJDEP, 2004b). The parameters that were evaluated as a part of this process are as follows: total phosphorus (TP), total nitrogen (TN), total suspended solids (TSS), ammonia nitrogen (NH_3-N), lead, zinc, copper, cadmium, biochemical (biological) oxygen demand (BOD), chemical oxygen demand (COD), and nitrite plus nitrate (NO_2 +

NO_3). The land use maps for each subbasin are from the 1995/97 NJDEP GIS layer. Annual NPS loads for each subbasin were then calculated using the loading equation:

$$Load = UL_c \times Area$$

Load is in units of pounds of pollutant per year (lbs/yr), UL_c is in units of pounds per acre per year (lbs/acre/yr) for each specific land use, and *Area* is in acres for each specific land use. The loading equation provides an approximation for annual NPS loads on a subbasin basis. This allows for the comparison of pollutant loading between subbasins and provides a method by which to prioritize subbasins for restoration and/or preservation. Table 5 presents estimated pollutant loading from land use within the subbasin, normalized to area.

Table 5: Pollutant Loading Normalized to Area

	TP	TN	TSS	NH3-N	LEAD	ZINC	COPPER	BOD	COD	NO2+NO3
1	**0.77**	**8.90**	**101.67**	**0.44**	**0.75**	**0.58**	**0.48**	**24.24**	**70.93**	**1.22**
2*	**1.10**	**11.70**	**139.53**	**0.68**	**0.92**	**0.72**	**0.59**	**29.77**	**142.83**	**1.59**
3*	**1.18**	**12.20**	**130.56**	**0.96**	**1.14**	**0.74**	**0.72**	**35.13**	**191.62**	**2.03**
4	**1.11**	**11.18**	**144.99**	**0.47**	**0.44**	**0.35**	**0.39**	**22.78**	**94.38**	**1.20**
5*	**1.37**	**14.68**	**139.23**	**0.85**	**0.59**	**0.49**	**0.55**	**29.88**	**209.07**	**1.93**
6*	**1.34**	**14.29**	**137.01**	**0.79**	**0.67**	**0.52**	**0.59**	**30.83**	**158.13**	**1.93**
7	**1.26**	**13.47**	**134.88**	**0.72**	**0.58**	**0.46**	**0.52**	**28.52**	**152.37**	**1.75**
8	**1.20**	**12.29**	**139.85**	**0.62**	**0.70**	**0.55**	**0.54**	**27.12**	**121.27**	**1.51**
9*	**1.43**	**15.15**	**146.43**	**0.92**	**0.65**	**0.54**	**0.58**	**30.74**	**241.43**	**1.99**
10	**0.78**	**7.58**	**139.30**	**0.24**	**0.34**	**0.24**	**0.23**	**17.04**	**45.75**	**0.62**
11*	**1.10**	**11.56**	**122.59**	**1.22**	**1.81**	**1.06**	**0.98**	**46.3**	**183.08**	**2.59**
12*	**0.64**	**6.28**	**108.70**	**0.19**	**0.45**	**0.33**	**0.28**	**15.74**	**24.09**	**0.55**
13	**0.74**	**7.05**	**110.79**	**0.28**	**0.44**	**0.31**	**0.31**	**16.29**	**53.65**	**0.66**

***denotes basin of concern as determined from the sum of rankings on pollutant loading**

Since each of the subbasins varies in size, the loading results presented in Table 6 were not normalized and consider the extent of the lands that contribute to the loading.

Table 6: Pollutant Loading from Total Subbasin

	Area	TP	TN	TSS	NH3-N	LEAD	ZINC	COPPER	BOD	COD	NO2+NO3
	Acres	lb/yr	lb/yr	lb/yr	lb/yr	lb/yr	lb/yr	lb/yr	lb/yr	lb/yr	lb/yr
1	**252**	**195**	**2240**	**25602**	**111**	**188**	**147**	**120**	**6103**	**17862**	**307**
2*	**625**	**686**	**7313**	**87247**	**426**	**575**	**449**	**371**	**18614**	**89313**	**993**

3*	**610**	**719**	**7440**	**79640**	**588**	**697**	**451**	**438**	**21429**	**116883**	**1236**
4	**625**	**691**	**6984**	**90566**	**296**	**272**	**216**	**243**	**14229**	**58956**	**749**
5*	**132**	**180**	**1934**	**18350**	**112**	**78**	**65**	**73**	**3937**	**27554**	**254**
6*	**335**	**477**	**5077**	**48673**	**281**	**238**	**183**	**209**	**10954**	**56177**	**685**
7	**274**	**345**	**3691**	**36954**	**197**	**159**	**126**	**173**	**7815**	**41745**	**481**
8	**261**	**313**	**3212**	**36538**	**162**	**182**	**143**	**142**	**7086**	**31683**	**396**
9*	**346**	**496**	**5241**	**50655**	**320**	**225**	**189**	**201**	**10635**	**83520**	**688**
10	**651**	**508**	**4938**	**90739**	**157**	**219**	**157**	**151**	**11101**	**29801**	**406**
11*	**124**	**136**	**1438**	**15256**	**152**	**225**	**132**	**122**	**5763**	**22785**	**322**
12*	**699**	**444**	**4389**	**75942**	**135**	**317**	**229**	**196**	**10998**	**16831**	**383**
13	**254**	**188**	**1787**	**28100**	**71**	**112**	**78**	**79**	**4131**	**13607**	**167**

***denotes basin of concern as determined from the sum of rankings on pollutant loading**

This data provides watershed managers with an estimation of the potential pollutant contribution from a particular subbasin. This data is useful primarily for preliminary observations and assessments because of the generalities inherent in the 1995/97 land use maps and the land use based pollutant load estimations. The analysis does, however, provide a starting point for targeting sensitive areas for restoration.

SUBBASINS OF CONCERN

#2 Main Stem of the Pompeston Creek in Cinnaminson

This subbasin is characterized by a large amount of high density residential, industrial, and mixed urban land uses Table 7. The tidal marsh lies at the outlet of the subbasin. The subbasin has a significant portion of land left as forest, water, and wetlands which may help to mitigate some of the effects of the urbanization throughout the basin.

This is one of the larger basins in the watershed (625.31 acres). The loading analysis calculated the second highest total loadings of most of the pollutants including TP, TN, heavy metals, BOD, COD, and NO2NO3. The basin is near the mouth of the Pompeston where it discharges to the Delaware. Therefore, nonpoint source pollution controls upstream, in addition to controls within the basin, will benefit the water quality of the main stem of the Pompeston Creek and the contribution that it makes to the Delaware River.

Table 7: Subbasin #2 Land Use, Main Stem through Cinnaminson to Tidal Marsh

Land Use	Acres	Percent
High/Med Residential	141.22	22.6%
Low/Rural Residential	9.17	1.5%
Commercial	74.29	11.9%
Industrial	98.21	15.7%

Mixed Urban		98.75	15.7%
Agriculture		45.35	7.3%
Forest, Water, Wetlands		144.67	23.1%
Barren Land		13.65	2.2%
	Total	625.31	100.0%

#3 Jack's Run drainage area in Cinnaminson and Riverton

The Jack's Run subbasin is a large drainage area (609.97 acres) with a large percentage of high and low density residential use and the greatest total amount of commercial and mixed urban land use compared to the other basins in the watershed. The basin begins south of Route 130 in Cinnaminson, includes the Riverton Country Club and golf course, continues through a residential area of Riverton, and outlets at the tidal marsh. These aspects of land use and the large drainage area, contribute to the highest total loadings of most nonpoint source pollution including TP, TN, NH3, heavy metals, BOD, COD, and NO2/NO3. When calculated on a loading per acre basis, the Jack's Run subbasin is still one of the largest contributors of heavy metals, BOD and NO2/NO3. Table 8 shows the breakdown of land use in this subbasin.

Table 8: Land Use for Jack's Run subbasin #3

Land Use		Acres	Percent
High/Med Residential		230.20	37.7%
Low/Rural Residential		104.99	17.2%
Commercial		77.19	12.7%
Industrial		0.0	0.0%
Mixed Urban		165.34	27.1%
Agriculture		1.07	0.2%
Forest, Water, Wetlands		27.87	4.6%
Barren Land		3.31	0.5%
	Total	609.97	100.0%

#5 and #6 East Branch Tenby Chase drainage area through Delran and Cinnaminson

These adjacent subbasins are contained in a heavily developed suburban area through Delran and Cinnaminson that creates typical runoff containing some of the highest TP, TN, TP, BOD, NO2NO3, and COD on a per acre basis. These two basins include a total land area of approximately 490 acres. Their combined dense residential land use and their location as a headwater to the East Branch of the Pompeston Creek, places them as a high priority for nonpoint source pollution controls. There are few stormwater water quality controls in this area, and a portion of the stream flows through underground culverts. As can be viewed from Table 9 and Table 10, almost 73% of subbasin 5 and 86% of subbasin 6 are covered with residential development which allows for erosion, geese habitat and fertilizer use, producing stormwater with loading of sediment, bacteria and nutrients.

Table 9: Land Use Subbasin #5

Land Use	Acres	Percent
High/Med Residential	95.93	72.8%
Low/Rural Residential	0.0	0.0%
Commercial	16.54	12.6%
Industrial	0.0	0.0%
Mixed Urban	10.47	7.9%
Agriculture	0.0	0.0%
Forest, Water, Wetlands	8.85	6.7%
Barren Land	0.0	0.0%
Total	131.79	100.0%

Table 10: Land Use Subbasin #6

Land Use	Acres	Percent
High/Med Residential	304.36	85.7%
Low/Rural Residential	1.26	0.4%
Commercial	2.04	0.6%
Industrial	0.0	0.0%
Mixed Urban	45.30	12.7%
Agriculture	0.0	0.0%
Forest, Water, Wetlands	2.29	0.6%
Barren Land	0.0	0.0%
Total	355.25	100.0%

#9 Teaberry Run drainage area in Moorestown

The Teaberry Run is a mid-sized (345.93 acre) drainage area discharging to the West Branch of the Pompeston Creek in Moorestown. The headwaters of the basin begin in the downtown center of Moorestown along Chester Avenue. The basin includes primarily high and medium density residential areas and outlets at Pompeston Park. The dense residential land use contributes to the highest TP, TN and TSS loadings per acre per year as compared to other subbasins across the watershed. The subbasin is also a significant source of NH3, BOD and COD. The land use in this subbasin also contributes some of the highest loads of the trace metal lead, zinc and copper per acre due to the mixed urban and commercial uses. Since this basin is an important headwater to the Pompeston Creek, the high calculated pollutant loadings to stormwater could have a larger impact downstream. Stormwater quality controls should be considered for the Teaberry Basin. Table 11 shows the breakdown of land use in this subbasin.

Table 11: Land Use Teaberry Run Subbasin #9

Land Use	Acres	Percent
High/Med Residential	220.11	63.6%
Low/Rural Residential	21.45	6.2%
Commercial	67.87	19.6%
Industrial	3.24	0.9%
Mixed Urban	26.78	7.8%
Agriculture	0.0	0.0%
Forest, Water, Wetlands	6.48	1.9%
Barren Land	0.0	0.0%
Total	345.93	100.0%

#11 Lakeview Memorial Park in Cinnaminson

The Lakeview Memorial Park subbasin is the smallest subbasin in the watershed draining only 124 acres. The basin begins at the confluence on the East and West Branch upstream of Fountain Farms Park, and outlets at the dam just upstream of the Rt 130 bridge. Of the 124 acres, nearly 50 acres are dedicated to the Lakeview Memorial Cemetery. The 1995/1997 land use cover from NJDEP distinguishes this land as “Other Urban or Built Up Land” and this designation in the nonpoint source analysis results in an unusually high heavy metals load for such a land area. For consistency, the designation was not changed in analysis. Therefore, although the per acre load of lead, zinc, and copper is calculated as the highest for the watershed, this subbasin is not considered to be of high priority for heavy metal pollutant loads to stormwater.

However, field surveillance confirms that nonpoint loading of fecal Coliform and nutrients from resident geese and cemetery contribute to the stormwater loads in this subbasin.

Table 12: Land Use for Subbasin #11

Land Use	Acres	Percent
High/Med Residential	39.74	31.9%
Low/Rural Residential	0.0	0.0%
Commercial	7.27	5.8%
Industrial	0.0	0.0%
Mixed Urban	64.25	51.7%
Agriculture	0.0	0.0%
Forest, Water, Wetlands	13.18	10.6%
Barren Land	0.0	0.0%
Total	124.44	100.0%

#12 West Branch through Pompeston Park drainage area in Moorestown

The Pompeston Park subbasin is the largest in the watershed (698.64 acres). The area has the highest total low density residential land use. There is also a significant portion of land left as forest and wetland at Pompeston Park, there is a small portion of agriculture, and some industry. Although this is the largest subbasin, the total nonpoint source pollutant loads are not nearly as high as in the other larger basins. The TP and TN per acre are the lowest calculated in the watershed. The industrial and other urban areas, however, do contribute to a mid-range level of total heavy metals. The lower impact land uses aid in buffering the pollutant loading capacity in this watershed and therefore remain an important asset.

Table 13: Land Use Subbasin #12

Land Use	Acres	Percent
High/Med Residential	17.68	2.5%
Low/Rural Residential	291.40	41.7%
Commercial	4.52	0.6%
Industrial	36.27	5.2%
Mixed Urban	58.24	8.4%
Agriculture	64.37	9.2%
Forest, Water, Wetlands	185.13	26.5%
Barren Land	41.00	5.9%
Total	698.61	100.0%

Field Reconnaissance: Lakes and Streams

Field reconnaissance was used to assess the physical characteristics of the waterways within the Pompeston Creek Watershed. Observations included numerous areas of streambank erosion, eutrophication/algal growth, and large areas of connected imperviousness that contribute to the increased velocity of the stream and also contributes to lower water quality.

The West Branch of the Pompeston Creek begins in an urbanized area of Moorestown. The Farmdale Tributary to the west and the Teaberry Run and Baker Tributaries from the east meet at Pompeston Park. These narrow and sometimes intermittent streams receive flow from the storm sewer system throughout Moorestown. The stream corridor of the West Branch is Pompeston Park. The main stem of the stream has been straightened and channelized. It is approximately 15 feet wide and 0.5 ft deep. Pompeston Park allows public access to the Pompeston Creek. Trails and paths from the surrounding streets and Baker Elementary School provide recreational opportunities for the community. Once it leaves the park, the West Branch flows through medium to high density residential areas of Moorestown and Cinnaminson. The main stem of the West Branch through Cinnaminson experiences erosion and flashiness during storm events. There are severely eroded banks downstream of the Devon Road Bridge. Many homeowners in this area have stabilized the banks with railroad ties, rocks, sandbags, or concrete. Flooding is also an issue at Devon Road.

The headwaters of the East Branch predominantly lie in Moorestown and take a course through some lands used as horse farms. This area is influenced by a more rural and agricultural land use in transition to low density residential. Much of the storm water conveyance is through ditches along the roadways. A 7.4 acre private pond receives flow from a tributary of the East Branch. The pond feeds the main stem of the east branch via a spillway.

Further downstream on the East Branch (northeastern portion of the Pompeston Creek Watershed), the land use transitions into high and medium density residential developments in Delran and Cinnaminson. Some portions of the stream are piped underground (Westover to Woodhaven Drive), while others have been channelized. Erosion and flashy flow are characteristic of the stream throughout this area. There are severely eroded banks at Winding Brook Drive downstream of Parry Road At New Albany Road, underground culverts discharge flow from a tributary that drains the Tenby Chase development. A tributary that discharges to the East Branch at Waterford Drive and Barberry Drive drains residential developments in Delran. The headwaters of the tributary flow through a single outfall pipe from the Tenby Chase development. Although the stream then passes through Tenby Chase Park which is home to many native species, high stormwater flows have steeply eroded banks through the park. Although the East Branch receives a great deal of stormwater, during dry periods, it often

runs dry between the New Albany Elementary School and the confluence of the East and West Branches at Willow Drive and Fountain Farms Park.

The East Branch meets the West Branch at Fountain Farms Park. Fountain Farms Park is a point of public access to the Pompeston Creek. Children and families use the area for recreation and fishing. Two large outfalls discharge to the main stem at Fountain Farms Park, and the streambanks have been eroded. Downstream of Fountain Farms Park is the Lakeview Memorial Park and Cemetery. The Pompeston Creek flows into a shallow 2.5 acre lake, before spilling over a dam and under the Rt. 130 Bridge. Downstream of Route 130, the stream widens and the streambanks experience a great deal of erosion. Here, the banks here are approximately 25 feet above the streambed. Less than one-quarter mile downstream, the Pompeston Creek is tidal. The head of tide can be found behind Buttonwood Lane, upstream of Cinnaminson High School.

The Pompeston Creek opens up to a tidal marsh downstream of Cinnaminson High School. The tidal marsh is home to a diversity of waterfowl and native plant species such as wild rice. The irrigation pond for Hunter's Farm is on the east bank of the marsh in Cinnaminson. Jack's Run empties into the tidal marsh from the west bank in Riverton. Jack's Run begins south of Route 130 around Highland Avenue. This area is characterized as commercial land use. The stream is fed by stormwater and contains a lot of sediment. The stream then disperses across the golf course at the Riverton Country Club. Ponds at the north end of the golf course along Thomas Avenue then discharge to Jack's Run. The stream channel contains a lot of concrete and other stabilization and receives a large amount of sediment. The tributary usually contains no flow until approximately five hundred feet downstream of Cedar Street.

Lippincott Pond is a small impoundment downstream of River Road on the east bank near the Cinnaminson Wastewater Treatment Plant. A significant amount of resident Canada Geese inhabit this area. The Pompeston Creek empties to the Delaware River between the Cinnaminson and Riverton Wastewater Treatment Plants.

Groundwater Recharge

The Pompeston Creek Watershed lies within the New Jersey Coastal Plain which is part of the Atlantic Coastal Plain physiographic province. The Coastal Plain is defined as a Sole Source Aquifer (SSA). A Sole Source Aquifer is one that contributes more than 50% of the drinking water to a specific area and the water would be impossible to replace if the aquifer were contaminated. With this designation, any federally-funded project that could affect groundwater must be reviewed by the USEPA. This "project review area" includes the aquifer's recharge zone and its stream-flow source zone, both of which contribute recharge water to the aquifer.

The Coastal Plain contains five major aquifers. The major source of drinking water for Burlington County has been the Potomac-Raritan-Magothy aquifer. However, increasing demands on the groundwater system are stressing the sustainability of this aquifer.

The Pompeston Creek Watershed is located within the Critical Water Supply Management Area No. 2 as designated by the state's Water Supply Management Act. Critical Area designations are made where excessive groundwater withdrawal poses a significant risk to the long term integrity of a water supply source. In Critical Water Supply Management Area 2, pumping from the Potomac-Raritan-Magothy aquifer system has caused the water level in a representative well (Elm Tree observation well) to decline 50 feet since 1968 (USGS, 2004).

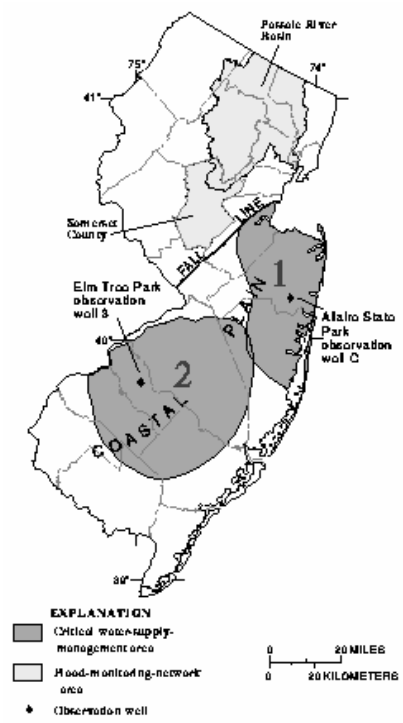

Figure 8: New Jersey's Critical Water Supply Areas

This designation is intended to identify and implement alternative water supplies to decrease demand on the aquifer. Water allocations from the Potomac-Raritan-Magothy aquifer system were reduced by an average of 22 percent within this vicinity (NJDEP, 2005). As the largest water supplier in the area, the New Jersey American Water Company was authorized to design, finance and build a project allowing the removal of 40 million gallons a day from the Delaware River in Cinnaminson and pumped to a treatment center in Delran.

Within the Pompeston Creek Watershed, New Jersey American Water Supply operates two well, that are permitted to withdraw one thousand gallons per minute and eight

hundred gallons per minute (NJGS, 2005). Actual head data and pumpage data are not available at this time. Reduction in stream flow due to urbanization, channel alteration or groundwater withdrawal can adversely affect water quality and the related ecology. Anecdotal evidence of reduced flow in areas of the Pompeston Creek near the location of the pumpage wells has been reported, but not officially documented. There is no USGS streamflow-gaging station available to confirm or deny this phenomenon.

Water Quantity

For the purposes of identifying critical areas subject to flooding according to different design storms, and to evaluate environmentally sound and cost effective measures to minimize damages under certain conditions, a hydrologic model was developed for the Pompeston Creek Watershed by the Rutgers Cooperative Research and Extensions' Water Resources Program. An approach using the model, The Hydrologic Engineering Center's Hydrologic Modeling System (HEC-HMS) which was developed by the United States Army Corps of Engineers, was used to identify surface runoff originating in different areas of the watershed. This hydrologic model is capable of routing stream flow and producing stream flow hydrographs under various hypothetical storm events.

This model delineated the Pompeston Creek Watershed into a total of thirteen subbasins. A 10 meter digital elevation model (DEM) obtained from NJDEP was used to determine the subbasin delineation used for the hydrological model. For each individual subbasin in the Pompeston Creek watershed, a composite curve number and initial abstraction were estimated using the SCS curve number infiltration loss method. Similarly, time lags were estimated using the Snyder unit hydrograph method for runoff transform.

The curve number is a critical parameter representing the infiltration/runoff capacity of the area and can be assigned based on the land use profile, hydrologic soil group and available soil moisture. The 1995 land use land cover data coverage available from the NJDEP GIS database, and the NRCS SSURGO soils were used to determine average soil moisture condition curve numbers for each land use and soil combination in the Pompeston Creek watershed. The composite (area weighted average) curve numbers were obtained using spatial analysis techniques and spatial databases within GIS.

Field surveillance and the subsequent modeling study were launched with the goal of identifying the critical areas subject to flooding for different storm events. The models can also assess opportunities to reduce flooding impacts through various storm water management strategies. The results of the steady state simulation for different design storms will define areas subject to flooding throughout the various segments of the Pompeston Creek Watershed. Since the Pompeston Creek watershed is less than 10 square miles and has only been broken into 13 subbasins, it was feasible to consider all 13 subbasins in the analysis. Figure 9 shows the subbasins as delineated for the initial hydrologic analysis.

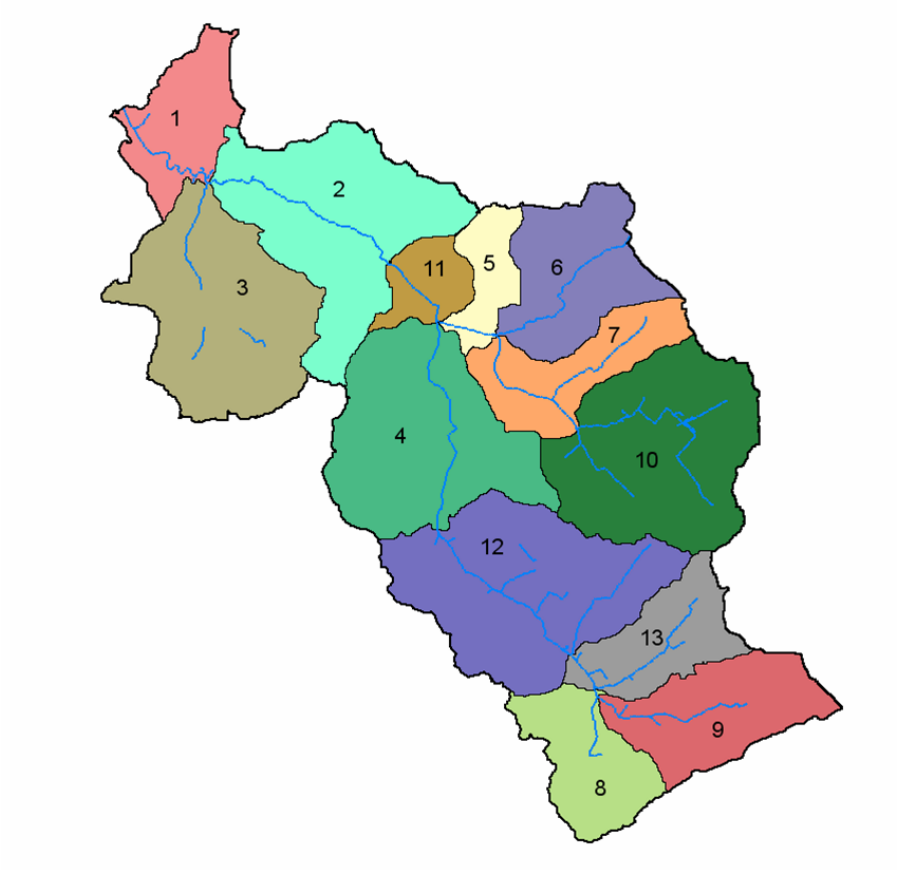

Figure 9: Subbasins used in the hydrologic model of the Pompeston Creek Watershed

The basins were qualified by total area, peak flows and discharge volumes. All thirteen basins were selected for further stormwater management analysis. The character of the basins is described in Table 14.

Table 14: Subbasins for hydrologic analysis

Watershed	Drainage Area (sq mi)	Description
1	0.375	Mouth of the Pompeston, drains the entire watershed, includes part of the tidal marsh
2	0.977	Drains to the main stem of the Pompeston Creek, down stream of Route 130 and the dam at Lakeview Memorial Park
3	0.953	Drains to the Jack's Run tributary in Riverton, begins slightly upstream of the Riverton Country Club and golf course, meets the main stem at the tidal marsh
4	0.976	Drains to the West Branch between North Riding Drive and Willow Drive at Fountain Farms Park at the confluence of the East and West Branch, Cinnaminson, mostly single unit residential
5	0.206	East Branch, drains from Route 130 to the confluence of the East and West Branches
6	0.555	Drains to the East Branch under New Albany Road, includes the Tenby Chase development in Delran
7	0.428	Drains to the East Branch at Waterford Drive, Cinnaminson, begins at the southern portion of the Tenby Chase development, Delran, and Tenby Chase Park
8	0.408	Farmdale Tributary, Moorestown, drains from Camden Avenue to Church Street
9	0.540	Drains to Teaberry Run on the West Branch, drains from Moorestown HS through downtown area to Pompeston Park
10	1.018	Drains farmland and wetlands from Bridgeboro Road in Moorestown to the East Branch at Well Fleet Road
11	0.194	Drains from Willow Drive, including Lakeview Memorial Park and cemetery, to the Pompeston main stem in Cinnaminson
12	1.092	Drains Pompeston Park and residential area, Moorestown, to North Riding Drive, includes wetland areas
13	0.396	Drains area from Riverton Road to Pompeston Park into the Baker Tributary

The stormwater management analysis attempts to illustrate management effects on runoff quantity by simulating an increase or decrease in impervious surface cover. An increase in impervious surface is represented by an increase in the weighted curve number, while the implementation of a stormwater management technique (stormwater BMP, for example) is represented by a decrease in the weighted curve number.

These scenarios were simulated by modifying the area weighted curve number for each subbasin within the HEC-HMS hydrologic model. A curve number is a hydrologic parameter given to parcels of land after combining the qualities of the soil, land use and antecedent moisture. The curve number for each parcel is representative of the runoff. A composite curve number calculated using the area weighting procedure, is then used to characterize the runoff properties of the subbasin. HEC-HMS then simulates runoff and calculates peak flow discharge and volume. Since wetlands are considered to be open bodies of water with little infiltration capacity in the SCS method, they were assigned a curve number of 98. However, in reality, wetlands do not act like a paved surface; they do hold back some water during a storm event. Therefore, when calculating the change in peak flow and volume with a 10% increase or decrease in the curve number, the wetlands curve number was left as constant. This also assumes that the wetlands areas will not be developed.

Two different scenarios were defined in each of these thirteen watersheds. For scenario one, the area weighted curve number was increased by 10% and peak flow and volume discharges were recalculated. For scenario two, the area weighted curve number was decreased by 10%, and peak flow and volume discharges were recalculated. In the analysis of the Pompeston Creek Watershed, it was assumed that a 10% change in the curve number was a practically achievable goal. For scenario one, the increase in the curve number represents an increase in the percentage of impervious surfaces in the subbasins should future residential or commercial development occur. Respectively, in scenario two, the decrease in curve number simulates the implementation of stormwater management strategies in the selected subbasins that would effectively control surface runoff and reduce peak flows and volumes.

Since the goal of the Pompeston Creek Watershed flow model was to simulate the impact of flooding according to standard design storms, the SCS hypothetical storm precipitation method was selected. The SCS hypothetical storm method implements four (I-IV) synthetic rainfall distributions developed by the Natural Resources Conservation Service (NRCS) from observed precipitation events. Each distribution contains rainfall intensities arranged to maximize the peak runoff for a given total storm depth (U.S. Army Corps of Engineers, 2001).

A type III storm that represents the typical storms of the Atlantic coastal areas of the United States, was selected. Storm depths corresponding to the 2, 10, and 100 year storms were entered as model parameters. Table 15 summarizes the average 24-hour rainfall depths for Burlington County for the different design storms.

Table 15: Burlington County Rainfall Depths for Standard Design Storms (USDA-NRCS)

TYPE III STORM	24-HR RAINFALL (INCHES)
2-Year Storm	3.4
10-Year Storm	5.2
100-Year Storm	8.8

Tables 16, 17 and 18 show the peak flows and volumes generated by HEC-HMS for the subbasins within the watershed. The analysis was generated for the 2-year, 10-year and 100-year design storms for the existing conditions in the selected sub watersheds and the 10% increase and 10% decrease in the curve numbers. The tables also show the percent change in the peak flows and volume of runoff for each scenario with respect to the existing conditions in the watershed.

Table 16: Peak flows and volumes for different scenarios for a 2-year storm

				Decrease 10%		Existing Condition		Increase 10%	
Basin	Area wt CN	CN+ 10%	CN- 10%	Peak Flow (cfs)	Total Vol (ac-ft)	Peak Flow (cfs)	Total Vol (ac-ft)	Peak Flow (cfs)	Total Vol (ac-ft)
1	73	78	68	39.2	18.1	46.4	21.1	55.1	24.6
2	76	83	70	96.7	50.9	119.7	62.0	149.7	75.9
3	74	81	66	80.0	42.4	101.3	52.8	129.5	66.0
4	78	86	71	110.6	55.7	139.9	69.0	179.2	86.3
5	76	84	69	27.1	11.0	34.7	13.7	44.9	17.1
6	83	91	75	87.1	38.7	113.3	49.1	149.6	62.9
7	83	91	75	63.7	29.7	81.9	37.4	106.7	47.4
8	79	87	71	61.5	24.8	79.4	31.2	104.0	39.5
9	81	89	73	73.3	34.7	94.9	44.0	124.9	56.2
10	84	90	78	36.9	23.6	48.4	30.4	66.5	40.6
11	67	74	60	15.5	6.3	19.4	7.7	24.5	9.5
12	84	91	78	161.7	82.8	198.5	100.0	245.9	121.7
13	81	88	74	59.9	26.4	75.5	32.6	96.5	40.5
Basin				Percent Change				Percent Change	
1				-15.5	-14.2			18.9	16.8
2				-19.3	-17.9			25.0	22.4
3				-21.0	-19.6			27.9	25.0
4				-20.9	-19.4			28.1	24.9
5				-21.7	-19.8			29.5	25.4
6				-23.1	-21.2			32.1	28.2
7				-22.2	-20.4			30.3	26.9
8				-22.5	-20.4			31.0	26.7
9				-22.8	-21.0			31.5	27.8
10				-23.8	-22.5			37.3	33.4
11				-20.2	-18.5			26.1	22.9
12				-18.5	-17.2			23.8	21.7
13				-20.8	-19.0			27.8	24.3

Table 17: Peak flows and volumes for different scenarios for a 10-year storm

				Decrease 10%		Existing Condition		Increase 10%	
Basin	Area wt CN	CN+ 10%	CN- 10%	Peak Flow (cfs)	Total Vol (ac-ft)	Peak Flow (cfs)	Total Vol (ac-ft)	Peak Flow (cfs)	Total Vol (ac-ft)
1	73	78	68	93.9	41.2	107.5	46.5	122.9	52.3
2	76	83	70	218.9	111.7	259.1	130.5	306.0	151.9
3	74	81	66	191.7	97.5	231.8	116.1	279.5	137.5
4	78	86	71	243.0	119.0	291.8	140.8	349.3	166.0
5	76	84	69	62.3	24.1	75.6	28.6	91.4	33.9
6	83	91	75	179.5	78.2	218.6	93.7	264.1	112.0
7	83	91	75	131.1	60.1	158.3	71.5	189.7	84.9
8	79	87	71	133.9	52.4	163.0	62.5	197.5	74.3
9	81	89	73	154.7	71.8	188.6	86.0	228.3	102.8
10	84	90	78	167.3	86.6	205.5	103.1	256.4	123.3
11	67	74	60	44.6	16.2	53.9	19.2	65.0	22.5
12	84	91	78	321.0	162.6	373.5	187.5	432.0	215.8
13	81	88	74	125.7	54.2	150.0	63.7	178.1	74.6

Basin	Percent Change		Percent Change	
1	-12.6	-11.4	14.3	12.6
2	-15.5	-14.4	18.1	16.4
3	-17.3	-16.0	20.6	18.5
4	-16.7	-15.5	19.7	17.9
5	-17.6	-15.9	21.0	18.4
6	-17.9	-16.6	20.8	19.5
7	-17.2	-16.0	19.9	18.6
8	-17.9	-16.2	21.1	18.9
9	-17.9	-16.6	21.1	19.4
10	-18.6	-15.9	24.8	19.6
11	-17.2	-15.5	20.5	17.6
12	-14.1	-13.3	15.7	15.1
13	-16.2	-14.9	18.7	17.1

Table 18: Peak flows and volumes for diferent scenarios for a 100-year storm

				Decrease 10%		Existing Condition		Increase 10%	
Basin	Area wt CN	CN+ 10%	CN- 10%	Peak Flow (cfs)	Total Vol (ac-ft)	Peak Flow (cfs)	Total Vol (ac-ft)	Peak Flow (cfs)	Total Vol (ac-ft)
1	73	78	68	227.0	97.1	249.3	105.8	272.2	114.8
2	76	83	70	509.7	256.8	572.1	286.3	635.8	316.9
3	74	81	66	467.3	233.0	534.1	263.9	603.4	296.0
4	78	86	71	552.9	267.9	625.3	301.1	698.5	335.5
5	76	84	69	146.3	55.5	166.9	62.7	187.9	70.1
6	83	91	75	387.6	168.0	440.0	190.0	489.5	212.8
7	83	91	75	282.7	129.1	319.1	145.3	353.8	162.0
8	79	87	71	302.0	116.7	344.0	131.9	385.5	147.6
9	81	89	73	341.3	157.1	388.5	177.9	434.5	199.6
10	84	90	78	549.6	246.6	623.7	274.2	704.9	303.7
11	67	74	60	122.7	42.2	141.1	47.7	160.5	53.5
12	84	91	78	670.8	340.3	737.8	374.3	801.5	409.4
13	81	88	74	275.1	117.8	308.6	131.6	341.2	145.7

Basin	Percent Change		Percent Change	
1	-9.0	-8.2	9.2	8.5
2	-10.9	-10.3	11.2	10.7
3	-12.5	-11.7	13.0	12.2
4	-11.6	-11.0	11.7	11.5
5	-12.4	-11.4	12.6	11.9
6	-11.9	-11.6	11.2	12.0
7	-11.4	-11.1	10.9	11.5
8	-12.2	-11.5	12.1	11.9
9	-12.1	-11.7	11.8	12.2
10	-11.9	-10.1	13.0	10.7
11	-13.0	-11.7	13.8	12.1
12	-9.1	-9.1	8.6	9.4
13	-10.9	-10.4	10.6	10.8

Table 19 shows the average percentage changes in the peak flow and volume of runoff from the sub watersheds for 10% increase and decrease of curve number for all the three design storms.

Table 19: Flow and volume change with alteration of curve number

Storm Event	Decrease in CN by 10%		Increase in CN by 10%	
	Peak Flow %	Total Vol %	Peak Flow %	Total Vol %
2-Year Storm (3.4 inches over 24 hours)	-20.9	-19.3	28.4	25.1
10-Year Storm (5.2 inches over 24 hours)	-16.7	-15.2	19.7	17.7
100-Year Storm (8.8 inches over 24 hours)	-11.4	-10.8	11.5	11.2

This table shows that for a 2-year design storm of 3.4 inches of rainfall over a 24 hour period, with a reduction of 10% in the curve number for the selected sub watersheds, the peak flow decreased by an average of 20.9% and the volume of runoff decreased by and average of 19.3%. Also with the increase of 10% curve number for the selected subbasins, the peak flow increased by an average of 28.4% and the volume of runoff increased by an average of 25.1%. For a 10-year design storm, the reduction of 10% in the curve number resulted in the reduction of an average of 16.7% of the peak flows and 15.2% of the volumes of runoff, whereas, the increase in 10% of the curve number resulted in the average increase of peak flows by 19.7% and increase of the volume of the runoff by 17.7%. Finally, for a 100-year design storm, the reduction in the curve number resulted in the average reduction of peak flow by 11.4% and volume of the runoff by 10.8%, whereas the increase of 10% of the curve number increased the peak flow and volume by and average of 11.5% and 11.2%, respectively.

It can be concluded from the previous scenarios that any changes in the watershed that would affect runoff have a more significant impact during storms of lower intensities than in the storms of higher intensities. The simulations show that stormwater management efforts can significantly reduce the peak flow rates and discharge volumes that contribute to flooding concerns during smaller storm events. It is these smaller, more frequent storms that contribute the majority of the rainfall in the state of New Jersey over a given year, and mitigating the effects of these smaller storms could have a significant positive impact on the water quantity issues through the watershed. A 10% increase in the curve number resulted in the highest percent increase in flow for basins 6 and 10. Basin 6 increased peak flow by 32.1% and volume by 28.2 %. This basin is very near build-out; it is 86% residential development. Therefore, the decrease in peak flow and volume becomes a more prominent issue. High flows and poor recharge are characteristic of this drainage area, and there are very few storm water controls in place. If the curve number can be decreased by 10% through stormwater BMPs, the peak flow and volume can be decreased by 23.1% and 21.2%, respectively. Basin 10 has the highest percent change in peak flow and volume if the curve number is increased by 10%. This area is going through a transition from agricultural land use to low density residential. The wetlands in the watershed play a large role in the high calculated curve number. Although these calculations are a rough estimate of what to expect, it should be

noted that if stormwater is not managed wisely as this area becomes more developed, there could be severe impacts downstream.

It should also be noted from Table 16 that a 10% increase in the weighted curve number for basins 8, 9, and 13 results in a large increase in peak flow and total volume during the 2 year storm. Decreasing the curve number by 10% also creates a large decrease in peak flow and volume. These basins are the headwaters to the West Branch. Issues downstream along the West Branch can be either compounded or alleviated by what happens upstream. Any increase in impervious surface in this area will have significant effects downstream and efforts should be taken to mitigate the effects of increased runoff in this portion of the watershed.

V. Regulations and Programs

Each of the four municipalities in the Pompeston Creek Watershed is required to comply with the requirements of the Statewide General Tier A New Jersey Pollutant Discharge Elimination System (NJPDES) permit for their Municipal Separate Storm Sewer System (MS4). Appendix E shows the schedule of implementation to which the municipalities need to adhere. The General MS4 NJPDES permit requires each municipality to develop a Municipal Storm Water Management Plan (MSWMP) and a Stormwater Control Ordinance. Furthermore, each municipality must assure that all development complies with the Residential Site Improvement Standards. See Appendix E for a summary of the Statewide Basic Minimum Requirements for the General (Tier A) MS4 NJPDES permit.

The requirements for the MSWMP include completing a build out analysis, calculating pollutant loads that would result from build out, and incorporating nonstructural stormwater management strategies into municipal development codes. The build out is required of the municipalities that have greater than one square mile of developable land.

Additionally, the General MS4 NJPDES permit requires each municipality to adopt and implement several key ordinances that will promote the use of stormwater as a resource. These ordinances include the following:

-Stormwater Control Ordinance:
A sample ordinance can be found at:
http://www.state.nj.us/dep/watershedmgt/DOCS/BMP_DOCS/bmpfeb2004pdfs/feb2004appdxd.pdf

-Yard waste:
A sample ordinance can be found at:
http://www.njstormwater.org/tier_A/pdf/containerized%20yard%20waste%20ordinance.pdf

-Illicit Connection
A sample ordinance can be found at:

http://www.njstormwater.org/tier_A/pdf/illicit%20connection%20ordinance.pdf

-Wildlife Feeding
A sample ordinance can be found at:
http://www.njstormwater.org/tier_A/pdf/wildlife%20feeding%20ordinance.pdf

-Improper Disposal of Waste
A sample ordinance can be found at:
http://www.njstormwater.org/tier_A/pdf/improper%20disposal%20of%20waste%20ordinance.pdf

-Litter Control
A sample ordinance can be found at:
http://www.njstormwater.org/tier_A/pdf/litter%20ordinance.pdf

-Pet Waste
A sample ordinance can be found at:
http://www.njstormwater.org/tier_A/pdf/pet%20waste%20ordinance.pdf

Additional considerations for ordinances that would benefit water quality and regulate water quantity could include a stream corridor/no fill ordinance, and an ordinance that will address the increase impervious area that comes with "knock-down/rebuilds". These ordinances should include low-impact development type language that allows for better use of stormwater as a resource.

Total Maximum Daily Load's (TMDL's)

As discussed previously, a TMDL represents the assimilative or carrying capacity of a waterbody, taking into consideration point and nonpoint pollution, natural conditions, and surface water withdrawals. A TMDL is a mechanism for identifying and quantifying all contributors to surface water quality in a drainage basin and setting goals for reductions needed to meet surface water quality standards (NJDEP, 2004).

Although a TMDL has not been proposed for the Pompeston Creek Watershed, the Regional Stormwater Management Plan will anticipate the need to address biological impairments and potential bacterial contamination and phosphorus loading and will plan accordingly.

VI. Information Not Available

The needs of the watershed and the information available about the watershed will determine the analysis and structure of the final Regional Stormwater Management Plan. Information that can be obtained without consuming undue resources of the committee must be used to provide the plan within the boundaries that have been originally set.

However, for the purposes of accurately representing the watershed for the intended purposes, several pieces of information would have been helpful.

A digital representation of the stormwater conveyance system would have provided information on sewersheds that may not follow the subbasins as defined by the topography. It is expected that these drainage patterns for the stormwater infrastructure would closely follow the topography of the land, making the cost of acquisition difficult to justify.

A digital representation of the flood hazard areas based on delineations made by the NJDEP under the Flood Hazard Area Control Act, N.J.S.A. 58:16A-50 was unavailable. The flood hazard areas are delineated given a storm depth equal to 125% of the 100-year design storm for the county. These maps are currently being developed in hard copy by the NJDEP, and it is anticipated that they will eventually be available digitally.

A digital elevation model that represents the watershed's topography at a resolution of a minimum of 2 feet would have provided more accurate delineations and provided a basis for cross sections in the building of a hydraulic model. This data set was initially believed to be available, but the data format was unusable in computer models.

The County of Burlington acquired a highly detailed data set that was produced through a LIDAR (Light Detection And Ranging) technique. This technology is powerful, but is not yet totally reliable, in that techniques used can lead to corrupted data sets. In this case, the data set was prepared (flown) when the leaves on the trees were on, resulting in elevations that included all vegetation and buildings. This data set was evaluated by several skilled individuals, but eventually it was determined this data set was not able to be used in a hydrologic/hydraulic study.

VII. Geographical Information System

As per 7:8-3.4 (b): *The Department encourages the use of existing information to the extent that it is available to minimize the cost of data acquisition, such as information available on the Department's Geographical Information System website or as developed through a watershed planning process.*

The process of map production for the Pompeston Creek Regional Stormwater Management Plan was achieved by the use of GIS data layers found on the NJDEP's website, http://www.state.nj.us/dep/gis/newmapping.htm.

This project has also benefited from GIS data sharing between the Rutgers Cooperative Extension Water Resources Program and Burlington County and the data made available through the Rutgers Center for Remote Sensing and Spatial Analysis (CRSSA).

VIII. Determination of Inclusion in Watershed Boundary

As per 7:8-3.4 (c): *The characterization and assessment shall include information on locations and activities outside the regional stormwater management planning area that drain into the planning area.*

With the topographic and stormwater conveyance that has been obtained by the committee, and field verification by the Water Resources Program, the watershed boundary that is represented on the maps is a good depiction of the actual drainage area. However, an unnamed tributary that courses through the Tenby Chase development in Cinnaminson and Delran appears to be draining to the Swedes Run Watershed, northeast of the Pompeston. The topography in the area slopes toward the Pompeston Creek and was therefore included within the watershed boundary. However, it appears that the stream bed was regarded allowing the flow in the opposing direction, flowing into Swedes Run in the area of Southview Drive and Tenby Chase Drive. The potential change in drainage area does not appear significant enough to alter the analysis.

IX. Rank of Water Quality Impacts

According to 7:8-3.4 (d): *Using the modeling or other information obtained under(a) through (c) above, the stormwater-related water quality impacts of existing land uses and projected land uses assuming full development under existing zoning shall be identified and ranked*

A. Inventory Pollutant Sources to the Pompeston Creek Watershed

Stormwater-related pollutant sources
As discussed earlier in this report, the Pompeston Creek Watershed was subdivided into thirteen subbasins and an aerial loading analysis was performed for each of these sub-watersheds. Based upon these calculations, the high density residential, commercial and industrial land uses provide the most significant loads to the Pompeston Creek. The residential areas and corporate complexes are believed to contribute significant nutrient loads and pesticide loads due to lawn maintenance activities. Sediment, the number one pollutant throughout the country, has a high potential to impair the Pompeston Creek. Sources of sediment include road grit, sanding of icy impervious surfaces in the winter, stream bank erosion due to the localized flashy hydrologic nature of the Pompeston Creek, land disturbance from new development and redeveloping areas, and the inability of invasive species to provide the root structure needed to prevent soil erosion. Fecal coliform is also a pollutant that is known to impair the water quality of the waterways in the Pompeston Creek Watershed. Sources of fecal coliform include resident Canada geese population, pet waste, wildlife (deer, raccoons, etc.) and illicit discharges of human waste. Furthermore, debris is a pollutant found in this watershed. The moderate to high level of imperviousness in the watershed provides an avenue for debris to collect and be

easily washed into the Pompeston Creek and its tributaries. Listed below are specific water quality issues that have been identified in the watershed.

Stormwater-related pollutants
All of the above pollutants can be transported to the waterways in the Pompeston Creek Watershed by stormwater runoff. Pollutants of concern include nutrients (phosphorus and nitrogen), sediment (total suspended solids), Fecal Coliform, toxics, and debris. These pollutants either individually or in combination may contribute to the impairment of the aquatic community in the Pompeston Creek Watershed.

B. Affected Uses

The Pompeston Creek is of high value to the communities through which it flows. It runs through several public parks where children play in the stream during warm weather and could potentially pose a health threat to those children.

The Pompeston Creek empties into the Delaware River less than 1.5 miles from the surface water intake for the New Jersey American Water Company pipeline in Cinnaminson, which serves as a drinking water source for many residents of New Jersey.

Although many of the traditional pollutants, such as TSS and phosphorus, primarily affect the surface waters, the infiltration of contaminated stormwater or the leaching of contaminants already in the system by precipitation could eventually affect the quality of the groundwater.

C. Identification and Rank of Pollutants and Sources

Table 20 provides a list of concerns regarding water quality that the Pompeston Creek Regional Stormwater Management Plan will address.

Table 20: Water Quality Impacts

	Concern	Notes
#1	Sublist 5 Waterbodies: Biological Impairment	Identify Stressors contained in non-point pollution that would contribute to macroinvertebrate impairment.
#2	Bacterial Contamination	Address non-point sources of bacterial contamination (i.e. pet waste, leaking sanitary sewers or septics)
#3	Erosion	Erosion would increase Total Suspended Solids, phosphorus and other contaminants, and lead to reduced quality of water and habitat downstream.
#4	Floatables/Debris	Careful examination of stream "cleaning". Must not disturb habitat.
#5	Lack of Stream Corridor Protection Ordinance	Cinnaminson, Delran and Riverton
#6	Redevelopment Plan for Route 130 from Pompeston to Wynwood Avenue	Stream Corridor Protection
#7	Invasive flora	To address destabilization of stream banks and lack of adequate food and habitat source for macroinvertebrates

X. Rank of Water Quantity Impacts

As per 7:8-3.4 (e): *Using the model or other information obtained under (a) through (c) above for stormwater-related water quantity impacts and stormwater-related groundwater recharge impacts of existing and projected land uses*

A combination of the hydrologic modeling effort and the field reconnaissance surveys provided valuable information on areas within the Pompeston Creek that experience flooding or other issues related to increased water quantity. Some of these areas of concern have been ranked below in Table 21.

Many sites in the watershed were found to be affected by the inefficient conveyance of stormwater. Examples of this could include erosion, downcutting and flooding. Land use that increases connected impervious cover is a concern with regard to increasing the water quantity and velocity. Erosion due to the increased velocity of the stream becomes a concern in both water quantity and water quality.

Table 21 ranks the water quantity concerns, flooding and otherwise, with consideration of threat to public health, safety, and welfare; risk of loss of or damage to water supplies; and risk of damage to the biological integrity of water bodies (as per N.J.A.C. 7:8 3.4 (e)).

Table 21: Water Quantity Impacts

	Concern	Notes
#1	Flooding-between Parry Road and Wayne Avenue, Cinnaminson	Severe erosion of banks, flooding the worst around Devon Road bridge, a lot of bank stabilization by homeowners
#2	Flooding-Waterford Drive, Cinnaminson and Delran	Stormwater is piped to one large culvert under Waterford Drive, during heavy storms the inlet at York Road overflows and floods the road. Basements also flood. The stream backs up downstream at dirt road crossing. Mosquito larvae in standing water
#3	Flooding-Westover Drive, Delran	Large field downstream of Tenby Chase Park on Westover Drive floods all the way to the tree line
#4	Erosion- Tenby Chase Drive	Severe erosion downstream of outfall through Tenby Chase Park
#5	Erosion - Route 130	Severe erosion downstream of Route 130 and dam at Lakeview Memorial Park
#6	Erosion - Parry Road and Winding Brook Drive	Severe erosion, not much stabilization by homeowners, severe erosion is localized
#7	Baseflow reduction (East Branch often dry between New Albany School and the confluence with the West Branch)	East Branch, approximately 1000 feet downstream of intersection of New Albany Road and Parry Road) and the confluence of the West Branch. Anecdotal evidence; no USGS gauging station
#8	Groundwater Depletion	NJDEP reported on depletion of Potomac-Raritan-Magothy Aquifer
#9	Channelization	Example: Teabury Run rip rap, erosion, Jack's Run concrete in channel.
#10	Flooding- Fountain Farms Park	Stream will overflow banks, significant erosion and steep banks
#11	Flooding- Riverton Country Club	Jack's Run piped as stormwater from Route 130, flows over and floods golf course at two locations, Manor Road and Highland Avenue

XI. Resources

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Appendix A: N.J.A.C. 7:8-3, Stormwater Management Rules

ENVIRONMENTAL PROTECTION

(a)

LAND USE MANAGEMENT
WATERSHED MANAGEMENT

✱ Stormwater Management

Adopted Repeal and New Rules: N.J.A.C. 7:7E-8.7, 7:8 and 7:13-2.8
Adopted Amendments: N.J.A.C. 7:7A-4.3 and 5.11, 7:15-3.4 and 3.5 and 7:20-1.3

Proposed: January 6, 2003 at 35 N.J.R. 119(a) (see also 35 N.J.R. 1328(a) and 4220(a)).

Adopted: January 5, 2004 by Bradley M. Campbell, Commissioner, Department of Environmental Protection.

Filed: January 6, 2004 as R.2004 d.48, **with substantive and technical changes** not requiring additional public notice and comment (see N.J.A.C. 1:30-6.3).

Authority: N.J.S.A. 12:5-3, 13:1D-1 et seq., 13:9A-1 et seq., 13:19-1 et seq., 40:55D-93 to 99, 58:4-1 et seq., 58:10A-1 et seq., 58:11A-1 et seq. and 58:16A-50 et seq.

DEP Docket Number: 34-02-12/109.

Effective Date: February 2, 2004.

Expiration Dates: August 3, 2006, N.J.A.C. 7:7A;
January 7, 2008, N.J.A.C. 7:7E;
February 2, 2009, N.J.A.C. 7:8;
June 30, 2005, N.J.A.C. 7:13;
April 30, 2004, N.J.A.C. 7:15;
April 28, 2005, N.J.A.C. 7:20.

The Department of Environmental Protection (Department) is adopting new Stormwater Management rules proposed on January 6, 2003 at 35 N.J.R. 119(a). The Department is also amending the stormwater management provisions of the following rules in order to coordinate with and cross-reference the new Stormwater Management rules: the Freshwater Wetlands Protection Act Rules at N.J.A.C. 7:7A; the Coastal Zone Management Rules at N.J.A.C. 7:7E; the Flood Hazard Area Control Act rules at N.J.A.C. 7:13; the Water Quality Management Planning rules at N.J.A.C. 7:15; and the Dam Safety Standards at N.J.A.C. 7:20. Based on comments received on the January 6, 2003 proposal, the Department determined that the originally proposed definition of "major development" could have been misinterpreted to mean that projects possessing preliminary local approval before the new rules took effect would be considered exempt from all stormwater review, rather than exempt from the additional requirements imposed by the new rule. Implementation of the new rules under this exemption would not have provided the protection of waterbodies in the State from the impacts of stormwater runoff and nonpoint source pollution. Therefore, it was necessary to repropose the definition of "major development" and add a new applicability provision to ensure Department review of stormwater management has occurred in order for a project to be grandfathered. (See 35 N.J.R. 4220(a); September 15, 2003.) The Department is concurrently adopting the September 15, 2003 proposal of a new definition of "major development" and new applicability provision elsewhere in this issue of the New Jersey Register.

The Stormwater Management rules govern the development standards for State, municipal, and regional stormwater management requirements, plans and ordinances. In accordance with the Stormwater Management Act, N.J.S.A. 40:55D-93 to 99 and the Municipal Stormwater Regulation Program rules adopted elsewhere in this issue of the New Jersey Register, every municipality in the State is required to prepare a stormwater management plan and a stormwater management ordinance(s) to implement that plan.

The adopted Stormwater Management rules provide a framework and incentives for managing runoff and resolving nonpoint source impairment on a drainage area basis for new and existing development; establish a hierarchy for implementation of stormwater management measures with initial reliance on low impact site design techniques to maintain natural vegetation and drainage before incorporating structural best management practices; establish new runoff control performance standards for groundwater recharge, water quality and water quantity; establish special area protection measures for pristine and exceptional value waters; provide regulatory consistency among regulatory agencies at the local and State level; and provide safety standards for stormwater management basins.

As part of its comprehensive Stormwater Management Program, the Department is also adopting amendments to New Jersey Pollutant Discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A. Those amendments include establishment and implementation of the Municipal Stormwater Regulation Program. Under that Program, potentially all of New Jersey's 566 municipalities, all 21 counties, the New Jersey Department of Transportation, State highway authorities, and many other State, interstate, and Federal agencies will be required to obtain a NJPDES permit for their stormwater discharges. See separate notice of adoption for N.J.A.C. 7:14A elsewhere in this issue of the New Jersey Register.

Summary of Hearing Officer's Recommendations and Agency Responses:

Public hearings on this proposal were held on the following dates and locations: February 13, 2003, Morris County Frelinghuysen Arboretum, Morristown; February 20, 2003, Collingswood Senior Community Center, Collingswood; and February 25, 2003, Department headquarters building, Trenton. Ms. Elizabeth Semple, Senior Policy Advisor, Division of Watershed Management, served as the hearing officer.

Ms. Semple recommended that the Department adopt the stormwater management rules proposed on January 6, 2003 and the stormwater management rule revisions proposed on September 15, 2003 with modifications described below in the Summary of Public Comments and Agency Responses.

The hearing records are available for inspection in accordance with applicable law by contacting:

New Jersey Department of Environmental Protection
Office of Legal Affairs
Attn. DEP Docket Number 34-02-12/109
PO Box 402
Trenton, New Jersey 08625-0402

Summary of Public Comments and Agency Responses:

The following people submitted written and/or oral comments on the proposed repeal and new Stormwater Management Rules, N.J.A.C. 7:8. The number in parentheses after each comment corresponds to the number identifying the respective commenters below.

1. A Illegible, Rob
2. Aasum, Mark
3. Accetta, Jacqueline
4. Addison, Doreen
5. Adler, John H., New Jersey Senate
6. Affrunti, Pat
7. Aheam, Matt
8. Ahles, Ray, New Jersey General Assembly
9. Ailey, Asher
10. Alama, Pauline
11. Alaya, Cristina
12. Aldom, Terence
13. Allen, Judith A., Delaware Township
14. Allen, Terri
15. Allessio, Renee
16. Altman, Tracye
17. Alvarado, Yeseni
18. Amendolic, Debra
19. Ammiano, Michael
20. Ammiano, Lisa
21. Amon, James C., D&R Canal Commission
22. Andersen, Thomas S., Du Pont
23. Anderson, Alma
24. Anderson, Dennis
25. Anderson, Jamie
26. Andrews, Robert
27. Andrews, Margaret
28. Anfuso, Timothy, Colts Neck Planning Board
29. Angarone, Nicholas
30. Arerhe , Jay
31. Argentina, Debra
32. Armstrong, Virginia M.
33. Arnold, Mary
33A. Arochas, Nora
34. Ashton, N.L.
35. Assante, Jamie M.
36. Astarta, M.
37. Auentyuon, Anne
38. Auentyuon, J.
39. Autran, Roland
40. B Illegible, Dave
41. B Illegible, R.
42. B Illegible, Sandra
43. Baier, Michael, Dept of Community Affairs
44. Bain, Elizabeth
45. Baker, Alfred (Mrs.)
46. Baker, David G., Borough of Lincoln Park
46A. Baker, David N., Village of Ridgewood
47. Baker, Marie
48. Bakun, George, Conocophillips Company Bayway Refinery
49. Baldwin, Donnamarie
50. Baldwin, Edward J.

pages 671-765
Responses by DEP to Public Comment

minimum rather than four to six feet width. To provide a choice will invariably result in the narrower width. (833)

RESPONSE TO COMMENTS 912 THROUGH 917: The safety criteria of N.J.A.C. 7:8-6.2(c)2 are based upon the report entitled "Recommendations for Public Safety Regulations," dated August 1994 from the Stormwater Detention Facility Advisory Council, and are consistent with the safety provisions in the RSIS at N.J.A.C. 5:21-7.5(f)6. The Department believes that it should discuss any substantial changes to these criteria with the Site Improvement Advisory Board before proposing such changes for public comment.

918. COMMENT: N.J.A.C. 7:8-6.1(c)2 is too restrictive. If the intent is to provide wet ponds with a wetlands function, a long gradually sloping shelf for the establishment of emergents is required. This shelf needs to be established from just above the water level at anywhere from a 1:10 to 1:20 slope to a depth of two to 2.5 feet. Establishment of a wetland shelf of emergents around the ponds edge also provides habitat for predators of mosquito larva and hinders the use of the pond by geese, a problem in New Jersey. The county would prefer the establishment of a performance standard dependent on the particular function of the pond. (1099)

RESPONSE: The intent of N.J.A.C. 7:8-6.1(c) is not to provide a wetlands function in a wet pond, but to address safety concerns.

919. COMMENT: The slope requirement in basins at N.J.A.C. 7:8-6.1(c)3 should be clarified. Does this section prohibit the use of properly designed and protected retaining walls in detention/retention basins? Walls should be allowed since they can provide attractive accents to basins as well as reducing the area of disturbance necessary for the construction of stormwater facilities. (596, 731, 1070, 1118)

RESPONSE: The slope requirement at N.J.A.C. 7:8-6.2(c)3 is for earthen dams, embankments, or berms, and does not prohibit the use of a non-earthen retaining wall as part of the stormwater basin.

920. COMMENT: The regulations should prohibit the construction of concrete low flow channels that tend to flush out the initial heavily polluted stormwater. Instead, the regulations should encourage the use of pervious low flow channels, such as paver blocks or gabion mattress low flow channels, which will allow for the planting of natural faltering vegetation instead of smooth concrete low flow channels. (21)

RESPONSE: The use of concrete low flow channels is not prohibited under the rules. The use of a concrete low flow channel is typically used in an extended dry detention basin, which must be utilized in a treatment train with other devices in order to meet the 80 percent TSS removal criteria. An extended detention basin typically removes pollutants due to settling by detaining flow over a period of time, which is controlled by the outlet structure. Other BMPs, such as a wet pond or a constructed wetlands, do not have concrete low flow channels. The use of vegetation or other types of low flow devices at the bottom of a stormwater BMP depends on the type of BMP proposed.

921. COMMENT: The commenter allows underground perforated pipe systems in a stone trench, wrapped with filter fabric. These systems have worked for many years in sandy soil areas. Are these systems permissible in your regulations? (875)

RESPONSE: Underground perforated pipes can be utilized to address the performance standards. Additionally, there is specific guidance in the BMP Manual for pretreatment of underground infiltration basins, including perforated pipes.

922. COMMENT: The Department should require the county to use perforated pipe, loose joints, and in general less concrete in new construction of roadside ditches. Water that gets into unperforated pipe with tight joints has no chance of recharging into the ground. The rules should consider further measures to assist with recharge. (3, 481)

RESPONSE: The use of perforated pipes is not specifically required through these regulations, but may be one of the ways in which the design and performance standards for stormwater runoff quantity, stormwater runoff quality, and groundwater recharge can be addressed, depending on site-specific conditions. N.J.A.C. 7:8-5.4(a)2i provides groundwater recharge performance standards for new major development, which requires groundwater recharge on a site to be maintained. The rules provide the flexibility to utilize many different measures to address groundwater recharge, such as nonstructural stormwater management strategies required at N.J.A.C. 7:8-5.2(a) and 5.3(a), surface infiltration basins, and subsurface infiltration facilities.

923. COMMENT: Can you improve upon an existing detention basin which, because of improper maintenance, may now be classified as wetlands? Is this a goal that will be permitted by the proposed stormwater management regulations, and how does this correlate to land use and regulations? (808, 842)

RESPONSE: The requirements regarding existing detention basins that have become wetlands are outside the scope of these rules. New stormwater management structures, such as basins or constructed wetlands, are required to be maintained regularly, including the keeping of maintenance logs.

924. COMMENT: The Department should prevent pollution from foreign chemicals such as fluoride, which increases osteoporosis and fractures in the elderly (as well as hypothyroidism in all ages) (605)

RESPONSE: The discharge of chemicals such a fluoride is regulated by another program and is outside of the scope of this rule.

925. COMMENT: Fertilizers, herbicides, pesticides should be banned for sale in New Jersey. (928)

RESPONSE: The banning of the sale of fertilizers, herbicides, and pesticides are outside the scope of this rule.

926. COMMENT: The county's practice of acquiring wider rights-of-way (ROWs) as a condition for allowing land sales or transfers, and requiring landowners to grade their ROW to the county's specifications, exacerbates a condition that the Department does little to correct: runoff and erosion from road ROWs, including severely eroded roadsides and accumulations of sediment in the roads. This problem would not be corrected under the new regulations, which allow the county to disturb up to one acre of soil without a permit. The Department should reduce the allowable soil disturbance without permit in county road department building projects to 5,000 square feet, which is the soil conservation district's threshold. (481)

RESPONSE: The one-acre threshold is consistent with the NJPDES stormwater permit requirements adopted elsewhere in this issue of the New Jersey Register. The Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., already provides a basis for comprehensive and coordinated Statewide control of sediment in stormwater during construction, including projects that are not subject to this chapter.

927. COMMENT: When will the Category One designation take effect on the Papakating River? Other commenters indicated that the Millstone River, Stony Brook, and Lake Carnegie are not currently designated nor proposed as Category One; however, the Millstone River and Stony Brook are publicly nominated for Category One designation. Please clarify that these areas continue to be designated as FW2. (414, 808, 842)

RESPONSE: The designation of specific waters within the State as Category One occurs through the adoption of Surface Water Quality Standards (N.J.A.C. 7:9B) and its associated processes, and are not designated through the stormwater rules.

928. COMMENT: Putting buffers around waterways and using MS4s around the State will not completely address the need to protect waterways and recharge aquifers. Clean-up of hazardous wastes is a must and "beneficial sludge" that is non-compliant must stop being land applied. Handing over the responsibility to municipalities or developers for protecting water quality is not the answer. (1200)

RESPONSE: The Department agrees with the commenter that the remediation of contaminated sites and proper handling of sludge are also critical components to protecting and restoring water quality. However, the beneficial use of sludge and site remediation practices are governed by other rules and are not included in this proposal. The Department is not handing the responsibility to maintain water quality to developers and municipalities as suggested by the commenter, but is prescribing new design and performance standards at the State and the local level to enhance water resource protection. The requirement to develop a municipal stormwater management plan and adopt a stormwater control ordinance under the NJPDES Phase II Municipal Stormwater Permitting Program is intended to promote consistency in stormwater management requirements across all levels of government.

Summary of Agency-Initiated Changes:

The Department has made the following agency-initiated modifications to the rules upon adoption:

1. At N.J.A.C. 7:8-1.2, the definition of the term "stormwater" was amended to add the words ", or conveyed by snow removal equipment" to be consistent with a change made in the definition of the same term in the NJPDES Stormwater Regulation Program rules adopted elsewhere in this issue of the New Jersey Register.

2. At N.J.A.C. 7:8-1.3, the words "Nonpoint Source Program" were replaced with the words "Division of" in the address to update the contact information for the rules.

3. At N.J.A.C. 7:8-5.5(c), Table 2, the words "Forested Buffer" and its TSS Percent Removal Rate of "70" is being removed. The percent TSS removal rate for the vegetated filter strip of "50 " is revised to "60-80," to

combine the forested buffer and the vegetated filter strip. The forested buffer is a vegetated filter comprised of forested area, and the combination into one best management practice clarifies this BMP.

4. In the last sentence of N.J.A.C. 7:8-5.6(a)2, the phrase "good condition" was changed to "good hydrologic condition" to provide consistency in terminology.

5. At N.J.A.C. 7:8-5.9(a)1iv, "Forested buffers" is being removed for consistency with the removal of the Forested Buffer BMP in Table 2 at N.J.A.C. 7:8-5.5(c). Subparagraphs (a)1v through xi are recodified as (a)1iv through x.

Federal Standards Statement

Executive Order No. 27(1994) and N.J.S.A. 52:14B-1 et seq. (as amended by P.L. 1995, c.65) require State agencies which adopt, readopt, or amend State regulations that exceed any Federal standards or requirements to include in the rulemaking document a Federal standards analysis. There are no current, analogous Federal requirements for stormwater management planning; however, there are several Federal programs concerning stormwater runoff and nonpoint source pollution control. These are discussed below.

Clean Water Act

The Federal Clean Water Act (33 U.S.C. §§1251 et seq.) requires permits under Section 402 of that Act (33 U.S.C. §1342) for certain stormwater discharges. The Department's requirements to obtain such permits are set forth in the New Jersey Pollutant Discharge Elimination System Rules, N.J.A.C. 7:14A, rather than in these Stormwater Management rules being adopted.

Section 319 of the Clean Water Act (33 U.S.C. §1329) authorizes a Federal grant-in-aid program to encourage states to control nonpoint sources. The Department developed a management program for nonpoint source control under which the Department issues grants to local, regional, State, and interstate agencies as well as to nonprofit organizations to, for example, develop or monitor best management practices to control stormwater.

Coastal Zone Management Act

Under Section 6217(g) of the Coastal Zone Management Act Reauthorization and Amendments of 1990 (CZARA), P.L. 101-508, the U.S. Environmental Protection Agency (EPA) has published "Guidance Specifying Management Measures For Sources of Nonpoint Pollution In Coastal Waters" (CZARA 6217(g) Guidance). States may opt to participate or not participate in overall coastal zone management program, with no penalty for non-participation other than the loss of Federal grants for this program. No mandatory Federal standards or requirements for nonpoint sources pollution control are imposed. The CZARA 6217(g) Guidance includes management measures for stormwater runoff and nonpoint source pollution control from land development as well as many other source types. The Department has developed a coastal zone management program, including a component addressing coastal nonpoint pollution control. The Stormwater Management rules at N.J.A.C. 7:8 are one means by which the Department implements its nonpoint pollution control program.

The Department has determined that the adopted rules do not contain any standards or requirements that exceed the standards or requirements imposed by Federal law. Accordingly, Executive Order No. 27(1994) and N.J.S.A. 52:14B-1 et seq. (P.L. 1995, c.65) do not require any further analysis.

Full text of the adopted new rules and amendments follows (additions to proposal indicated in boldface with asterisks ***thus***; deletions from proposal indicated in brackets with asterisks *[thus]*):

CHAPTER 7A
FRESHWATER WETLANDS PROTECTION ACT RULES

7:7A-4.3 Conditions that apply to all general permit authorizations

(a) (No change.)

(b) The following conditions apply to all activities conducted under the authority of a general permit:

1.-9. (No change.)

10. If activities under the general permit meet the definition of "major development" at N.J.A.C. 7:8-1.2, the Stormwater Management Rules at N.J.A.C. 7:8 apply.

11.-16. (No change.)

(c)-(f) (No change.)

7:7A-5.11 General permit 11—Outfalls and intake structures

(a)-(e) (No change.)

(f) Stormwater discharged from an outfall authorized under general permit 11 shall be managed in accordance with the Stormwater Management Rules at N.J.A.C. 7:8.

(g)-(j) (No change.)

CHAPTER 7E
COASTAL ZONE MANAGEMENT

SUBCHAPTER 8. RESOURCE RULES

7:7E-8.7 Stormwater management

If a project or activity meets the definition of "major development" at N.J.A.C. 7:8-1.2, then the project or activity shall comply with the Stormwater Management rules at N.J.A.C. 7:8.

CHAPTER 8
STORMWATER MANAGEMENT

SUBCHAPTER 1. GENERAL PROVISIONS

7:8-1.1 Scope and purpose

(a) This chapter establishes general requirements for stormwater management plans and stormwater control ordinances, as well as content requirements and procedures for the adoption and implementation of regional stormwater management plans and municipal stormwater management plans under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq.; the Water Quality Planning Act, N.J.S.A. 58:11A-1 et seq.; the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq.; and the Flood Hazard Area Control Act, N.J.S.A. 58:16A-50 et seq.; and implementing rules.

(b) This chapter establishes design and performance standards for stormwater management measures required by rules pursuant to the Flood Hazard Area Control Act, N.J.S.A. 58:16A-50 et seq.; the Coastal Area Facility Review Act, N.J.S.A. 13:19-1 et seq.; the Wetlands Act of 1970, N.J.S.A. 13:9A-1 et seq.; the Waterfront Development Law, N.J.S.A. 12:5-3; the Freshwater Wetlands Protection Act, N.J.S.A. 13:9B-1 et seq.; and the Dam Safety Act, N.J.S.A. 58:4-1 et seq.

(c) This chapter establishes safety standards for stormwater management basins pursuant to N.J.S.A. 40:55D-95.1.

(**Agency Note:** N.J.A.C. 7:8-1.2 below includes the definition of "major development" as reproposed at 35 N.J.R. 4220(a) and adopted elsewhere in this issue of the New Jersey Register.)

7:8-1.2 Definitions

The following words and terms, when used in this chapter, shall have the following meanings unless the context clearly indicates otherwise.

[“Agricultural development” means land uses normally associated with the production of food, fiber and livestock for sale. Such uses do not include the development of land for the processing or sale of food and the manufacture of agriculturally related products.]

“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:

1. A county planning agency; or

2. A county water resources 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 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, 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 on agricultural land, development means: any activity that requires a State permit; any activity reviewed by the County Agricultural Boards (CAB) and the State Agricultural Development 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 *[water]* *stormwater runoff*, sediments, *[and]* *or* dissolved materials drain to a particular receiving waterbody or to a particular point along a receiving waterbody.

"Environmentally constrained area" means the following areas where the physical alteration of the land is in some way restricted, either through regulation, easement, deed restriction or ownership such as: wetlands, floodplains, threatened and endangered species sites or designated habitats, and parks and preserves. ***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.***

"Environmentally critical area" means an area or feature which is of significant environmental value, including, but not limited to: stream corridors; natural heritage priority sites; habitats 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 Neighborhoods" means neighborhoods 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 *[that]* seeps into the soil from precipitation.

"Lead planning agency" means one or more public entities having stormwater management planning authority designated by the regional stormwater management planning committee pursuant to N.J.A.C. 7:8-3.2*, **that serves*** as the primary representative of the committee.

"Major development" means any "development" that provides for ultimately disturbing one or more acres of land or increasing impervious surface by one-quarter acre or more. 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. Projects undertaken by any government agency which otherwise meet the definition of "major development" but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., are also considered "major development."

"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, political subdivision of this State and any state, interstate or Federal agency.

"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, groundwaters 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.

"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 nonstormwater discharges into stormwater conveyances.

"Stormwater management planning agency" means a public body authorized by legislation to prepare stormwater management plans.

"Stormwater management planning area" means the geographic area for which a stormwater management planning agency is authorized to prepare stormwater management plans, or a specific portion of that area identified in a stormwater management plan prepared by that agency.

"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 Urban 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 groundwater, 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 groundwater 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.

7:8-1.3 Program information

Questions or submissions regarding this chapter should be directed to the *[Nonpoint Source Program,]* ***Division of*** Watershed Management, New Jersey Department of Environmental Protection, PO Box 418, Trenton, New Jersey 08625.

7:8-1.4 Severability

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

7:8-1.5 Relationship to other regulatory programs

(a) Nothing in this chapter shall be construed as preventing the Department or other agencies or entities from imposing additional or more stringent stormwater management requirements necessary to implement the purposes of any enabling legislation including those measures necessary to achieve the Surface Water Quality Standards at N.J.A.C. 7:9B.

(b) If a stormwater management measure is used as a soil erosion or sediment control measure, the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., shall also apply.

(c) These stormwater requirements are the Department's standards referenced by the stormwater management provisions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.

(**Agency Note:** The following section, N.J.A.C. 7:8-1.6, Applicability to major development, reflects the adoption of this section, proposed at 35 N.J.R. 4220(a), published elsewhere in this issue of the New Jersey Register.)

7:8-1.6 Applicability to major development

(a) Except as provided in (b) below, all major development shall comply with the requirements of this chapter.

(b) The following major development shall be subject to the stormwater management requirements in effect on February 1, 2004, copies of which are available from the Department at the address specified in N.J.A.C. 7:8-1.3:

1. Major development which does not require any of the Department permits listed in (c) below and which has received one of the following approvals pursuant to the Municipal Land Use Law (N.J.S.A. 40:55D-1 et seq.) prior to February 2, 2004:

i. Preliminary or final site plan approval;

ii. Final municipal building or construction permit;

iii. Minor subdivision approval where no subsequent site plan approval is required;

iv. Final subdivision approval where no subsequent site plan approval is required; or

v. Preliminary subdivision approval where no subsequent site plan approval is required;

2. Major development which has received one of the approvals pursuant to the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., in (b)1 above prior to February 2, 2004 and has secured at least one of the applicable permits listed in (c) below from the Department by February 2, 2004, and provided that the permit included a stormwater management review component; and

3. Major development undertaken by any government agency, which does not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., provided that the project has secured at least one of the applicable Department permits listed in (c) below prior to February 2, 2004, and provided that the permit included a stormwater management review component.

(c) For the purposes of this section, the term "permit" shall include transition area waivers under the Freshwater Wetlands Protection Act. In order to qualify under (b)2 or 3 above, the major development must have obtained at least one Department permit granted under the following statutes and, provided that the permit included a stormwater management review component, prior to February 2, 2004:

1. Flood Hazard Area Control Act, N.J.S.A. 58:16A-50 et seq.;
2. Freshwater Wetlands Protection Act, N.J.S.A. 13:9B-1 et seq.;
3. Coastal Area Facility Review Act, N.J.S.A. 13:19-1 et seq.; or
4. Waterfront and Harbor Facilities Act, N.J.S.A. 12:5-3;

(d) An exemption provided by (b) above shall expire with the expiration, termination or other loss of duration or effect of either of the qualifying local approval or Department permit, whichever comes first. The expiration of local approvals under (b)1 above shall be governed by local ordinance. In the event there are multiple qualifying Department permits under (c) above, the expiration date is governed by that permit which expires last provided that the permit is still in effect. Once the exemption expires, the major development shall be subject to all requirements of this chapter upon reapplication for that permit and all subsequent permits or local approval(s) under the Municipal Land Use Law.

(e) An exemption under (b) above is limited to the land area and the scope of the project addressed by the qualifying approval(s) and permit(s). Exemptions under this section shall be deemed void if revisions are made to the qualifying approval or permit in (b) above, including approvals under the Municipal Land Use Law, unless upon application, the Department determines that each revision would have a de minimis impact on water resources. In making this determination, the Department shall consider the extent of any impacts on water resources resulting from the revision, including, but not limited to:

1. Increases in stormwater generated;
2. Increases in impervious surface;
3. Increases in stormwater pollutant loading;
4. Changes in land use;
5. New encroachments in special water resource protection areas; and
6. Changes in vegetative cover.

(f) In case of conflict with the Coastal Permit Program rules at N.J.A.C. 7:7-4.4(a)4, the requirements of this chapter shall supersede.

SUBCHAPTER 2. GENERAL REQUIREMENTS FOR STORMWATER MANAGEMENT PLANNING

7:8-2.1 Scope

This subchapter provides general principles applicable to all stormwater management plans and stormwater control ordinances, including the goals of stormwater management planning, the process for identification of stormwater management planning agencies, and stormwater management plan requirements.

7:8-2.2 Goals of stormwater management planning

(a) All stormwater management plans and stormwater control ordinances shall be designed to:

1. Reduce flood damage, including damage to life and property;
2. Minimize, to the extent practical, any increase in stormwater runoff from any new development;
3. Reduce soil erosion from any development or construction project;
4. Assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
5. Maintain groundwater recharge;
6. Prevent, to the greatest extent feasible, an increase in nonpoint pollution;
7. Maintain the integrity of stream channels for their biological functions, as well as for drainage;
8. Minimize pollutants in stormwater runoff from new and existing development in order 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

9. Protect public safety through the proper design and operation of stormwater management basins.

7:8-2.3 Stormwater management planning agencies

(a) The following entities may be stormwater management planning agencies provided they are authorized under their enabling legislation to prepare stormwater management plans:

1. A municipality;
2. A county;
3. A county water resources agency or association;
4. A designated planning agency under N.J.A.C. 7:15;
5. A Soil Conservation District*, **in coordination with the State Soil Conservation Committee***;
6. The Delaware River Basin Commission;
7. The Pinelands Commission;
8. The Delaware and Raritan Canal Commission;
9. The New Jersey Meadowlands Commission;
10. The Department; or
11. Other regional, State or interstate agencies.

7:8-2.4 Stormwater management plan requirements

(a) A stormwater management plan shall include structural and nonstructural stormwater management strategies necessary to meet the stormwater management goals of this chapter.

(b) A regional stormwater management plan shall comply with the requirements of this subchapter and N.J.A.C. 7:8-3.

(c) A municipal stormwater management plan shall comply with the requirements of this subchapter and N.J.A.C. 7:8-4.

(d) A stormwater management plan shall incorporate the safety standards for stormwater management basins at N.J.A.C. 7:8-6.

(e) In developing a stormwater management plan and identifying appropriate stormwater management measures thereunder, each stormwater management planning agency shall consider the physical characteristics and ecological resources of the stormwater management planning area.

(f) A stormwater management plan and any stormwater management ordinance shall be coordinated with any other stormwater management plans related to the same river basin or drainage area.

7:8-2.5 Exemptions

A municipality or other entity conducting stormwater management planning under this chapter may petition the Department at the address provided at N.J.A.C. 7:8-1.3 for an exemption to the requirements of this chapter by submitting documentation to demonstrate that, if granted, the exemption will not result in an increase in flood damage, water pollution*, **including threats to the biological integrity,*** or constitute a threat to the public safety.

SUBCHAPTER 3. REGIONAL STORMWATER MANAGEMENT PLANNING

7:8-3.1 Scope

(a) This subchapter describes stormwater management planning and implementation at the regional level, including plan elements; planning process; characterization; development of drainage area-specific objectives and standards; selection of stormwater management measures; strategy for implementing the measures and evaluating the effectiveness of the regional stormwater management plan; plan review, adoption, amendment or revision; and implementation and periodic evaluation of the plan.

(b) A regional stormwater management plan shall address stormwater-related water quality, groundwater recharge and/or water quantity impacts of new and existing land uses in a regional stormwater management planning area. A regional stormwater management planning area shall consist of one or more ***continuous*** drainage areas. For example, a drainage area could be *[a]* ***an area defined by*** a hydrologic unit code 14 (HUC14) as defined by the United States Geological Survey.

7:8-3.2 Regional stormwater management planning committee and lead planning agency

(a) A regional stormwater management planning committee (the committee) shall be established for the purposes of creating a regional stormwater management plan.

(b) A person or entity seeking to establish a regional stormwater management committee shall solicit participation from municipalities, interstate agencies, regional agencies, counties, designated planning agencies under N.J.A.C. 7:15, Soil Conservation Districts, regional environmental commissions, ***Pinelands Commission, mosquito control and extermination commissions,*** public water supply and wastewater treatment utilities and agencies, lake associations, watershed associations, the watershed management planning area public advisory committee, environmental organizations, businesses, the Department and other appropriate State and Federal agencies and, members of the general public in the drainage area(s) to be addressed by the proposed plan. *The **solicitation for members of the general public to be part of the regional stormwater management planning committee can be performed through notices in local paper.***

(c) The regional stormwater management planning committee shall designate a lead planning agency, which shall be recognized as the primary contact for the committee. The regional stormwater management planning committee, through the lead planning agency, shall:

1. Prepare the regional stormwater management plan;
2. Coordinate the regional stormwater management planning process with any applicable watershed management area planning process;
3. Provide opportunities for public participation throughout the regional stormwater management planning process; and
4. Perform other activities appropriate to facilitate the regional stormwater management planning process, including mediation, public information, *[and]* providing technical assistance*,* and ***seeking and providing*** grants or other financial assistance*, **as available,*** to municipalities and/or local or regional agencies pursuant to N.J.S.A. 40:55D-99 or other applicable authority.

(d) A request for recognition as a regional stormwater management planning committee shall be submitted to the Department at the address listed in N.J.A.C. 7:8-1.3 by the lead planning agency, and include the following information:

1. A draft work plan and schedule for completing a regional stormwater management plan;
2. A copy of the mailing list used to solicit participation, including the entities identified in (b) above;
3. A copy of the letter of invitation to participate in the committee;
4. A copy of each response to the letter of invitation; and
5. In cases where no response from a public entity to the letter of invitation is received within 60 days, the group shall send a follow-up request by certified mail, return receipt requested, and submit proof of such follow-up.

(e) The Department shall respond in writing within 45 days of the receipt of a complete request for recognition as a regional stormwater management planning committee. The Department shall either approve the application, request additional information or deny the request for recognition. Denials will include a justification for the decision.

The Department shall base approval or denial on the information submitted in the draft work plan and schedule for plan completion, completion of the requirements to involve and notify impacted parties, and whether there are other competing or overlapping requests for recognition for the same regional stormwater management planning area.

7:8-3.3 Regional stormwater management plan and elements

(a) A regional stormwater management plan shall incorporate, at a minimum, the following elements:

1. Identification of the lead planning agency and a description of the structure and members of the committee;
2. A statement of authority to develop and implement a stormwater management plan from *[each]* public *[entity that is]* ***entities, as appropriate,*** represented on the regional stormwater management planning committee;
3. A characterization and assessment of the regional stormwater management planning area prepared in accordance with N.J.A.C. 7:8-3.4;

4. A statement of drainage area-specific water quality, groundwater recharge, and water quantity objectives established under N.J.A.C. 7:8-3.5;

5. The drainage area-specific stormwater-related water quality, groundwater recharge and water quantity design and performance standards established under N.J.A.C. 7:8-3.6;

6. The stormwater management measures selected in accordance with N.J.A.C. 7:8-3.7 and a summary of the rationale for the selection of each measure;

7. A description of the strategy for implementing the selected stormwater management measures for the regional stormwater management planning area and for evaluating the effectiveness of the regional stormwater management plan in accordance with N.J.A.C. 7:8-3.8, including a long-term monitoring program; and

8. To the extent elements of the plan do not represent the consensus of the committee, the plan shall identify and provide a discussion of the majority and minority positions.

(b) The regional stormwater management plan may also include:

1. Innovative stormwater measures and strategies such as nonpoint source pollutant trading, mitigation strategies, or special protection measures; and

2. 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 demonstrate that the functional value and overall condition of the special water resource protection area will be maintained or enhanced.

7:8-3.4 Characterization and assessment of the regional stormwater management planning area

(a) The regional stormwater management plan shall include a characterization and assessment that addresses the following components, unless the committee determines that a component is not appropriate for the regional stormwater management planning area and provides a rationale for not including the component:

1. Maps showing the following information. Maps developed on a Geographical Information System shall meet the Digital Data standards in N.J.A.C. 7:1D unless a rationale for a different format is provided.

i. The regional stormwater management planning area boundary;

ii. Existing land uses;

iii. Projected land uses assuming full development under existing zoning;

iv. Soil mapping units based on the detailed soil maps in County Soil Surveys published by the U.S. Department of Agriculture or, in areas for which County Soil Surveys are not available, on information obtained from Soil Conservation Districts;

v. Topography based on the U.S. Geological Survey Topographic Map, 7.5 minute quadrangle series, or other sources of information depicting topography in similar or greater detail;

vi. Water bodies based on detailed map sheets in County 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;

vii. Coastal wetlands based on maps prepared by the Department under the Wetlands Act of 1970, N.J.S.A. 13:9A-1 et seq., and freshwater wetlands based on maps prepared by the Department under the Freshwater Wetlands Protection Act, N.J.S.A. 13:9B-1 et seq.;

viii. Flood hazard areas based on delineations made by the Department under the Flood Hazard Area Control Act, N.J.S.A. 58:16A-50 et seq. For a water body for which the Department has not delineated the flood hazard area, a map of the flood hazard area prepared in accordance with N.J.A.C. 7:13 is acceptable;

ix. Groundwater recharge areas and well head protection areas based on maps prepared by the Department *[under N.J.S.A. 58:11A-13]* or ordinances of an affected municipality;

x. Environmentally constrained areas and environmentally critical areas;

xi. River areas designated under the New Jersey Wild and Scenic Rivers Act, N.J.S.A. 13:8-45 et seq., or the Federal Wild and Scenic Rivers Act, 16 U.S.C. §§1278 et seq.;

xii. For each waterbody in the regional stormwater management planning area, identification of the waterbody or waterbody segment, the drainage area, and the classification of the waterbody pursuant to N.J.A.C. 7:9B-1.15;

xiii. Each waterbody designated as a water quality limited surface water pursuant to N.J.A.C. 7:15-6;

xiv. Man-made stormwater conveyance, storage and discharge systems, including municipal separate storm sewer outfall pipes and the drainage areas as appropriate for these outfall structures; and

xv. *[Potable]* ***Source water areas of potable public*** surface water ***supply*** intakes and public water supply reservoirs ***available on the Department's webpage at www.nj.gov/dep/swap***;

2. A map showing jurisdictional boundaries within the regional stormwater management planning area of municipal, county, and other agencies with responsibility for implementing stormwater management;

3. Identification of the physical characteristics of the regional stormwater management planning area pertinent to stormwater management, such as slopes, swales and impoundment areas as necessary for completing the analysis in N.J.A.C. 7:8-3.4(a)4;

4. A water quality, groundwater recharge and water quantity hydrologic and hydraulic model or analysis of the regional stormwater management planning area which addresses existing land uses and projected land uses assuming full development under existing zoning and taking into account permanently preserved lands;

5. An identification and evaluation of existing municipal, county, State, Federal, and other stormwater-related groundwater recharge, water quality and water quantity regulations and programs shall be conducted, including, where applicable, programs to develop total maximum daily loads (TMDLs) in accordance with N.J.A.C. 7:15-7; and

6. A summary of information that has been identified as useful for purposes of stormwater management planning but that is not available for technical, financial, or other reasons.

(b) The Department encourages the use of existing information to the extent that it is available to minimize the cost of data acquisition, such as information available on the Department's Geographical Information System website (www.state.nj.us/dep/gis) or as developed through a watershed planning process.

(c) The characterization and assessment shall include information on locations and activities outside the regional stormwater management planning area that drain into the planning area (for example, stormwater originating in an adjacent drainage area that is transferred to the stormwater management planning area).

(d) Using the modeling or other information obtained under (a) through (c) above, the stormwater-related water quality impacts of existing land uses and projected land uses assuming full development under existing zoning shall be identified and ranked in accordance with the following process:

1. Inventory existing and potential stormwater-related pollutant sources and stormwater-related pollutants in the regional stormwater management planning area.

i. Stormwater-related pollutant sources include, for example, urban and suburban development, roads, storm sewers, agriculture, mining, and waterfront development.

ii. Stormwater-related pollutants include, for example, nutrients, pathogens, hydrocarbons, metals, pesticides, sediments, and suspended solids;

2. For surface water bodies and/or segments thereof and aquifers and/or portions thereof in the regional stormwater management planning area, identify and describe the existing or designated uses that are or may be adversely affected by stormwater-related pollutants, and to the extent feasible, identify the source(s) of the pollutant. The use of the report and list prepared by the Department to comply with Federal Clean Water Act, Section 303(d) and 305(b) (33 U.S.C. §§1313(d) and 1315(b)) and underlying data, including biological assessments, is encouraged; and

3. Identify and rank the most significant existing and potential stormwater-related pollutants and, for each pollutant, identify and rank the sources.

(e) Using the modeling or other information obtained under (a) through (c) above for stormwater-related water quantity impacts and stormwater-related groundwater recharge impacts of existing and

projected land uses assuming full development under existing zoning, the most significant existing and potential stormwater-related water quantity problems, including flooding, erosion, mosquitoes, base-flow reduction, groundwater depletion, and associated ecosystem impacts, shall be identified and described. The problems shall be ranked based on consideration of threat to public health, safety, and welfare as evidenced by history of or potential for flood damage; risk of loss of or damage to water supplies; and risk of damage to the biological integrity of water bodies.

7:8-3.5 Drainage area-specific water quality, groundwater recharge and water quantity objectives

(a) The regional stormwater management plan shall identify drainage area-specific water quality, groundwater recharge and water quantity objectives that are consistent with the goals of stormwater management planning at N.J.A.C. 7:8-2.3, and address each of the stormwater-related pollutant sources and pollutants ranked under N.J.A.C. 7:8-3.4(d) and the water quantity and groundwater recharge problems ranked under N.J.A.C. 7:8-3.4(e). The objectives shall address the elimination, reduction, or minimization of stormwater-related impacts associated with new and existing land uses. The objectives developed for the regional stormwater management plan may take into consideration environmental, social, and economic factors.

(b) Notwithstanding (a) above, the drainage area-specific objectives for major development shall provide, at a minimum, the protection that would be achieved through the application of N.J.A.C. 7:8-5, Design and Performance Standards for Stormwater Management Measures.

(c) If a TMDL has been established pursuant to N.J.A.C. 7:15 for a waterbody or waterbody segment in the regional stormwater management planning area, drainage area-specific objectives shall incorporate the loading reductions established in the TMDL for stormwater sources of pollution. In addition, if a waterbody or waterbody segment in the regional stormwater management planning area is on the Department's list prepared to comply with Federal Clean Water Act, Section 303(d) (33 U.S.C. §1313(d)) for one or more designated uses by stormwater runoff, then drainage area objectives shall be included that address the pollutants or pollution for which the waterbody is threatened or impaired.

7:8-3.6 Drainage area-specific design and performance standards

(a) The regional stormwater management plan shall identify drainage area-specific design and performance standards in order to meet the drainage area-specific water quality, groundwater recharge and water quantity objectives identified under N.J.A.C. 7:8-3.5.

(b) Drainage area-specific design and performance standards may include performance standards for control of stormwater quantity, erosion, groundwater recharge and stormwater quality, as well as design standards for particular structural and nonstructural stormwater management strategies.

(c) The design and performance standards for stormwater management measures for major development described in N.J.A.C. 7:8-5 shall be incorporated into the regional stormwater management plan. Alternative drainage area-specific design and performance standards may be developed provided the alternative standard is at least as protective as would be achieved under N.J.A.C. 7:8-5 when considered on a regional stormwater management planning area basis.

(d) For structural stormwater management measures, drainage area-specific design and performance standards shall conform to the general standards at N.J.A.C. 7:8-5.7.

(e) Drainage area-specific design and performance standards do not have to be uniform throughout a drainage area provided the drainage area, when considered in its entirety, satisfies N.J.A.C. 7:8-5.

7:8-3.7 Selection of stormwater management measures

(a) The regional stormwater management plan shall identify stormwater management measures necessary to achieve the drainage area-specific water quality, groundwater recharge and water quantity objectives developed in accordance with N.J.A.C. 7:8-3.5, and design and performance standards developed in accordance with N.J.A.C. 7:8-3.6.

(b) Stormwater management measures in the following categories shall be considered and selected, as appropriate:

1. Stormwater management measures for new land uses;

2. Stormwater management measures for existing land uses, including, for example, retrofit measures for the modification of existing structural stormwater management measures or other structures affecting stormwater runoff; elimination of illicit or illegal discharges; prevention or minimization of the exposure of pollutants to stormwater; and control of floatables;

3. Stormwater management measures that enhance, protect, and/or preserve land or water areas possessing characteristics or features that provide for flood control, maintenance or improvement of water quality, or conservation of natural resources (for example, land use controls, local and regional open space plans and taxes, buffer zones, redirecting, recharging or minimizing stormwater discharges, pretreatment and/or end-of-pipe treatment); and

4. Public education programs that address stormwater quantity and quality.

(c) A written rationale shall be provided for each selected stormwater management measure, including an analysis of feasibility, benefits and costs, estimated percent pollutant load reduction and anticipated performance longevity;

(d) Each selected stormwater management measure shall include, as appropriate, a program for preventative and corrective maintenance, including a long-term implementation schedule and identification of the entity responsible for implementation and maintenance.

7:8-3.8 Strategy for implementing and evaluating effectiveness of stormwater management measures

(a) The regional stormwater management plan shall include a strategy for implementing the stormwater management measures. The lead planning agency or another entity designated by the committee shall be responsible for coordination and tracking of the implementation of the regional stormwater management plan, including the long-term monitoring program.

(b) The implementation strategy shall:

1. Identify agencies and/or entities necessary to implement the measures and conduct the long-term monitoring program;

2. Identify the respective measures and/or monitoring each agency and/or entity will implement and the enabling mechanisms by which the measures will be implemented, including, for example, new or amended municipal ordinances or interagency agreements;

3. Establish a schedule for the implementation of the measures based on priority, including specific milestones for all mechanisms identified under (b)2 above;

4. Provide an estimate of short term and long term implementation costs to be incurred; and

5. Identify existing and potential private, local, State, and Federal funding sources to implement the regional stormwater management plan.

(c) The implementation strategy shall include a long-term monitoring program that will provide information about land use, water quality, water quantity, groundwater resources and riparian and aquatic habitat condition, as appropriate. Information for the monitoring program may include data obtained through watershed management, local, county, State, interstate, and/or Federal monitoring programs, including volunteer monitoring programs.

(d) The implementation strategy shall include a procedure for evaluating and then updating as necessary, at least every five years, the effectiveness of the implemented measures in achieving the objectives and design and performance standards established in the regional stormwater management plan.

7:8-3.9 Regional stormwater management plan review, adoption, and amendment and/or revision

(a) Upon completion of a regional stormwater management plan, the lead planning agency shall submit the plan to the Department and, if applicable, to the designated water quality management planning agency as an amendment to the areawide water quality management plan(s) in accordance with the Water Quality Management Planning Rules at N.J.A.C. 7:15.

(b) In reviewing a regional stormwater management plan submitted under (a) above, the Department shall determine whether the plan conforms to the requirements of this chapter. The Department will

disapprove, return for additional information or proceed with a proposed amendment in accordance with N.J.A.C. 7:15-3.4(g).

(c) Modifications to an adopted regional stormwater management plan shall be processed as an amendment or revision in accordance with N.J.A.C. 7:15-3.4(b)5 or 3.5(b)5, as applicable.

7:8-3.10 Implementation of adopted regional stormwater management plan

(a) Once the regional stormwater management plan has been adopted pursuant to N.J.A.C. 7:8-3.9, implementation responsibilities are as follows:

1. The Department will use the adopted regional stormwater management plan as the basis for reviewing the stormwater management aspects of projects or activities regulated pursuant to Coastal Permit Program rules, N.J.A.C. 7:7; the Freshwater Wetland Protection Act rules, N.J.A.C. 7:7A; the Coastal Zone Management rules, N.J.A.C. 7:7E; the Flood Hazard Area Control Act rules, N.J.A.C. 7:13; the New Jersey Pollutant Discharge Elimination System rules, N.J.A.C. 7:14A; and the Dam Safety Standards, N.J.A.C. 7:20. The requirements of this chapter are considered to be the minimum stormwater standards. Additional requirements may be imposed as necessary under the respective programs.

2. Each municipality in the regional stormwater management planning area shall incorporate the applicable provisions of the regional stormwater management plan into a new or amended municipal stormwater management plan and ordinances.

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;

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 *[principals]* ***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 (HUC 14) drainage areas as defined by the United States Geological Survey; and an estimate, for each HUC 14 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;

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; *[and]*

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 *[(the date 24 months from the effective date of this subchapter)]* ***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.

(e) Within one year of the adoption of a regional stormwater management plan as an amendment to the Areawide Water Quality Management Plan, or an amendment thereto, each municipality within the regional stormwater management planning area shall amend their respective municipal stormwater management plans and stormwater control ordinance(s) to implement the regional stormwater management plan.

7:8-4.4 County review process

(a) A municipality shall submit a copy of the adopted stormwater management plan and stormwater control ordinance(s) to the county review agency and the Department.

(b) In reviewing the adopted municipal stormwater management plan and ordinance(s), the county review agency shall consider whether the plan and ordinance(s) conform with the requirements of this chapter.

(c) In accordance with N.J.S.A. 40:55D-97, it is the county review agency's responsibility to review and approve, conditionally approve (specifying the necessary amendments to the plan and ordinance(s)) or disapprove the adopted municipal stormwater management plan and ordinance(s) within 60 calendar days of receipt of the plan and ordinance(s). If the county review agency does not approve, conditionally approve, or disapprove the plan or ordinance(s) within 60 calendar days, the plan and ordinance(s) shall be deemed approved. The county review agency shall issue a written decision to the municipality, with a copy to the Department.

(d) A municipal stormwater management plan and ordinance(s) approved under (c) above shall take effect immediately. A municipal stormwater management plan and ordinance(s) conditionally approved under (c) above shall take effect upon adoption by the municipality of the amendments specified by the county review agency.

(e) Within 30 days of the effective date of the municipal stormwater management plan and ordinance(s) under (d) above, the municipality shall place the plan and ordinance(s) on its website and notify the Department, the Soil Conservation District and State Soil Conservation Committee, or:

1. Submit a copy of the approved municipal stormwater management plan and ordinance(s) to the Department; and

2. Provide notice of such approval to the Soil Conservation District and the State Soil Conservation Committee and, upon request, submit a copy of the approved plan and ordinance(s).

7:8-4.5 Reservation of rights

The Department reserves the right to review stormwater management plans and ordinances for compliance with this subchapter and make recommendations to correct any deficiencies.

7:8-4.6 Variance or exemption from the design and performance standards for stormwater management measures

A municipality may grant a variance or exemption from the design and performance standards for stormwater management measures set forth in its approved municipal stormwater management plan and stormwater control ordinance(s), provided the municipal plan includes a mitigation plan in accordance with N.J.A.C. 7:8-4.2(c)11 and the municipality submits a written report to the county review agency and the Department describing the variance or exemption and the required mitigation.

SUBCHAPTER 5. DESIGN AND PERFORMANCE STANDARDS FOR STORMWATER MANAGEMENT MEASURES

7:8-5.1 Scope

(a) This subchapter establishes design and performance standards for stormwater management measures for(a) major development intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies.

(b) The standards specified in this subchapter do not apply to major development if alternative design and performance standards that are at least as protective as would be achieved through this subchapter when considered on a regional stormwater management area basis are applicable under a regional stormwater management plan *[or]* adopted in accordance with this chapter or a water quality management plan adopted in accordance with N.J.A.C. 7:15.

7:8-5.2 Stormwater management measures for major development

(a) Stormwater management measures for major development shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards at N.J.A.C. 7:8-5.4 and 5.5. To the maximum extent practicable, these standards shall be met by incorporating nonstructural stormwater management strategies at N.J.A.C. 7:8-5.3 into the design. If these measures alone are not sufficient to meet these standards, structural stormwater management measures at N.J.A.C. 7:8-5.7 necessary to meet these standards shall be incorporated into the design.

(b) The development shall incorporate a maintenance plan under N.J.A.C. 7:8-5.8 for the stormwater management measures.

(c) 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).

(d) The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements at N.J.A.C. 7:8-5.4 and 5.5:

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 *[10]* *14* feet, provided that the access is made of permeable material.

(e) A waiver from strict compliance from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements at N.J.A.C. 7:8-5.4 and 5.5 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 N.J.A.C. 7:8-5.4 and 5.5 to the maximum extent practicable;

3. The applicant demonstrates that, in order to meet the requirements at N.J.A.C. 7:8-5.4 and 5.5 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 (e)3 above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate for requirements of N.J.A.C. 7:8-5.4 and 5.5 that were not achievable on-site.

7:8-5.3 Nonstructural stormwater management strategies

(a) ***To the maximum extent practicable, the standards in N.J.A.C. 7:8-5.4 and 5.5 shall be met by incorporating nonstructural stormwater management strategies at N.J.A.C. 7:8-5.3 into the design.*** The person submitting an application for review shall identify the nonstructural strategies 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 strategies identified in (b) below into the design of a particular project, the applicant shall identify the *[measure]* ***strategy*** and provide a basis for the contention.

(b) Nonstructural stormwater management strategies incorporated into site design shall:

1. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;

2. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;

3. Maximize the protection of natural drainage features and vegetation;

4. Minimize the decrease in the *[pre-construction]* "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 drainage area to the point of interest within a watershed;

5. Minimize land disturbance including clearing and grading;

6. Minimize soil compaction;

7. Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;

8. Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas; and

9. Provide other *[preventative]* 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. These source controls include, but are not limited to:

i. Site design features that help to prevent accumulation of trash and debris in drainage systems;

ii. Site design features that help to prevent discharge of trash and debris from drainage systems;

iii. Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and

iv. 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.

(c) Any land area used as a non-structural stormwater management measure to meet the performance standards in N.J.A.C. 7:8-5.4 and 5.5 shall be dedicated to a government agency, subjected to a conservation restriction filed with the appropriate County Clerk's office, or subject to Department approved or equivalent restriction that ensures *[the maintenance of]* that measure ***or an equivalent stormwater management measure approved by the reviewing agency is maintained*** in perpetuity.

(d) Guidance for nonstructural stormwater management strategies is available in the New Jersey Stormwater Best Management Practices Manual available from the Department through the address listed at N.J.A.C. 7:8-1.3.

7:8-5.4 Erosion control, groundwater recharge and runoff quantity standards

(a) This section 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.

1. 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.

2. The minimum design and performance standards for groundwater recharge are as follows:

i. The design engineer shall, using the assumptions and factors for stormwater runoff ***and groundwater recharge*** calculations at N.J.A.C. 7:8-5.6, either:

(1) 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

(2) Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the two-year storm is infiltrated.

ii. This groundwater recharge requirement does not apply to projects *[that qualify as]* ***within the*** "urban redevelopment*[.]*****area,***" ***or to projects subject to (a)2iii below.***

iii. The following types of stormwater shall not be recharged:

(1) 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

(2) Industrial stormwater exposed to "source material." "Source material" means any material(s) or machinery, located at an industrial facility, that 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.

iv. 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 downgradient of the groundwater recharge area.

3. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at N.J.A.C. 7:8-5.6, complete one of the following:

i. 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;

ii. 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; *[or]*

iii. Design stormwater management measures so that the post-construction peak runoff rates for the two, 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-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***

iv. In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with (a)3i, ii and iii above shall only be applied if the increased volume of stormwater runoff could increase flood damages below the point of discharge.

(b) Any application for a new agricultural development that meets the definition of major development at N.J.A.C. 7:8-1.2 shall be submitted to the Soil Conservation District for review and approval in accordance with the requirements of this section and any applicable Soil Conservation District guidelines for stormwater runoff quantity and erosion control. ***For purposes of this section, "agricultural development" means land uses normally associated with the production of food, fiber and livestock for sale. Such uses do not include the development of land for the processing or sale of food and the manufacture of agriculturally related products.***

7:8-5.5 Stormwater runoff quality standards

(a) Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality design storm 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 one-quarter 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 Pollutant 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 below. 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		

(b) 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*[, which]**. ***The BMP Manual** may be obtained from the address identified in N.J.A.C. 7:8-1.3 *or found on the Department's website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in N.J.A.C. 7:8-5.9(a)**. 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. Where the Department is not 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 address at N.J.A.C. 7:8-1.3.

(c) 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
*[Forested Buffers	70]*
Extended Detention Basin	40-60
Infiltration Structure	80
Manufactured Treatment Device	See N.J.A.C. 7:8-*[5.7(c)]**5.7(d)*
Sand Filter	80
Vegetative Filter Strip	*[50]**60-80*
Wet Pond	*[60]**50*-90

(d) 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.

(e) 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 N.J.A.C. 7:8-5.4 and 5.5.

(f) Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in N.J.A.C. 7:8-1.3.

(g) 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.

(h) 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 HUC 14 drainage. 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:

1. The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:

i. 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 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.

ii. Encroachment within the designated special water resource protection area under (h)1i 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.

2. All stormwater shall be discharged outside of but may 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. (see N.J.A.C. 2:90-1.3).

3. 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., (see N.J.A.C. 2:90-1.3), 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:

i. Stabilization measures shall not be placed within 150 feet of the waterway;

ii. Stormwater associated with discharges allowed by this paragraph shall achieve a 95 percent TSS post construction removal rate;

iii. Temperature shall be addressed to ensure no impact on receiving waterway;

iv. 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;

v. A conceptual project design meeting shall be held with the appropriate Department staff and Soil Conservation District staff to identify necessary stabilization measures; and

vi. All encroachments proposed under this section shall be subject to review and approval by the Department.

4. 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 this subsection has been approved by the Department, 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 this subsection shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined above in (h)1i. In no case shall a stream corridor protection plan allow reduction of the Special Water Resource Protection Area to less than 150 feet as measured perpendicular to the waterway subject to this subsection.

5. This subsection 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 *[(effective date of the rule)]* ***February 2, 2004***, provided that the construction begins on or before *[(five years from effective date of the rule)]* ***February 2, 2009***.

7:8-5.6 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:

i. The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in Section 4, National Engineering Handbook (NEH-4), dated July 2002, incorporated herein by reference as amended and supplemented. This methodology is additionally described in Technical Release 55—Urban Hydrology for Small Watersheds (TR-55), dated June 1986, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the Natural Resources Conservation Service website at http://www.wcc.nrcs.usda.gov/water/quality/common/neh630/4content.html or at Natural Resources Conservation Service, 220 Davison Avenue, Somerset, New Jersey 08873; (732) 537-6040; or

ii. The Rational Method for peak flow and the Modified Rational Method for hydrograph computations. The rational and modified rational methods are described in "Appendix A-9 Modified Rational Method" in the Standards for Soil Erosion and Sediment Control in New Jersey, July 1999. This document is available from the State Soil Conservation Committee or any of the Soil Conservation Districts listed at N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number or each Soil Conservation District is available from the State Soil Conservation Committee, P.O. Box 330, Trenton, NJ 08625, 609-292-5540.

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 N.J.A.C. 7:8-5.6(a)1i and the Rational and Modified Rational Methods at N.J.A.C. 7:8-5.6(a)1i.*** 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 *[calculation]* ***application. If more than one land cover has 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, that may reduce pre-construction stormwater runoff rates and volumes.

4. In computing stormwater runoff from *[a]* ***all*** design storm***s***, 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 *[the water quality storm]* ***runoff from unconnected impervious cover***, urban impervious area modifications as described in the NRCS Technical Release-55, Urban Hydrology for Small Watersheds ***or 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 Groundwater-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 the New Jersey Geological Survey website at http://www.state.nj.us/dep/njgs/; or at New Jersey Geological Survey, 29 Arctic Parkway, PO Box 427, Trenton, NJ 08625-0427; (609) 984-6587.

7:8-5.7 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 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 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 the width of the diameter of the orifice or one-third 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 N.J.A.C. 7:8-6.2(a).

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 N.J.A.C. 7:8-6.

*[(c)]**(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 this subchapter.

*[(d)]**(c)* Manufactured treatment devices may be used to meet the requirements of this subchapter, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.

7:8-5.8 Maintenance requirements

(a) The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.

(b) 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.

(c) 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.

(d) If the person responsible for maintenance identified under (b) above is not a public agency, the maintenance plan and any future revisions based on (h) below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.

(e) Preventative and corrective maintenance shall be performed *[as needed]* ***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.

(f) The person responsible for maintenance identified under (b) 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.

(g) The person responsible for maintenance identified under (b) above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.

(h) The person responsible for maintenance identified under (b) above shall retain and make available, upon request by *[a]* ***any*** public entity ***with administrative, health, environmental or safety authority over the site***, the maintenance plan and the documentation required by *[(g)]**(f)* and *[(h)]**(g)* above.

(i) 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.

7:8-5.9 Sources for technical guidance

(a) Technical guidance for stormwater management measures can be found in the documents listed at (a)1 and 2 below, which are available from Maps and Publications, Department of Environmental Protection, 428 East State Street, PO 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, 2002 as amended. Information is provided on stormwater management measures such as:

i. Bioretention systems;
ii. Constructed stormwater wetlands;
iii. Dry wells;
[iv. Forested buffers;]
*[v.]**iv.* Extended detention basins;
*[vi.]**v.* Infiltration structures;
*[vii.]**vi.* Manufactured treatment devices;
*[viii.]**vii.* Pervious paving;
*[ix.]**viii.* Sand filters;
*[x.]**ix.* Vegetative filter *[strip]*; and
*[xi.]**x.* Wet pond.

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:

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, PO 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, PO Box 330, Trenton, New Jersey 08625, 609-292-5540.

SUBCHAPTER 6. SAFETY STANDARDS FOR STORMWATER MANAGEMENT BASINS

7:8-6.1 Scope

(a) This subchapter sets forth requirements to protect public safety through the proper design and operation of stormwater management basins. This subchapter applies to any new stormwater management basin.

(b) The provisions of this subchapter are not intended to preempt ***more stringent*** municipal or county safety requirements for new or existing stormwater management basins. Municipal and county stormwater management plans and ordinances may, pursuant to their authority, require existing stormwater management basins to be retrofitted to meet one or more of the safety standards in N.J.A.C. 7:8-*[6.3(a)2]**6.2(a)2*, (b) and (c)1 for trash racks, overflow grates, and escape provisions at outlet structures.

7:8-6.2 Requirements for trash racks, overflow grates and escape provisions

(a) 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:

1. The trash rack shall have parallel bars, with no greater than six-inch spacing between the bars;

2. The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure;

3. 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; and

4. The trash rack shall be constructed of rigid, durable, and corrosion resistant material and designed to withstand a perpendicular live loading of 300 lbs./ft sq.

(b) An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, the grate shall comply with the following requirements:

1. The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance;

2. The overflow grate spacing shall be no greater than two inches across the smallest dimension; and

3. The overflow grate shall be constructed of rigid, durable, and corrosion resistant material and designed to withstand a perpendicular live loading of 300 lbs./ft sq.

(c) Stormwater management basins shall include escape provisions as follows:

1. If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. Escape provisions include the installation of permanent ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management basins. With the prior approval of the reviewing agency pursuant to N.J.A.C. 7:8-*[6.4(a)]* *6.3*, a free-standing outlet structure may be exempted from this requirement;

2. 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. 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 N.J.A.C. 7:8-6 Appendix A for an illustration of safety ledges in a stormwater management basin; and

3. In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than three horizontal to one vertical.

7:8-*[6.4]* *6.3* Variance or exemption from safety standards

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.

CHAPTER 13
FLOOD HAZARD AREA CONTROL

SUBCHAPTER 2. PROJECT STANDARDS

7:13-2.8 Stormwater management

If a project or activity meets the definition of "major development" at N.J.A.C. 7:8-1.2, then the project or activity shall comply with the Stormwater Management rules at N.J.A.C. 7:8.

CHAPTER 15
WATER QUALITY MANAGEMENT PLANNING

SUBCHAPTER 3. PLAN ASSESSMENT, AMENDMENT AND ADOPTION

7:15-3.4 Water quality management plan amendment procedures

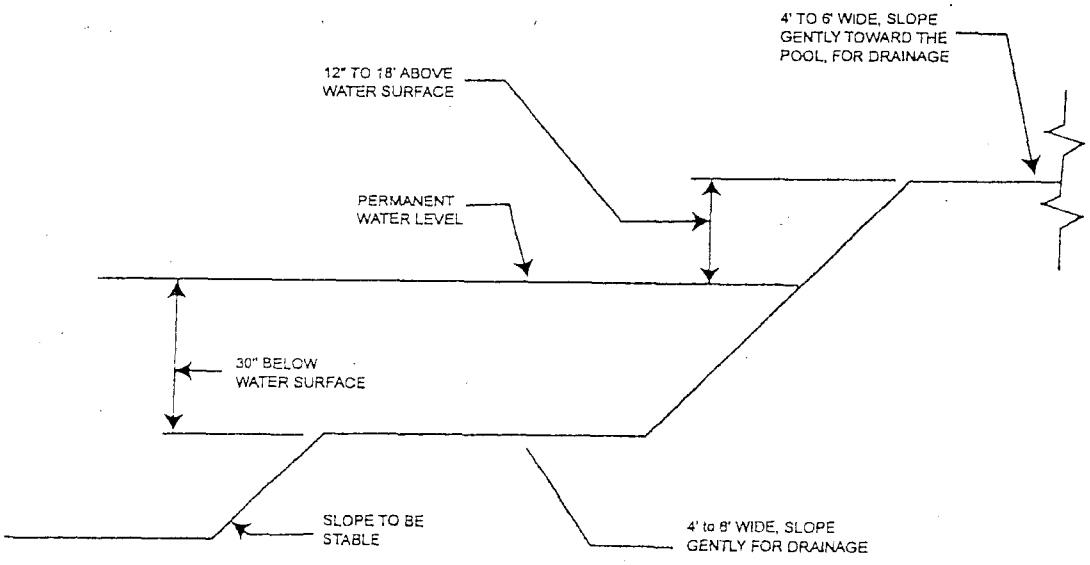
(a) (No change.)

(b) Procedures for amendment of the Statewide WQM Plan are as follows:

1. Water quality related provisions in present and future rules adopted by the Department shall be considered to be part of the Statewide WQM Plan. Such provisions may not be adopted, amended, or repealed through the WQM plan amendment process under (b)6 below.

2. Priority systems, intended use plans and project priority lists for wastewater facilities that are developed by the Department and accepted by the United States Environmental Protection Agency (USEPA) pursuant to USEPA regulations, or that otherwise are developed by the Department under N.J.A.C. 7:22, shall be considered to be part of the Statewide WQM Plan. Such priority systems and project priority lists shall be adopted or revised in accordance with USEPA regulations and N.J.A.C. 7:22, as appropriate, and shall not be adopted or revised through the WQM plan amendment process under (b)6 below.

Appendix A: Illustration of safety ledges in a new detention basin. Depicted is an elevational view.



NOTE: NOT DRAWN TO SCALE

NOTE: FOR BASINS WITH PERMANENT POOL OF WATER ONLY

3. Statewide Sludge Management Plans, District Sludge Management Plans and sludge management rules that are promulgated or approved by the Department pursuant to N.J.S.A. 13:1E-1 et seq. shall be considered to be part of the Statewide WQM Plan. Such plans and rules shall be promulgated, revised, updated or approved in accordance with N.J.S.A. 13:1E-1 et seq., and shall not be promulgated, revised, updated, or approved through the WQM plan amendment process under (b)6 below.

4. Lists of water quality limited segments, lists of segments where TMDLs will be developed, and project priority lists for TMDL development which are developed by the Department under N.J.A.C. 7:15-6 shall be adopted as amendments to the Statewide WQM Plan. TMDLs developed in accordance with N.J.A.C. 7:15-7 shall be adopted as amendments to the relevant Areawide WQM Plan(s). However, such lists, and TMDLs shall be adopted or revised in accordance with N.J.A.C. 7:15-6 or 7:15-7, as appropriate, and shall not be adopted or revised through the WQM plan amendment process under (b)6 below. The Department may also publish a draft amendment as an Interested Party Review document or as a pre-proposal prior to formal proposal of the amendment.

5. A regional stormwater management plan prepared in accordance with N.J.A.C. 7:8-3 shall be submitted only by a lead planning agency as a proposed amendment to the applicable areawide WQM plan. In addition, the following changes to an adopted regional stormwater management plan shall be processed as amendments to applicable areawide WQM Plans under this section:

i. The addition, deletion or modification to any of the drainage area-specific water quality, groundwater recharge or water quantity objectives identified under N.J.A.C. 7:8-3.5;

ii. The addition, deletion or modification to any drainage area-specific design or performance standard developed under N.J.A.C. 7:8-3.6;

iii. Any modification to a regional stormwater management plan that the Department or designated planning agency determines is likely to have a significant environmental, social, or economic impact; or

iv. Any modification that the applicant requests be processed as an amendment.

6. Components of the Statewide WQM Plan other than (b)1 through 5 above may be amended by using the procedure specified in (g) below, except that the Commissioner shall render the final decision identified in (g)9 below.

(c)-(f) (No change.)

(g) Except as provided in (h) below, the Department procedure for amendment of areawide WQM plans is as follows:

1.-2. (No change.)

3. The Department shall notify the applicant and the applicable designated planning agency, if any, in writing of its decision under (g)2 above. If the Department's decision is to proceed further with the amendment request under (g)2iii above, then this notification shall include the public notice that shall be given for the proposed amendment. If the proposed amendment is a regional stormwater management plan, the Department shall also notify the Department of Community Affairs and the Department of Agriculture. The applicant shall request written statements of consent under (g)4 below, and shall give public notice by publication in a newspaper of general circulation at the applicant's expense. The Department shall maintain a list identifying the newspaper that shall be used for this purpose in each planning area. The public notice shall also be published in the New Jersey Register. In cases where such Department decisions include a requirement for a non-adversarial public hearing, the public notice shall provide at least 30 days notice of the hearing.

4.-11. (No change.)

(h)-(l) (No change.)

7:15-3.5 Water quality management plan review, revision, and certification

(a) (No change.)

(b) The Department and the designated planning agencies shall prepare revisions to Statewide and areawide WQM Plans under this section whenever such revisions are necessary to:

1.-2. (No change.)

3. Revise schedules for submission of wastewater management plans under N.J.A.C. 7:15-5.23(g);

4. Provide for the following substantive changes in Statewide and areawide WQM plans where the Department determines no significant individual or cumulative impacts will occur to environmentally sensitive areas or other natural resources (such as water supplies) due to the proposed revision (individually or in combination with past revisions in the area), that the changes are consistent with N.J.A.C. 7:15-3.6 and 3.7, and that certain directly affected municipal and county agencies and other interests as identified by the Department have been provided an opportunity to review and comment on the proposed revision:

i.-iv. (No change.)

v. Expansion of a future sewer service area to contiguous lots, where the expansion involves less than 100 acres, contributes less than 8,000 gallons per day of additional wastewater flow, and does not create a significantly new pattern of sewered development such that a significant potential or incentive is created for additional revisions or amendments to open new areas to sewered development; or

5. Provide for any modification in an adopted regional stormwater management plan that does not require an amendment under N.J.A.C. 7:15-3.4(b)5.

(c)-(f) (No change.)

CHAPTER 20
DAM SAFETY STANDARDS

SUBCHAPTER 1. APPLICATION PROCEDURE; DESIGN CRITERIA FOR DAM CONSTRUCTION; DAM INSPECTION PROCEDURE

7:20-1.3 Permit-by-rule

(a) All dams must be designed, constructed, operated, maintained or removed in compliance with the rules in this subchapter except as set forth below:

1. Owners and operators of Class IV dams (see N.J.A.C. 7:20-1.8, Dam classification) are not required to file documents with nor obtain a permit from the Department, but must meet the following requirements, in addition to those set forth elsewhere in this subchapter:

i. (No change.)

ii. All necessary local approvals must be obtained;

iii. A New Jersey licensed professional engineer must design the Class IV Dam to meet all technical requirements of this subchapter; and

iv. If the Class IV dam is designed or constructed for stormwater management purposes, the dam shall comply with the Stormwater Management Rules at N.J.A.C. 7:8.

2. (No change.)

(b)-(c) (No change.)

(a)

LAND USE MANAGEMENT
WATERSHED MANAGEMENT
Stormwater Management
Definition of "Major Development"; Applicability to Major Development
Adopted New Rules: N.J.A.C. 7:8-1.2 and 1.6

Proposed: September 15, 2003 at 35 N.J.R. 4220(a).
Adopted: January 9, 2004 by Bradley M. Campbell, Commissioner, Department of Environmental Protection.
Filed: January 9, 2004 as R.2004 d.61, **with technical changes** not requiring additional public notice and comment (see N.J.A.C. 1:30-6.3).

Authority: N.J.S.A. 13:1D-1 et seq., 13:9A-1 et seq., 13:19-1 et seq., 40:55D-93 through 99, 58:4-1 et seq., 58:10A-1 et seq., 58:11A-1 et seq. and 58:16A-50 et seq.
DEP Docket Number: 20-03-08/417.
Effective Date: February 2, 2004.
Expiration Date: February 2, 2009.

The Department of Environmental Protection (Department) is adopting new Stormwater Management rules proposed on September 15, 2003 at 35 N.J.R. 4220(a). Particularly, the Department is adopting a new definition of "major development" and a new section at N.J.A.C. 7:8-1.6, Applicability to major development. On January 6, 2003, the Department proposed repeal and new Stormwater Management rules, N.J.A.C. 7:8. (See 35 N.J.R. 119(a).) The adoption of the new Stormwater Management rules appears elsewhere in this issue of the New Jersey Register. These new rules are incorporated within the new Stormwater Management Rules.

Based on comments received on the January 6, 2003 proposal of the Stormwater Management rules, the Department determined that the originally proposed definition of "major development" could have been misinterpreted to mean that projects possessing preliminary local approval, before the new rules took effect, would be considered exempt from all stormwater review, rather than exempt from the additional requirements imposed by the new rule. Implementation of the new rules under this exemption would not have provided adequate protection to waterbodies in the State from the impacts of stormwater runoff and nonpoint source pollution. Additionally, the Department determined that to qualify for grandfathering from the new rules, it was appropriate to require that, in addition to the enumerated local approvals, a project also have one enumerated Department permit that included stormwater management review component. Therefore, it was necessary to repropose the definition of "major development" and propose a new applicability provision to ensure adequate review of stormwater management has occurred in order for a project to qualify for continued treatment under the previous rules and that grandfathered approvals have a limited term. (See 35 N.J.R. 4220(a); September 15, 2003.)

The comment period on the reproposal closed on November 14, 2003. Comments were received from 327 interested persons.

Summary of Public Comments and Agency Responses:

The following people submitted written comments on the reproposed definition of "major development" and proposed new section at N.J.A.C. 7:8-1.6, Applicability to major development. The number in parentheses after each comment corresponds to the number identifying the respective commenters below.

List of Commenters

1. Akers, Fred
2. Alexandrini, Leanne
3. Allen, Francine
4. Allen, Kenneth
5. Allen, Peter
6. Allen, Julia
7. Anthony, Paul R.W.
8. Argentina, Debra
9. Armstrong, James
10. Armstrong, James C.
11. Aures, Bonita
12. Auth, Joan
13. Bailey, Robert
14. Baker, Marie
15. Balint, Christine
16. Barnett, Daniel
17. Bartholomew, Claude
18. Beckwith, Anita
19. Bellach, William
20. Best, Theodore V.
21. Boiyai, Melani
22. Boras, Jo & Leonard
23. Brenke, Richard
24. Brennenstuhl, James
25. Brine, Charles
26. Brinker, Erica
27. Brown, Jessica
28. Bryson, Jennifer
29. Bucquet, Caroline
30. Burani, Sergio
31. Buriani, Michael
32. Burns, Marilyn
33. Butrym, Michael
34. Cabri, Henry
35. Cannata-Nowel, Anita
36. Cantilli, John
37. Capozucca, John
38. Carley, Bryan
39. Carlough, Bob
40. Carluccio, Tracy; for the Delaware River Keeper
41. Carringer, Nancy
42. Case, Steve
43. Cheung, Danny
44. Chiang, Rodney
45. Chin, Alina
46. Christian, Mary Jo
47. Clougherty, Jill
48. Cohen, Martin
49. Colby, Richard
50. Colgan, Deborah
51. Colosi, Joseph
52. Colson, Linda for the Cape Accountability Civic Group
53. Connell, Joyce
54. Conner, Mike
55. Connolly, William M., Director, for the Department of Community Affairs Division of Codes and Standards
56. Cooper, Neil
57. Covington, Katharine
58. Croce, Michael
59. Crum, Daniel
60. Curtis, Marie A., for the New Jersey Environmental Lobby
61. D'Alessio-Cole, Cheryl
62. Dambra, John
63. Darrow, Michael
64. Deckelnick, Joe
65. Decker, George
66. DeFiglio, Judith
67. Denzer, Joan
68. Desjardins, Donna
69. DeWeese, Robin
70. Dey, Stephen P.; for the New Jersey State Board of Agriculture
71. DiLodovico, Anthony
72. Dockery, Dan
73. Donnici, Anthony
74. Dooley, Brian
75. Dreyling, Chris
76. Ducate, Janice
77. Duggan, Frances
78. Dumais, Susan
79. Dungan, Christian
80. Dunne, Loretta
81. Easton, Kathy
82. Eckstein
83. Edelmann, Carolyn Foot
84. Egenton, Michael for the New Jersey State Chamber of Commerce
85. Elbin, Susan
86. Ember, Steve
87. Eng, Sherman
88. Epstein, Susan
89. Erwin, Jane
90. Etter, Ron
91. Fair, Abigail for the Association of New Jersey Environmental Commissions
92. Farkas, Daniel Evans
93. Farri, Virginia
94. Federoff, Valadimir
95. Fenster, Steven
96. Finch, Kathy
97. Flanagan, Carol
98. Foester, Judith
99. Ford, Peter
100. Freireich, Jeffrey; for the Kushner Companies
101. Frey, Wilma
102. Fritsch, Wayne
103. Ftera, Constance
104. Fulmer, Noah
105. Garry, Lorrain Gagl
106. Gioielli, Lawrence
107. Giorgio, Heather
108. Goad, Brian
109. Goldberg, Rosalyn
110. Goldsholl, Bernard
111. Graham, Stephen J.; for the Gill St. Bernard's School
112. Grahn, Charlene
113. Grambor, Roberta
114. Grambor, Robert
115. Grant, Gordon P.
116. Graver, Robert
117. Grayzel, Jeffrey
118. Greene, Karen Patter
119. Griber, Penelope A.; for the D.W. Smith Associates, LLC
120. Halpin, Matthew S.; for the New Jersey Society of Municipal Engineers
121. Hamfeldt, Art
122. Handelman, Mary Ellen; Secretary to the Department of Community Affairs Division of Codes ad Standards Site Improvement Advisory Board
123. Hanna, Steve
124. Harrison, Charles
125. Hartley, Lorraine
126. Haselton, Kerry
127. Hawkins, George for the Stony Brook Millstone Watershed Association
128. Healy, James
129. Heiser, Christopher
130. Hellerman, George
131. Henderson, Amy
132. Henriquez, Pamela

Section 319 of the Clean Water Act authorizes a Federal grant-in-aid program to encourage states to control nonpoint sources. The Department developed a management program for nonpoint source control under which the Department issues grants to local, regional, State, and interstate agencies as well as to nonprofit organizations to, for example, develop or monitor best management practices to control stormwater.

Coastal Zone Management Act

Under Section 6217(g) of the Coastal Zone Management Act Reauthorization and Amendments of 1990 (CZARA), P.L. 101-508, the U.S. Environmental Protection Agency (EPA) has published "Guidance Specifying Management Measures For Sources of Nonpoint Pollution In Coastal Waters" (CZARA 6217(g) Guidance). States may opt to participate or not participate in overall coastal zone management program, with no penalty for non-participation other than the loss of Federal grants for this program. No mandatory Federal standards or requirements for nonpoint sources pollution control are imposed. The CZARA 6217(g) Guidance includes management measures for stormwater runoff and nonpoint source pollution control from land development as well as many other source types. The Department has developed a coastal zone management program, including a component addressing coastal nonpoint pollution control. The Stormwater Management Rules at N.J.A.C. 7:8 are one means by which the Department implements its nonpoint pollution control program.

The Department has determined that the adopted definition and rule do not contain any standards or requirements that exceed the standards or requirements imposed by Federal law. Accordingly, Executive Order No. 27(1994) and N.J.S.A. 52:14B-1 et seq. (P.L. 1995, c.65) do not require any further analysis.

Full text of the adoption follows (additions to proposal indicated in boldface with asterisks ***thus***; deletions from proposal indicated in brackets with asterisks *[thus]*):

CHAPTER 8
STORMWATER MANAGEMENT

SUBCHAPTER 1. GENERAL PROVISIONS

7:8-1.2 Definitions

The following words and terms, when used in this chapter, shall have the following meanings, unless the context clearly indicates otherwise.

. . .

"Major development" means any "development" that provides for ultimately disturbing one or more acres of land or increasing impervious surface by one-quarter acre or more. 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. Projects undertaken by any government agency which otherwise meet the definition of "major development" but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., are also considered "major development."

. . .

7:8-1.6 Applicability to major development

(a) Except as provided in (b) below, all major development shall comply with the requirements of this chapter.

(b) The following major development shall be subject to the stormwater management requirements in effect on *[(the date one day prior to the effective date of this rule)]* ***February 1, 2004***, copies of which are available from the Department at the address specified in N.J.A.C. 7:8-1.3:

1. Major development which does not require any of the Department permits listed in (c) below and which has received one of the following approvals pursuant to the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., prior to *[(the effective date of this rule)]* ***February 2, 2004***:

i. Preliminary or final site plan approval;

ii. Final municipal building or construction permit;

iii. Minor subdivision approval where no subsequent site plan approval is required;

iv. Final subdivision approval where no subsequent site plan approval is required; or

v. Preliminary subdivision approval where no subsequent site plan approval is required.

2. Major development which has received one of the approvals pursuant to the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., in (b)1 above prior to *[(the effective date of this rule)]* ***February 2, 2004*** and has secured at least one of the applicable permits listed in (c) below from the Department by *[(the effective date of this rule)]* ***February 2, 2004***, and provided that the permit included a stormwater management review component; and

3. Major development undertaken by any government agency, which does not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., provided the project has secured at least one of the applicable Department permits listed in (c) below prior to *[(the effective date of this rule)]* ***February 2, 2004***, and provided that the permit included a stormwater management review component.

(c) For the purposes of this section, the term "permit" shall include transition area waivers under the Freshwater Wetlands Protection Act. In order to qualify under (b)2 or 3 above, the major development must have obtained at least one Department permit granted under the following statutes and, provided that the permit included a stormwater management review component, prior to *[(the effective date of this rule)]* ***February 2, 2004***:

1. Flood Hazard Area Control Act, N.J.S.A. 58:16A-50 et seq.;
2. Freshwater Wetlands Protection Act, N.J.S.A. 13:9B-1 et seq.;
3. Coastal Area Facility Review Act, N.J.S.A. 13:19-1 et seq.; or
4. Waterfront and Harbor Facilities Act, N.J.S.A. 12:5-3.

(d) An exemption provided by (b) above shall expire with the expiration, termination or other loss of duration or effect of either of the qualifying local approval or Department permit, whichever comes first. The expiration of local approvals under (b)1 above shall be governed by local ordinance. In the event there are multiple qualifying Department permits under (c) above, the expiration date is governed by that permit which expires last provided that the permit is still in effect. Once the exemption expires, the major development shall be subject to all requirements of this chapter upon reapplication for that permit and all subsequent permits or local approval(s) under the Municipal Land Use Law.

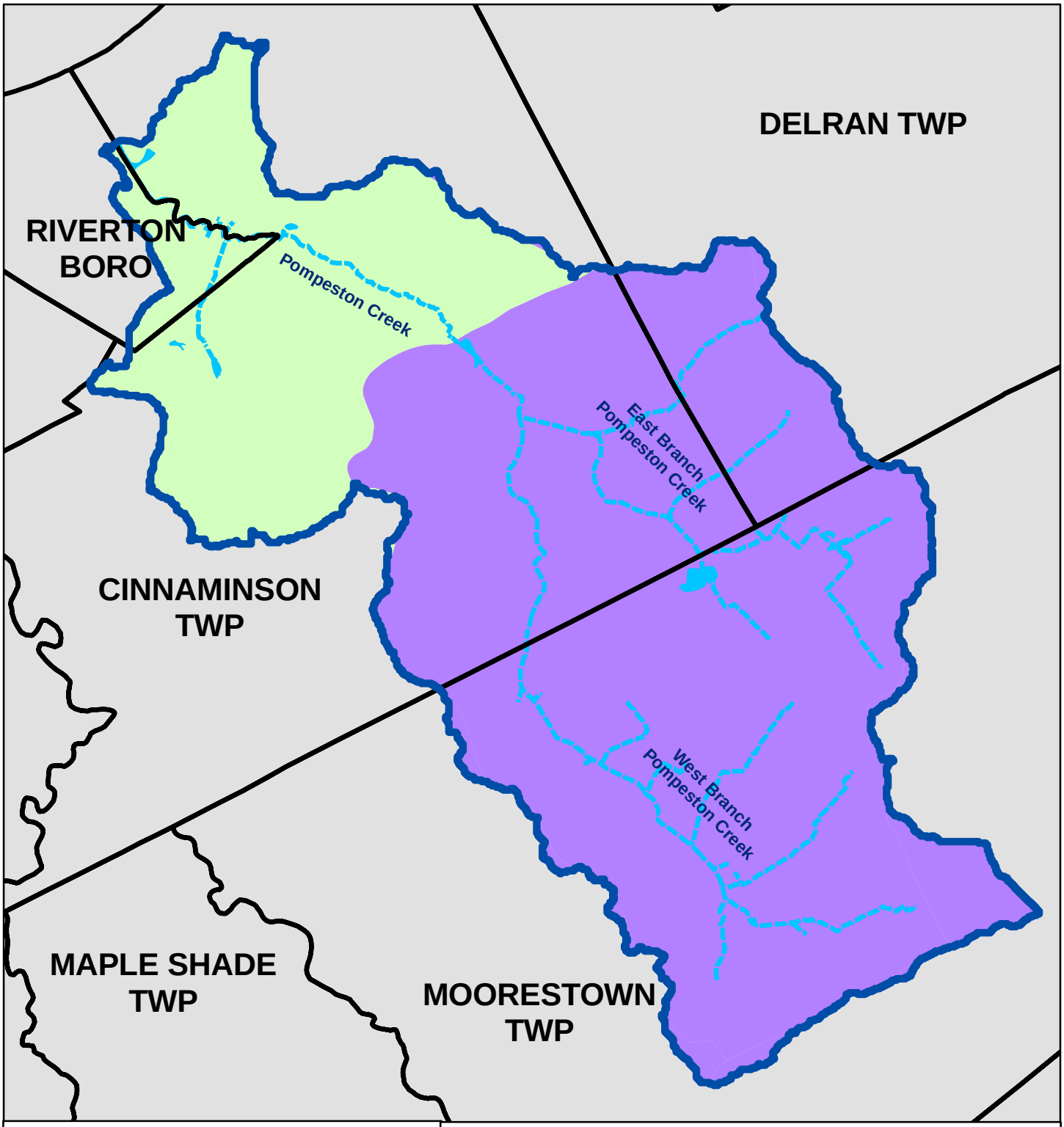
(e) An exemption under (b) above is limited to the land area and the scope of the project addressed by the qualifying approval(s) and permit(s). Exemptions under this section shall be deemed void if revisions are made to the qualifying approval or permit in (b) above, including approvals under the Municipal Land Use Law, unless upon application, the Department determines that each revision would have a de minimis impact on water resources. In making this determination, the Department shall consider the extent of any impacts on water resources resulting from the revision, including, but not limited to:

1. Increases in stormwater generated;
2. Increases in impervious surface;
3. Increases in stormwater pollutant loading;
4. Changes in land use;
5. New encroachments in special water resource protection areas; and
6. Changes in vegetative cover.

(f) In case of conflict with the Coastal Permit Program Rules at N.J.A.C. 7:7-4.4(a)4, the requirements of this chapter shall supersede.

Appendix B: Maps

MAP LIST



LEGEND

- Watershed Boundary
- Municipalities
- Rivers & Streams
- Lakes

Subwatersheds

- Upper
- Lower

MAP 1 - REGIONAL STORMWATER MANAGEMENT PLANNING AREA BOUNDARY
Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996

N W E S

0 2,800 Feet

NEW JERSEY AGRICULTURAL EXPERIMENT STATION
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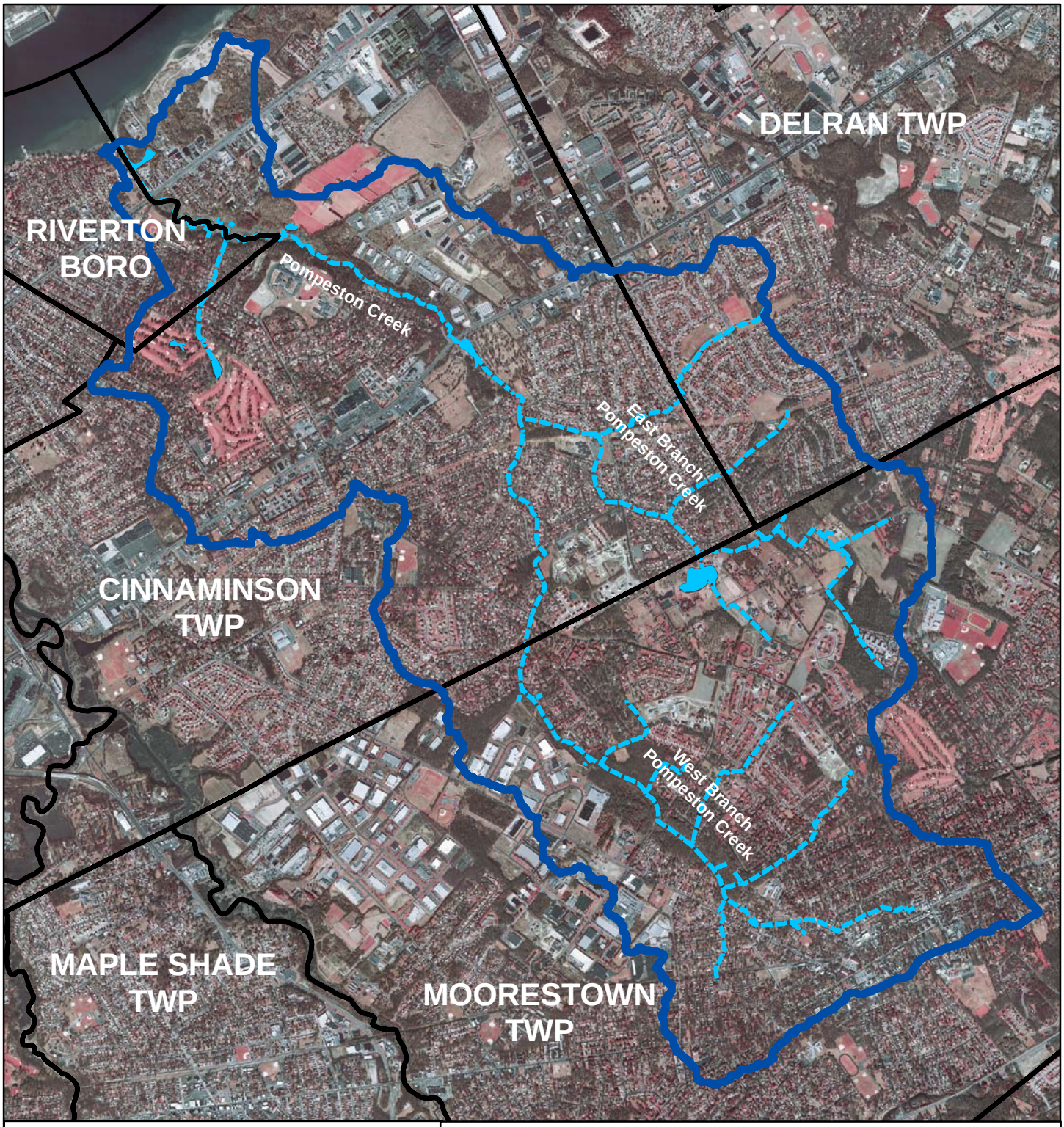
Rutgers University
RCRE Water Resources Program
14 College Farm Road
New Brunswick, NJ 08901
T: 732-932-9011
F: 732-932-8644



LEGEND

- Watershed Boundary
- Municipalities
- Rivers & Streams
- Lakes

MAP 2 - AERIAL PHOTO

Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; NJDEP Digital Orthophotos, 2002

N W E S

0 2,800 Feet

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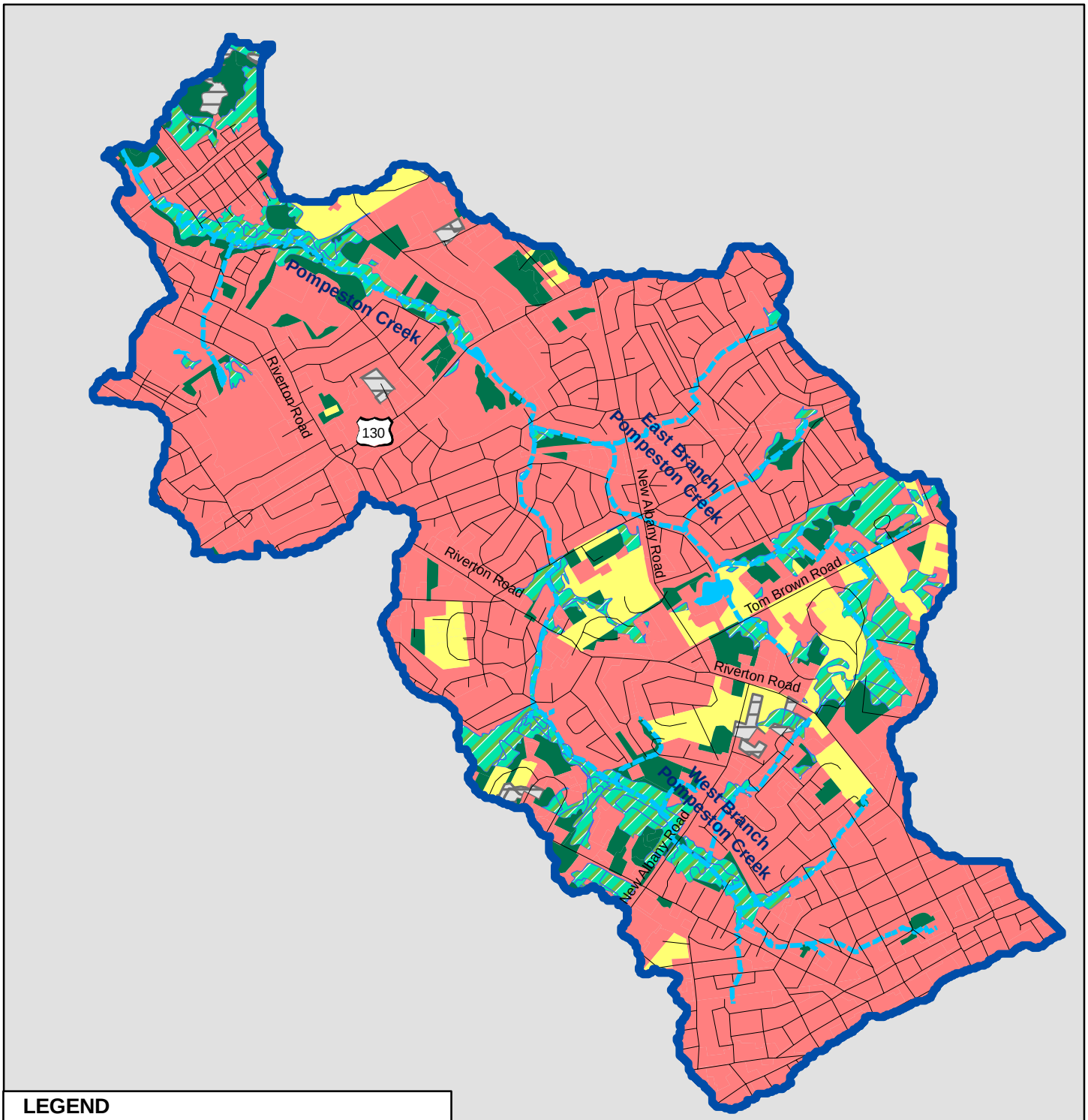

LEGEND

- Watershed Boundary
- Major Roads
- Rivers & Streams
- Agriculture
- Barren Land
- Forest
- Urban
- Water
- Wetlands

MAP 3 - EXISTING LAND USES

Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; NJDEP Land Use/Land Cover, 1995/1997

N W E S

0 2,800 Feet

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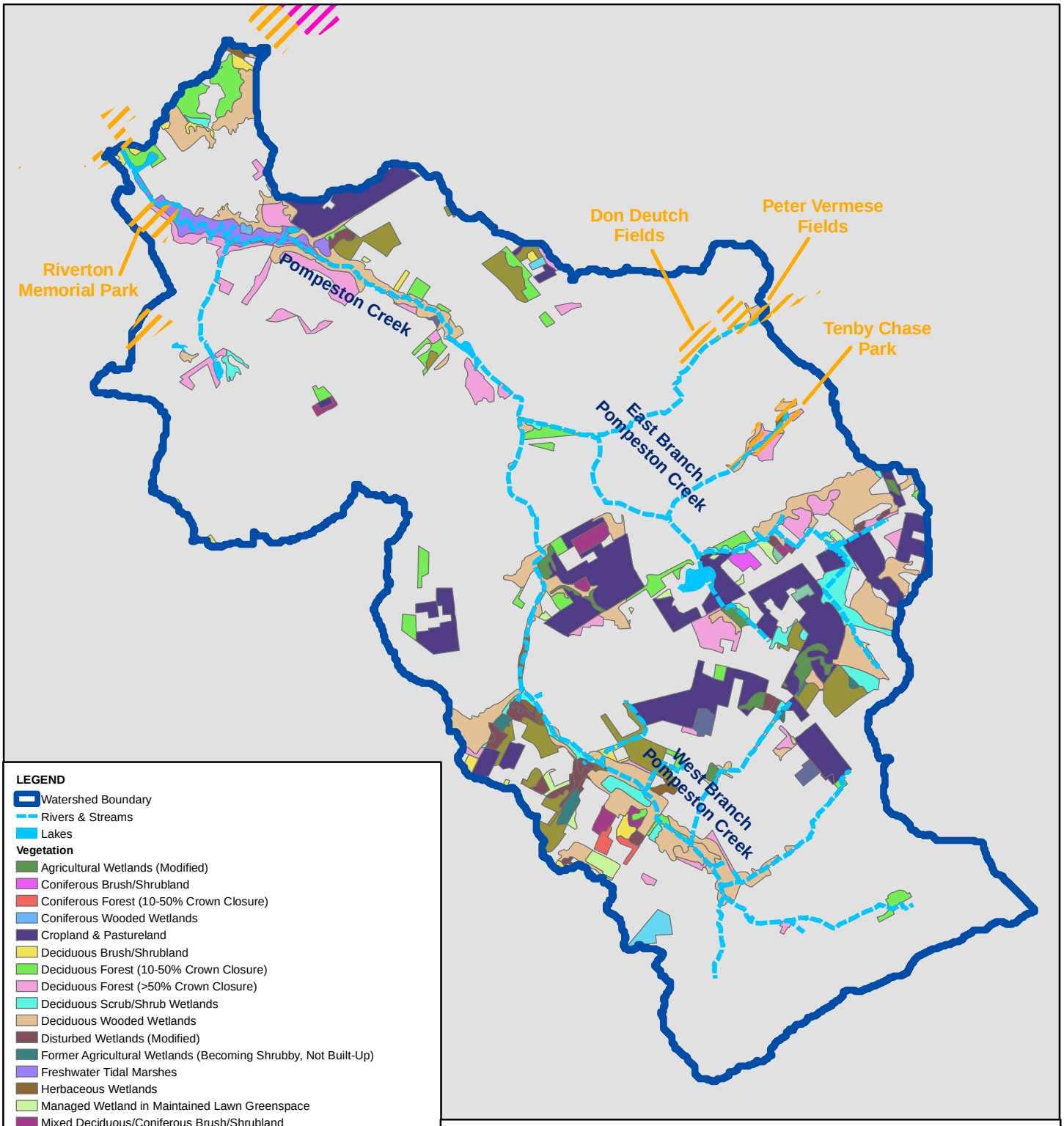

LEGEND

- Watershed Boundary
- Rivers & Streams
- Lakes

Vegetation

- Agricultural Wetlands (Modified)
- Coniferous Brush/Shrubland
- Coniferous Forest (10-50% Crown Closure)
- Coniferous Wooded Wetlands
- Cropland & Pastureland
- Deciduous Brush/Shrubland
- Deciduous Forest (10-50% Crown Closure)
- Deciduous Forest (>50% Crown Closure)
- Deciduous Scrub/Shrub Wetlands
- Deciduous Wooded Wetlands
- Disturbed Wetlands (Modified)
- Former Agricultural Wetlands (Becoming Shrubby, Not Built-Up)
- Freshwater Tidal Marshes
- Herbaceous Wetlands
- Managed Wetland in Maintained Lawn Greenspace
- Mixed Deciduous/Coniferous Brush/Shrubland
- Mixed Forest (>50% Coniferous with >50% Crown Closure)
- Mixed Forest (>50% Deciduous with 10-50% Crown Closure)
- Old Field (<25% Brush Covered)
- Orchards/Vineyards/Nurseries/Horticultural Areas
- Other Agriculture

Open Space

- Park
- Wildlife Preserve

MAP 4 - VEGETATION & OPEN SPACE MAP

Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; NJDEP Land Use/Land Cover, 1995/1997

N W E S

0 2,800 Feet

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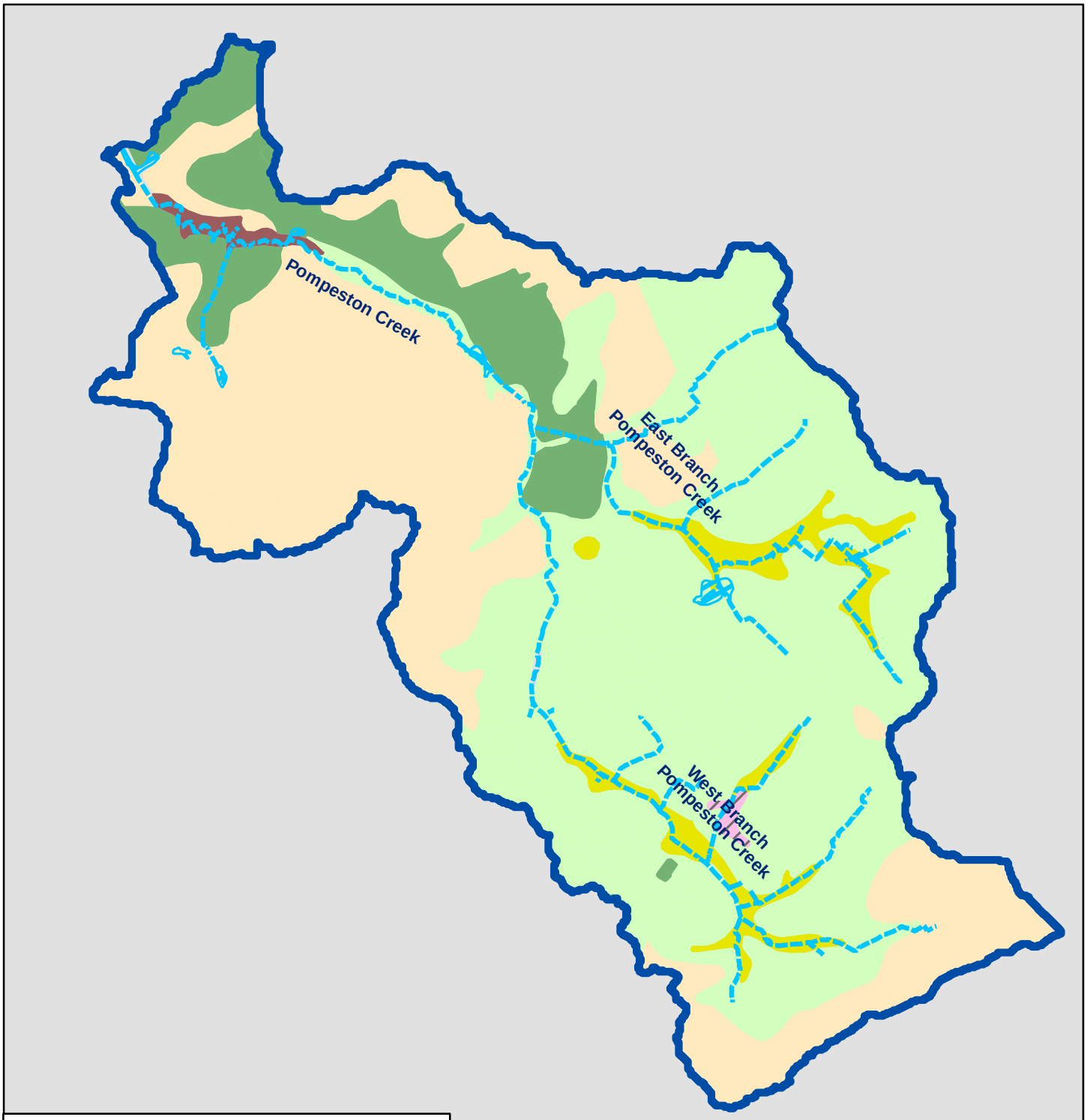
F: 732-932-8644



LEGEND

- Watershed Boundary
- Rivers & Streams
- Lakes

Hydrologic Soil Group

- A: High Infilitration Rate
- B: Moderate Infilitration Rate
- B/D
- C: Slow Infiltration Rate
- C/D
- D: Very Slow Infiltration Rate

MAP 5 - HYDROLOGIC SOIL GROUP MAP

Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; USDA/NRCS SSURGO Soil Data for Burlington County, 2005

N W E S

0 2,800 Feet

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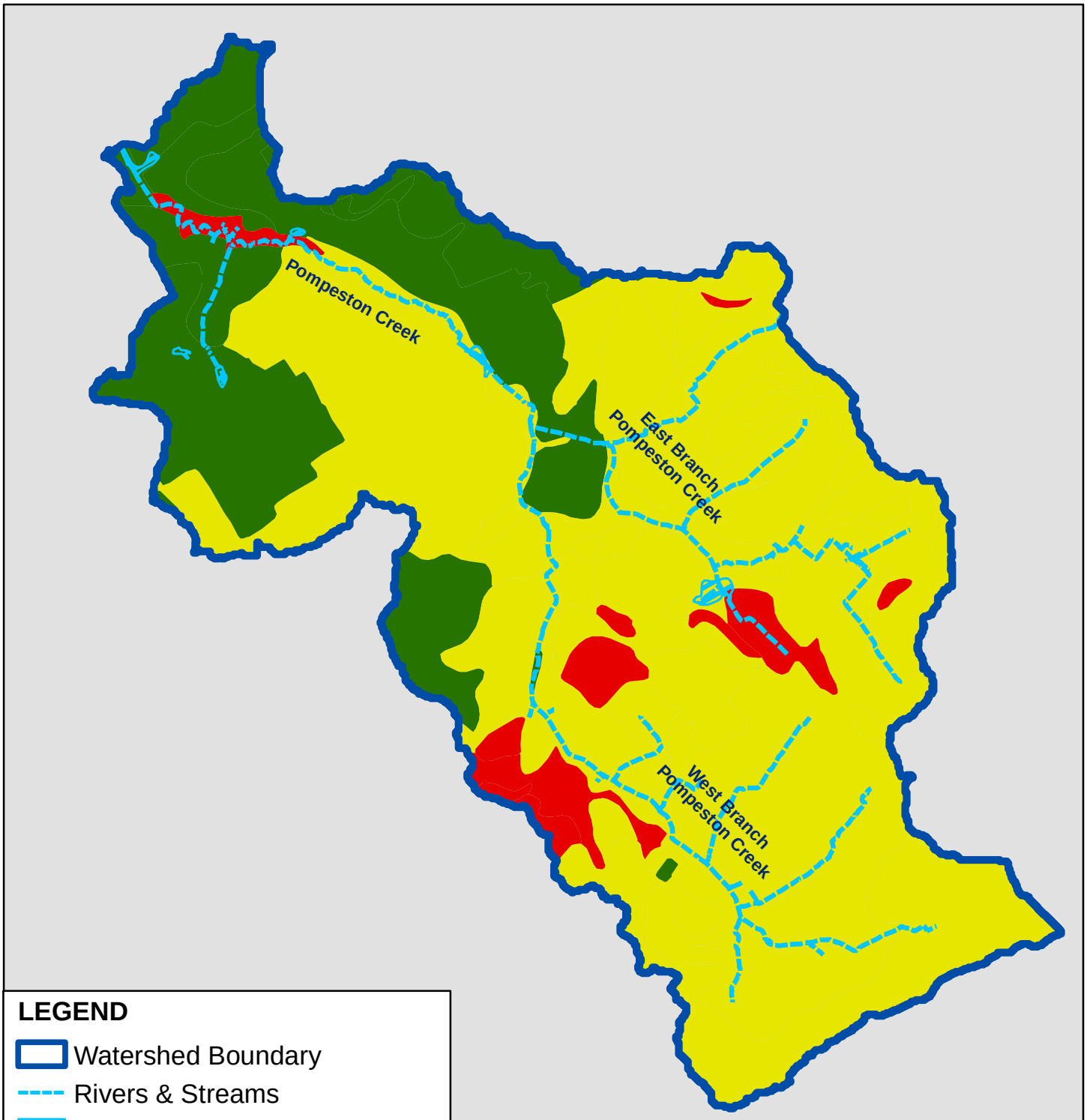

LEGEND

- Watershed Boundary
- Rivers & Streams
- Lakes

Soil Erodibility

- < 0.23; Low Erodibility
- 0.23-0.36; Moderate Erodibility
- > 0.36; High Erodibility

MAP 6 - SOIL ERODIBILITY MAP

Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; USDA/NRCS SSURGO Soil Data for Burlington County, 2005

N W E S

0 2,800 Feet

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LEGEND

- Watershed Boundary
- Rivers & Streams
- Lakes

MAP 7 - USGS QUADRANGLE MAP

Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; USGS 7.5' Topographic Quadrangles, Beverly-PA-NJ, Camden-NJ-PA, Frankford-PA-NJ, Moorsetown-NJ

0 840 Feet

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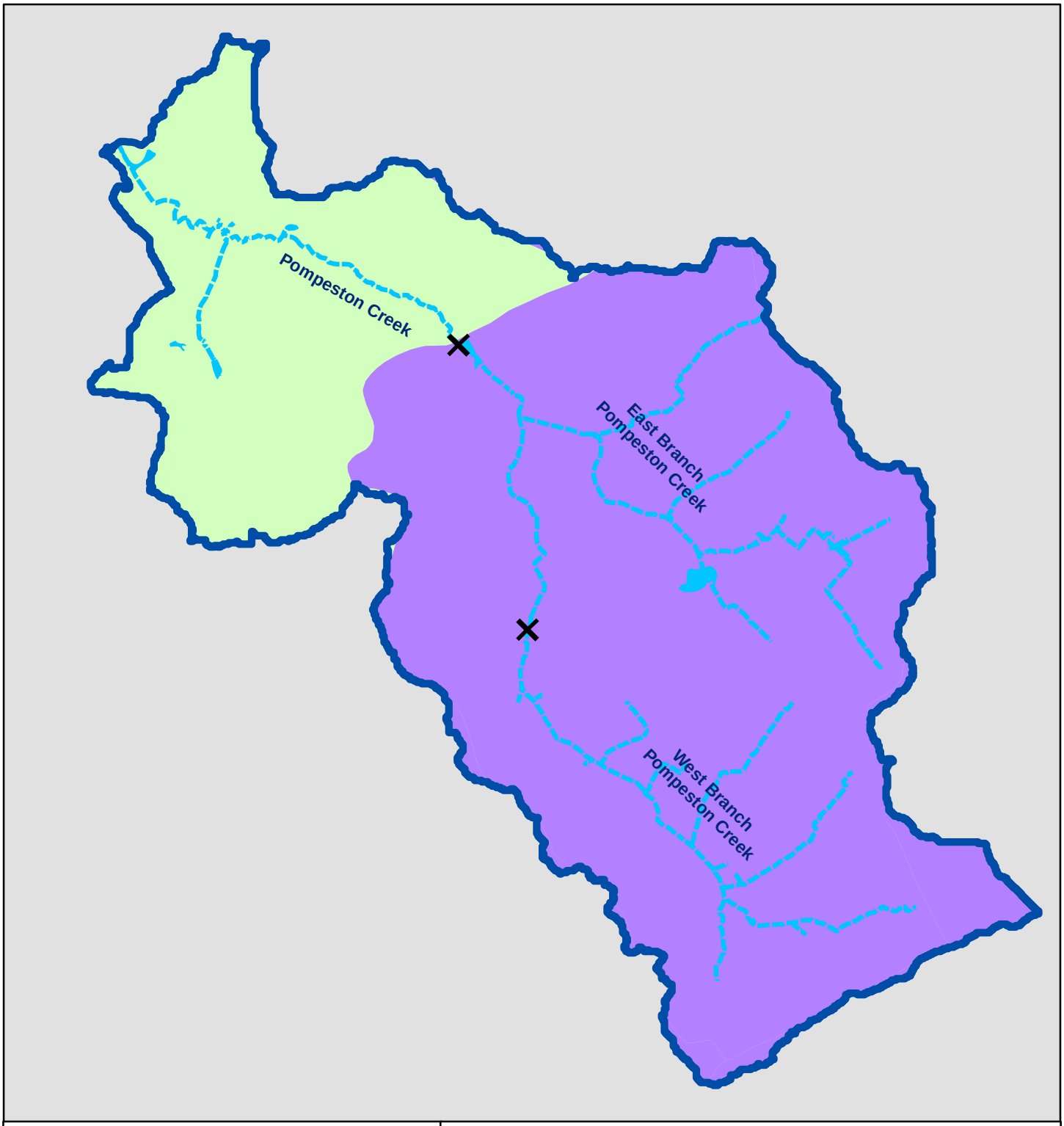

LEGEND

- Watershed Boundary
- Rivers & Streams (Labeled)
- Lakes (Labeled)

Subwatersheds

- Upper
- Lower
- Dams

MAP 8 - WATERBODIES MAP

Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996

0 2,800 Feet

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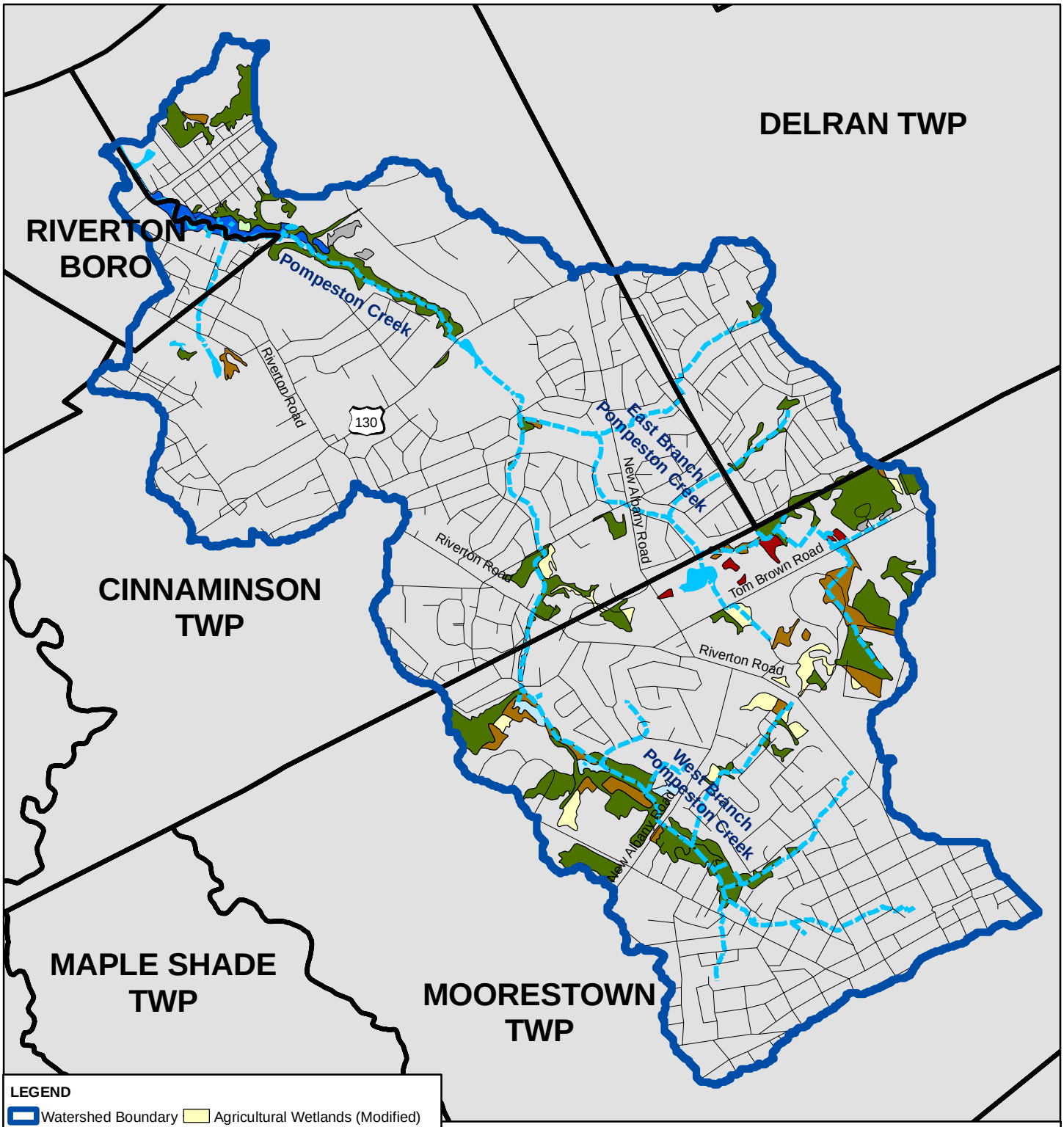

LEGEND

- Watershed Boundary
- Municipalities
- Major Roads
- Rivers & Streams
- Lakes
- Agricultural Wetlands (Modified)
- Coniferous Wooded Wetlands
- Deciduous Scrub/Shrub Wetlands
- Deciduous Wooded Wetlands
- Disturbed Wetlands (Modified)
- Freshwater Tidal Marshes
- Herbaceous Wetlands
- Managed Wetlands (Modified)

MAP 9 - WETLANDS MAP

Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996

0 2,800 Feet

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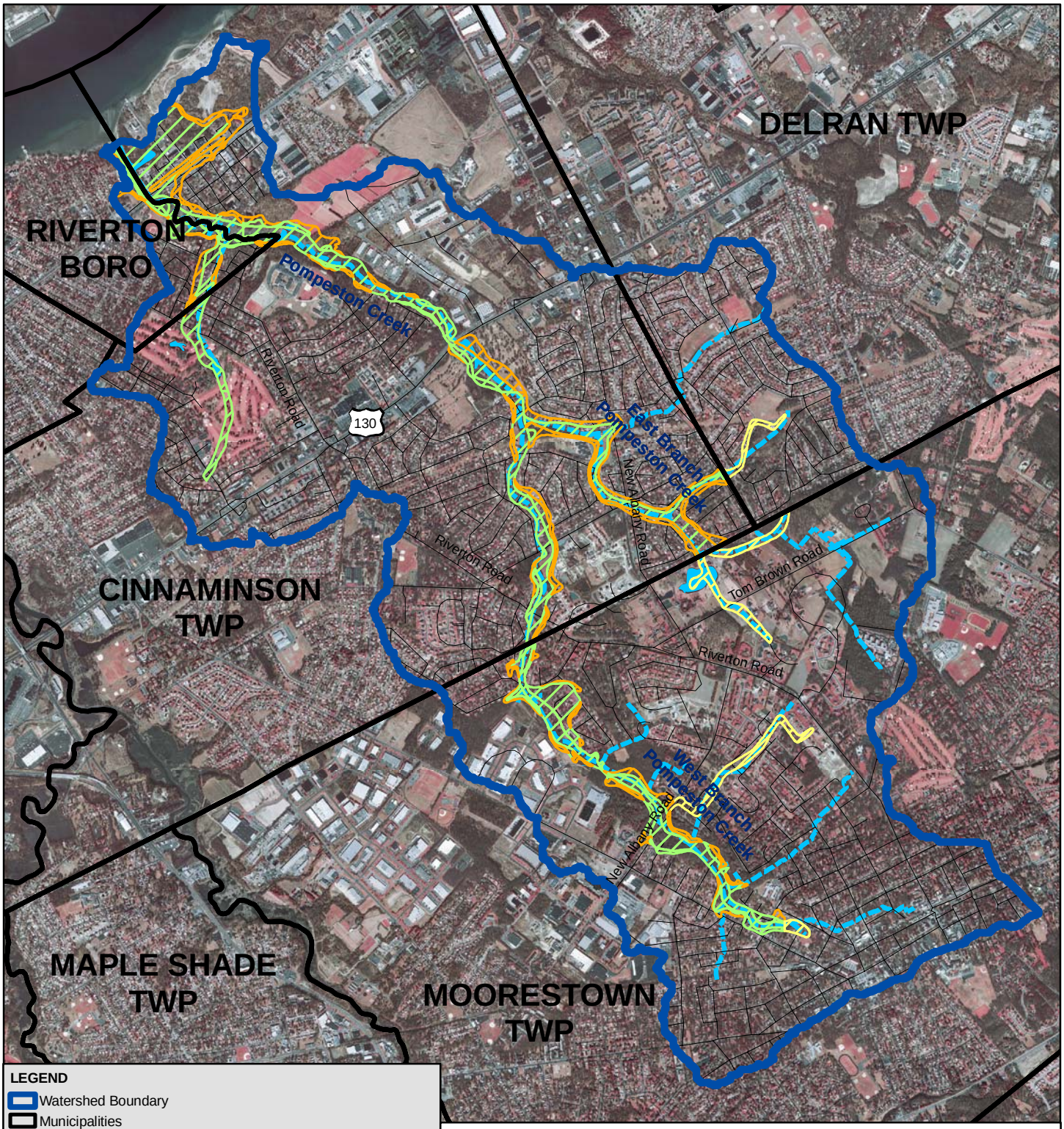

LEGEND

- Watershed Boundary
- Municipalities
- Major Roads
- Rivers & Streams
- Lakes

Flood Zone

- A (Areas of 100-Yr Flood; No Base Flood Elevation Determined)
- AE (Areas Subject to Inundation by 100-Yr Flood Events)
- X500 (Areas Subject to Inundation by 500-Yr Flood Events)

MAP 10 - FLOODPLAIN AREA MAP

Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; FEMA Q3 Flood Data, 1996; NJDEP Digital Orthophotos, 2002

N W E S

0 2,800 Feet

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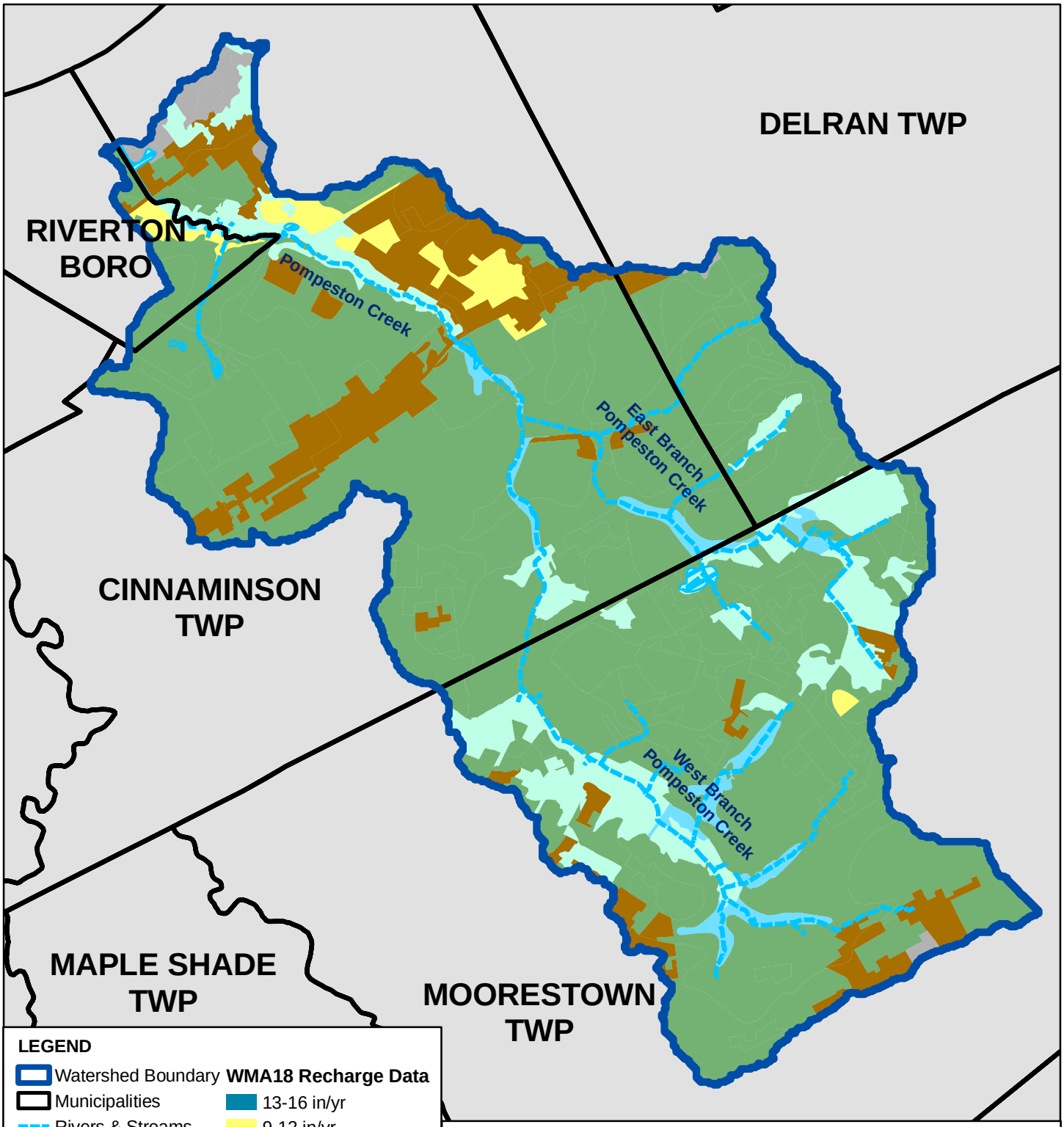

LEGEND

- Watershed Boundary
- Municipalities
- Rivers & Streams
- Lakes

WMA18 Recharge Data

- 13-16 in/yr
- 9-12 in/yr
- 8 in/yr
- 1-7 in/yr
- 0 in/yr
- Hydric Soils
- Wetlands

MAP 11 - GROUNDWATER RECHARGE MAP

Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; NJGS Groundwater Recharge Data, 2000

0 2,800 Feet

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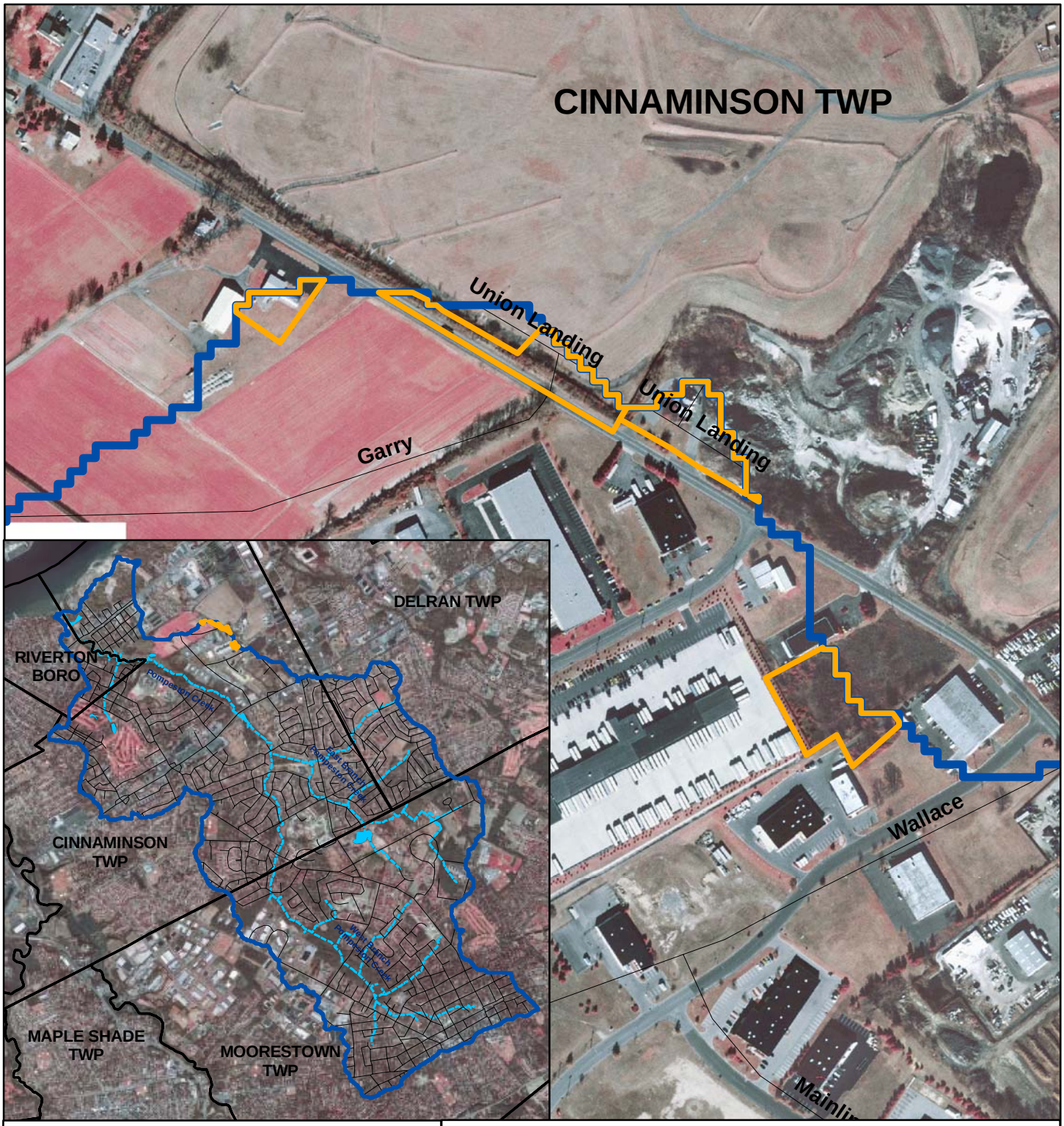

LEGEND

- Watershed Boundary
- Major Roads
- Rivers & Streams
- Lakes
- Areas with High Groundwater Recharge

MAP 11A - HIGH GROUNDWATER RECHARGE AREAS MAP
Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; NJGS Groundwater Recharge Data, 2000; NJDEP Digital Orthophotos, 2002

N W E S

275 137.5 0 Feet

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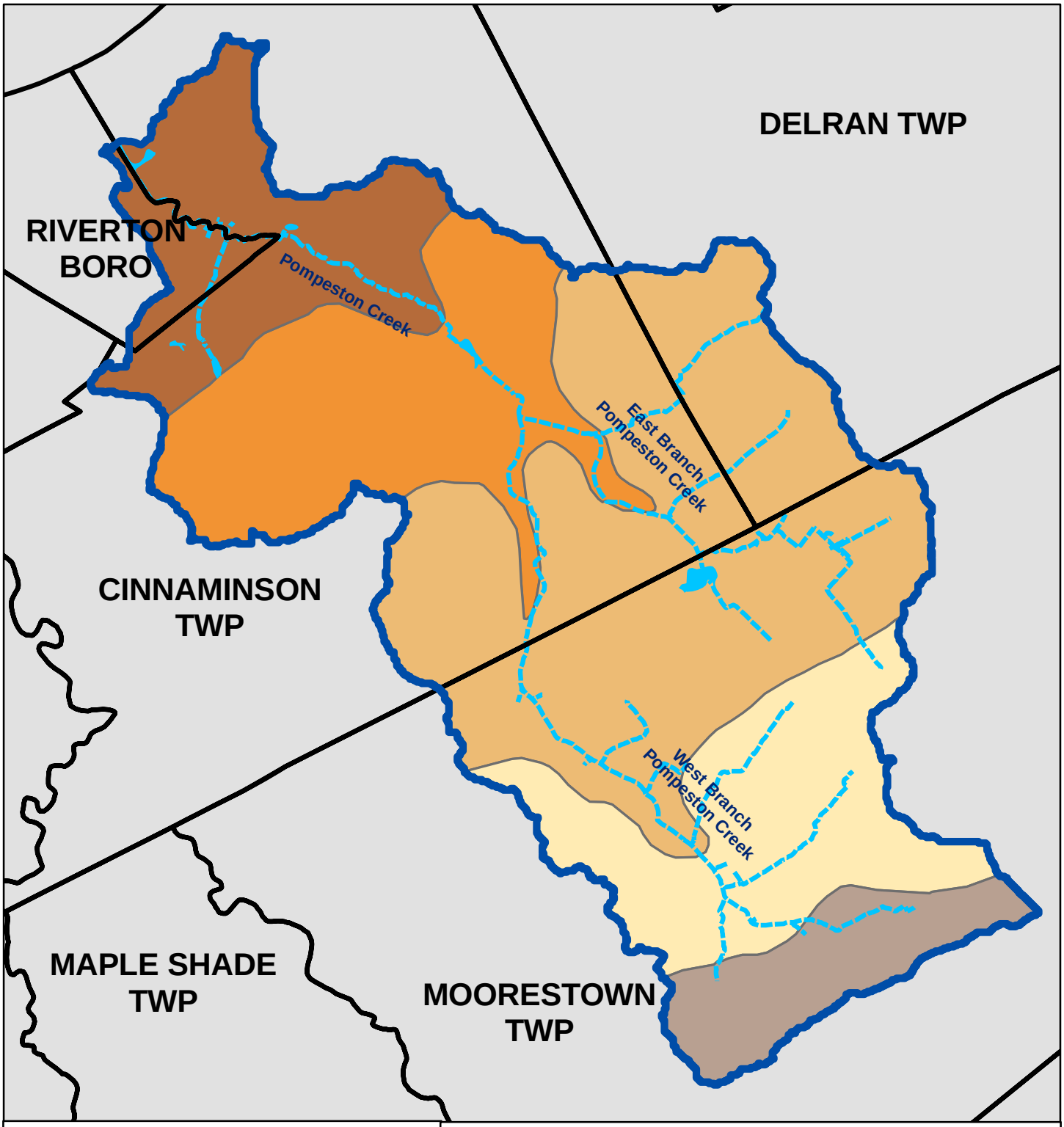

LEGEND

- Watershed Boundary
- Municipalities
- Rivers & Streams
- Lakes

Geologic Formation

- Englishtown Formation
- Woodbury Formation
- Merchantville Formation
- Magothy Formation
- Potomac Formation

MAP 11B - GEOLOGY MAP
Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; NJGS Bedrock Geology, 2004

N W E S

0 2,800 Feet

NEW JERSEY AGRICULTURAL EXPERIMENT STATION
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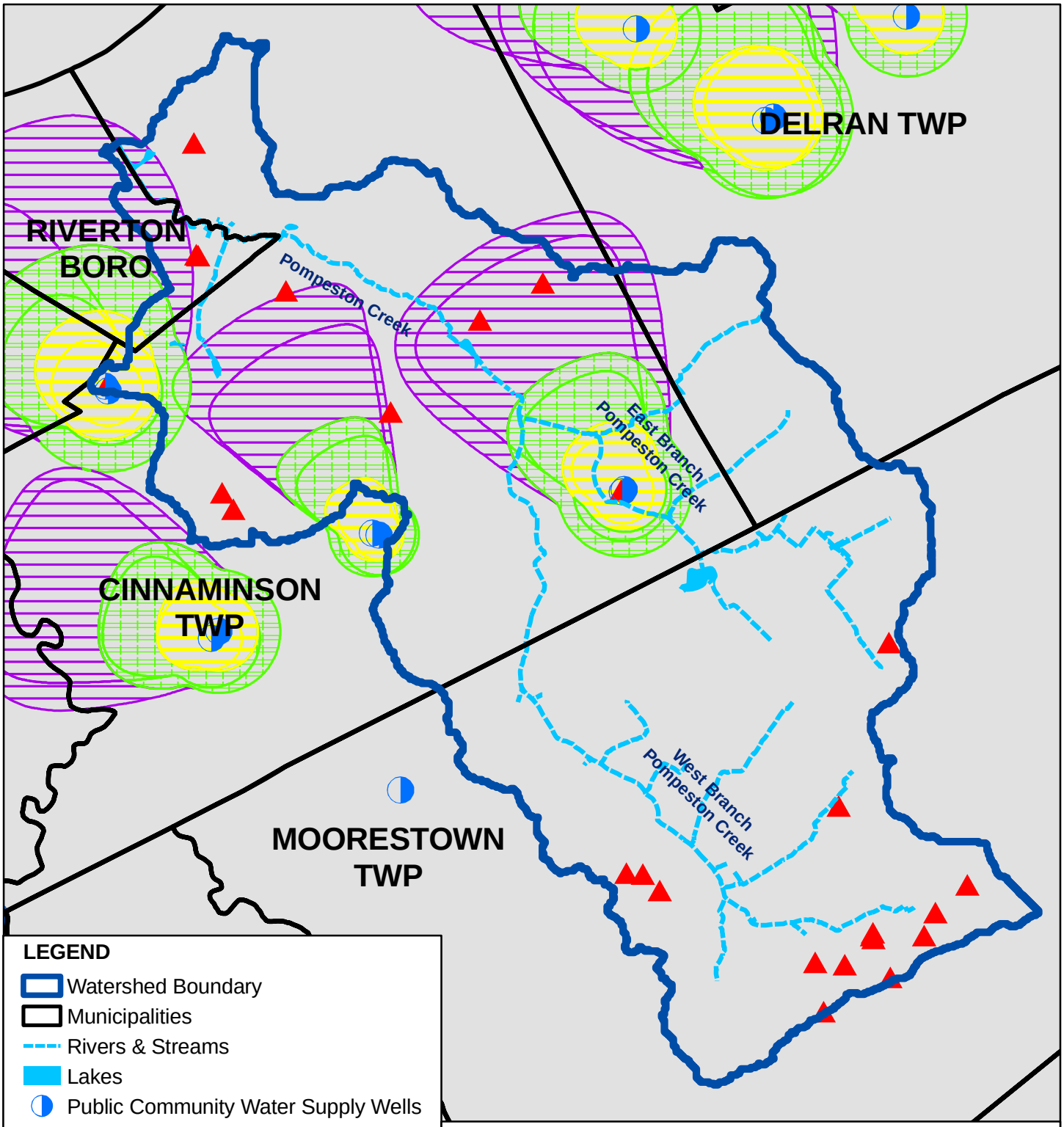


LEGEND

- Watershed Boundary
- Municipalities
- Rivers & Streams
- Lakes
- Public Community Water Supply Wells
- Known Contaminated Sites (2001)

NJGS Wellhead Protection Areas

- 2-Year Time of Travel to Well
- 5-Year Time of Travel to Well
- 12-Year Time of Travel to Well

MAP 12 - WELLHEAD PROTECTION AREAS MAP

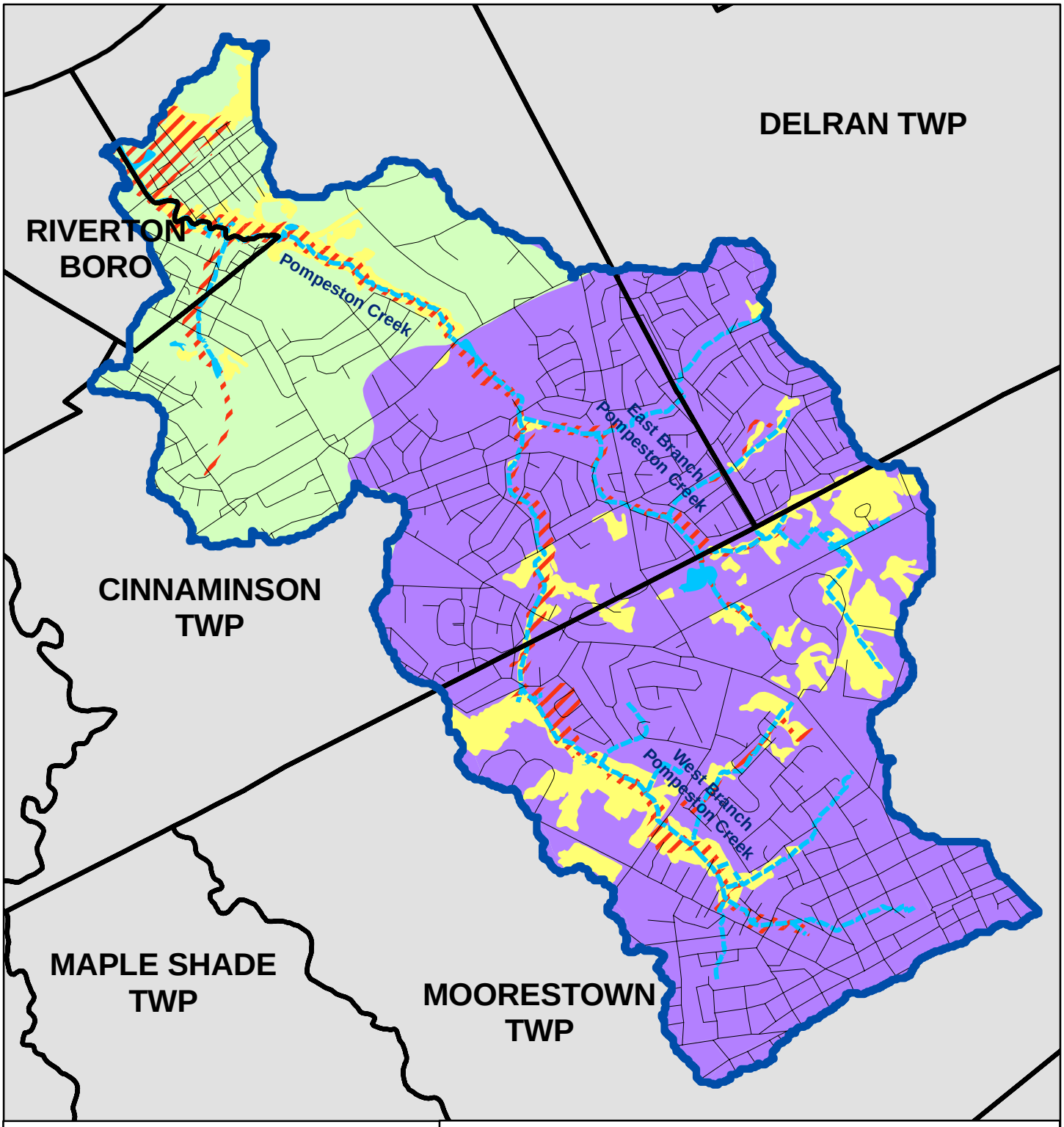
Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; NJGS PCWS, 1997; NJDEP KCS List, 2001; NJDEP WHPA, 2002

0 2,800 Feet

NEW JERSEY AGRICULTURAL EXPERIMENT STATION
RUTGERS COOPERATIVE RESEARCH & EXTENSION

Rutgers University
RCRE Water Resources Program
14 College Farm Road
New Brunswick, NJ 08901
T: 732-932-9011
F: 732-932-8644



LEGEND

- Watershed Boundary
- Municipalities
- Major Roads
- Rivers & Streams
- Lakes

Subwatersheds

- Upper
- Lower
- 100-Year Floodplain
- Wetlands +25' Buffer

MAP 13 - ENVIRONMENTALLY CONSTRAINED AREAS MAP
Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; FEMA Q3 Flood Data, 1996; NJDEP Landscape Project, 2001

0 2,800 Feet

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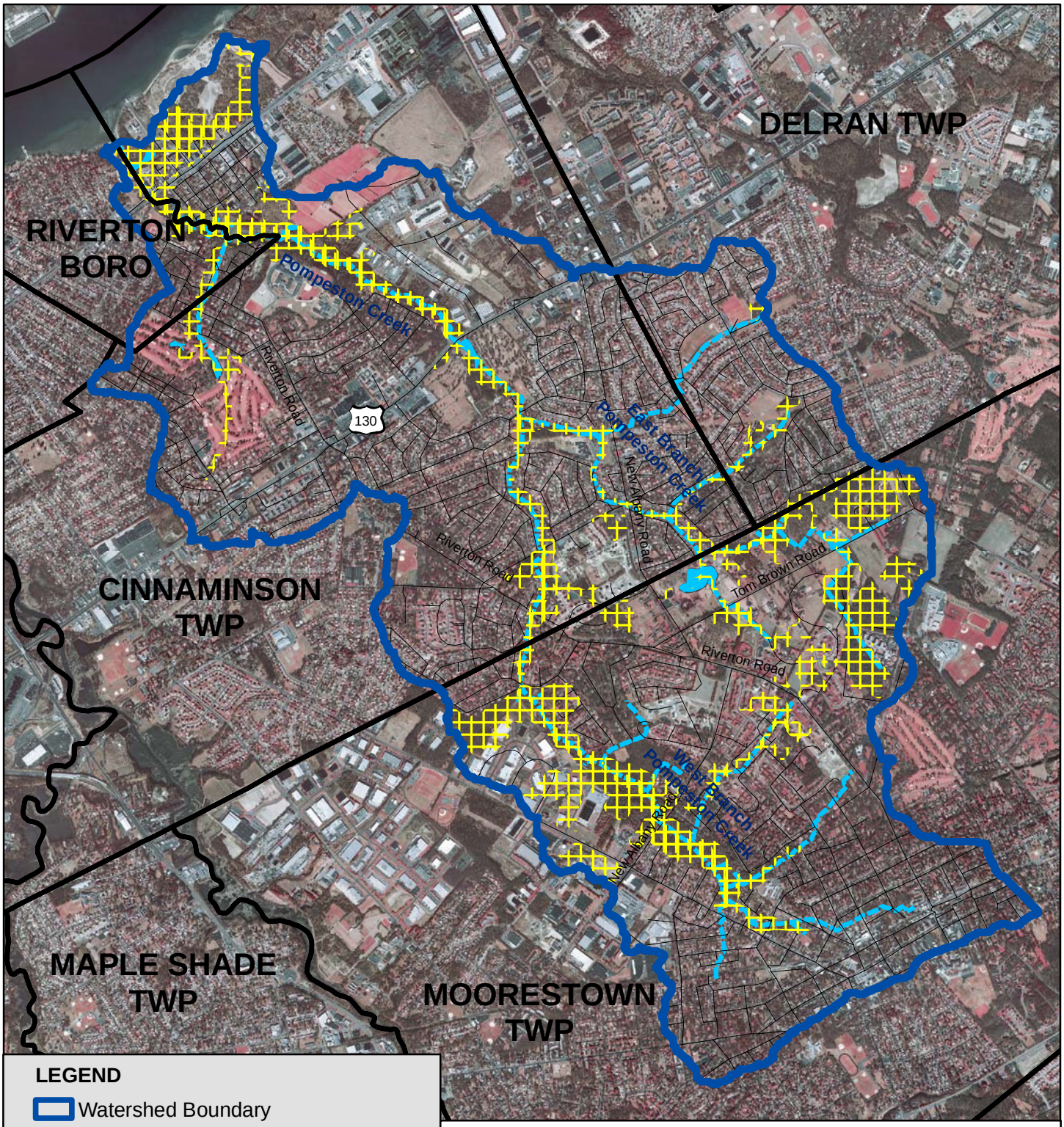

LEGEND

- Watershed Boundary
- Municipalities
- Major Roads
- Rivers & Streams
- Lakes
- Environmentally Constrained Areas

MAP 13A - ENVIRONMENTALLY CONSTRAINED AREAS AERIAL MAP
Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; FEMA Q3 Flood Data, 1996; NJDEP Landscape Project, 2001; NJDEP Digital Orthophotos, 2002

N W E S

0 2,800 Feet

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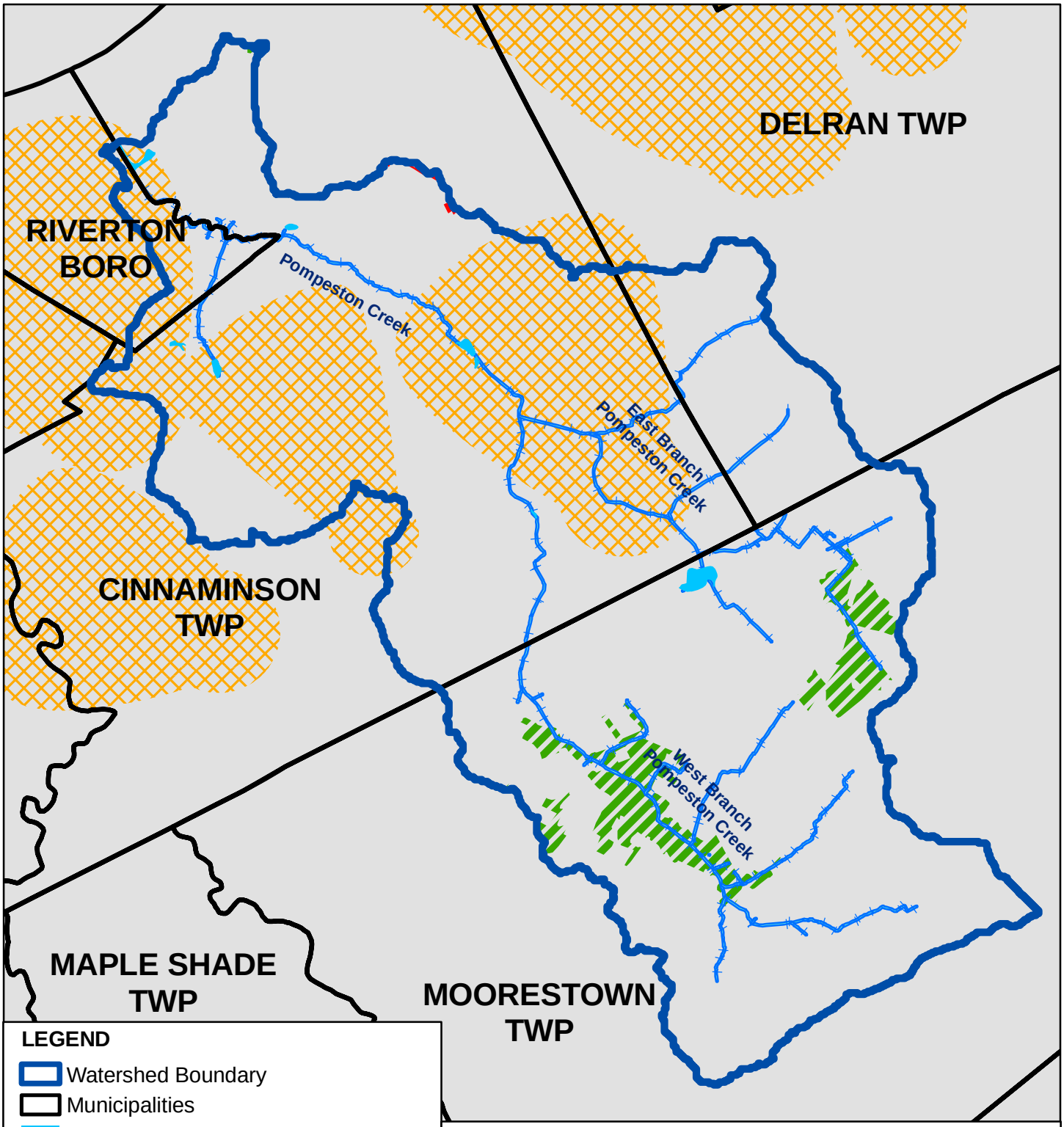

LEGEND

- Watershed Boundary
- Municipalities
- Lakes
- Stream Corridor
- Contiguous Forested Areas
- NJGS Wellhead Protection Areas
- Areas of High Groundwater Recharge

MAP 14 - ENVIRONMENTALLY CRITICAL AREAS MAP

Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; NJDEP Landscape Project, 2001; NJDEP WHPA, 2002; NJGS Groundwater Recharge Data, 2000

N W E S

0 2,800 Feet

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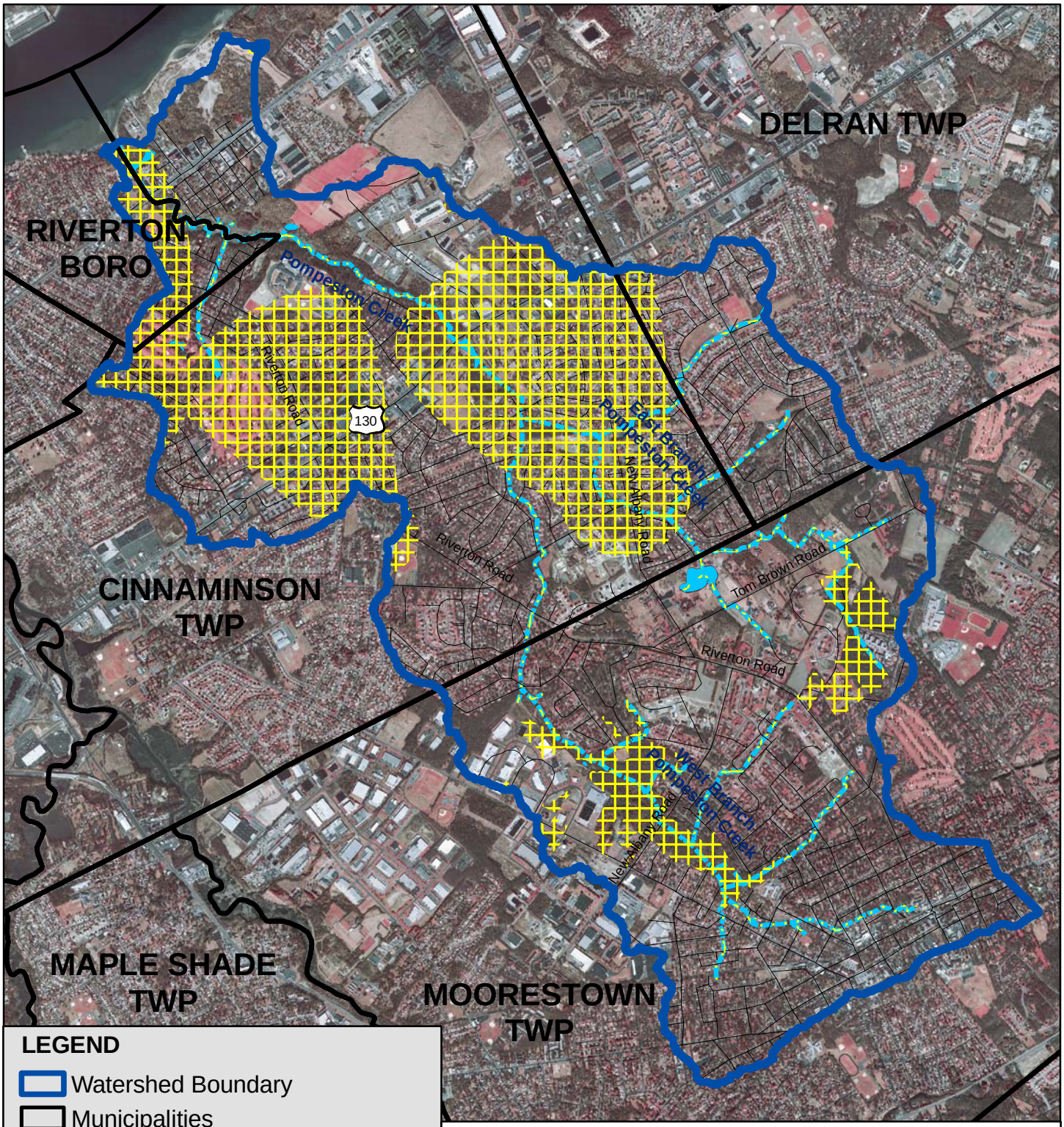

LEGEND

- Watershed Boundary
- Municipalities
- Major Roads
- Rivers & Streams
- Lakes
- Environmentally Critical Areas

MAP 14A - ENVIRONMENTALLY CRITICAL AREAS AERIAL MAP
Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; NJDEP Landscape Project, 2001; NJDEP WHPA, 2002; NJGS Groundwater Recharge Data, 2000; NJDEP Digital Orthophotos, 2002

0 2,800 Feet

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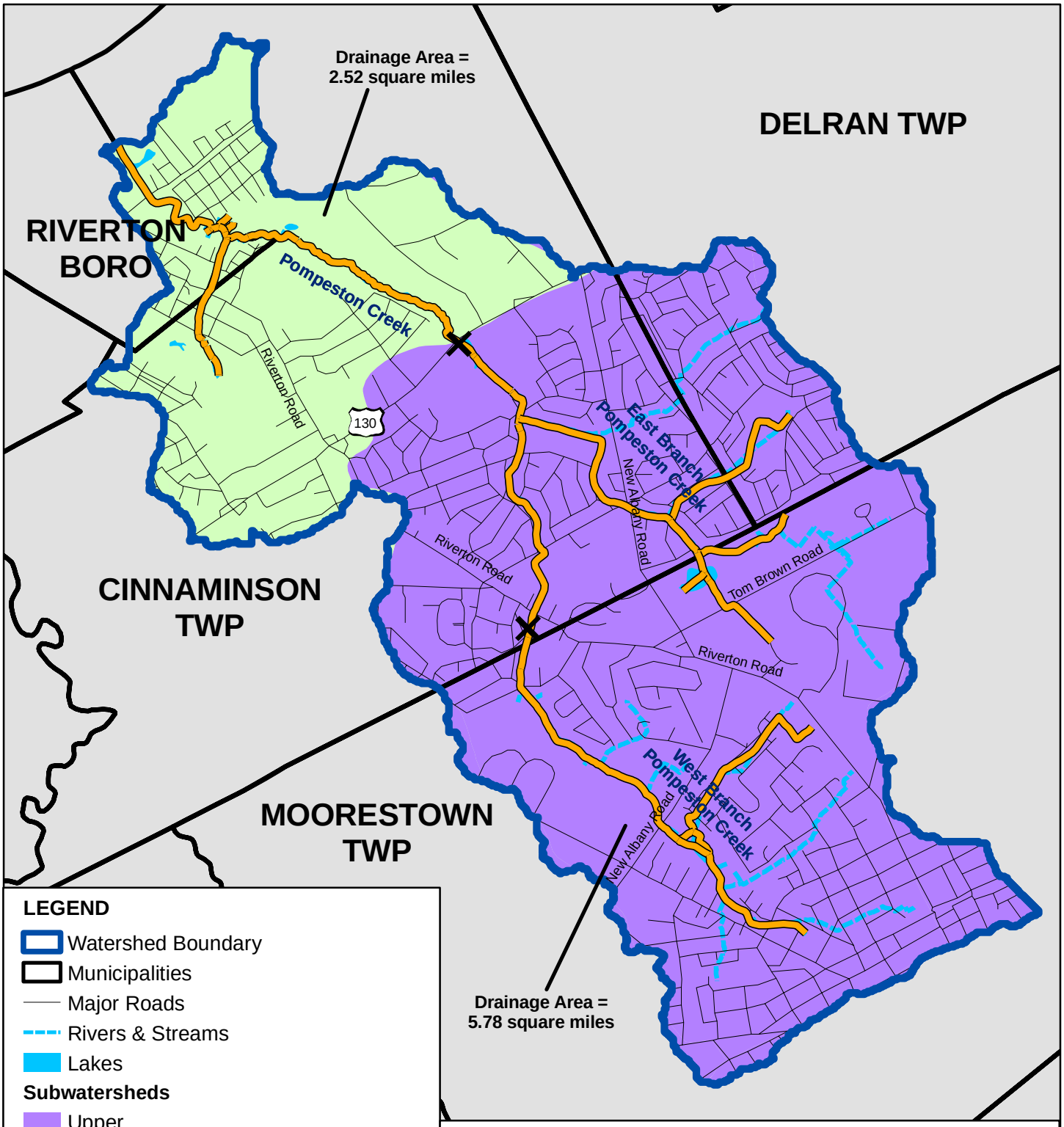

LEGEND

- Watershed Boundary
- Municipalities
- Major Roads
- Rivers & Streams
- Lakes

Subwatersheds

- Upper
- Lower
- Dams

State Water Quality Classification

- FW2-NT

MAP 15 - WATERBODY CLASSIFICATION MAP

Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; NJDEP Surface Water Quality Standards, 2005; NJDEP Dams, 2000

N W E S

0 2,800 Feet

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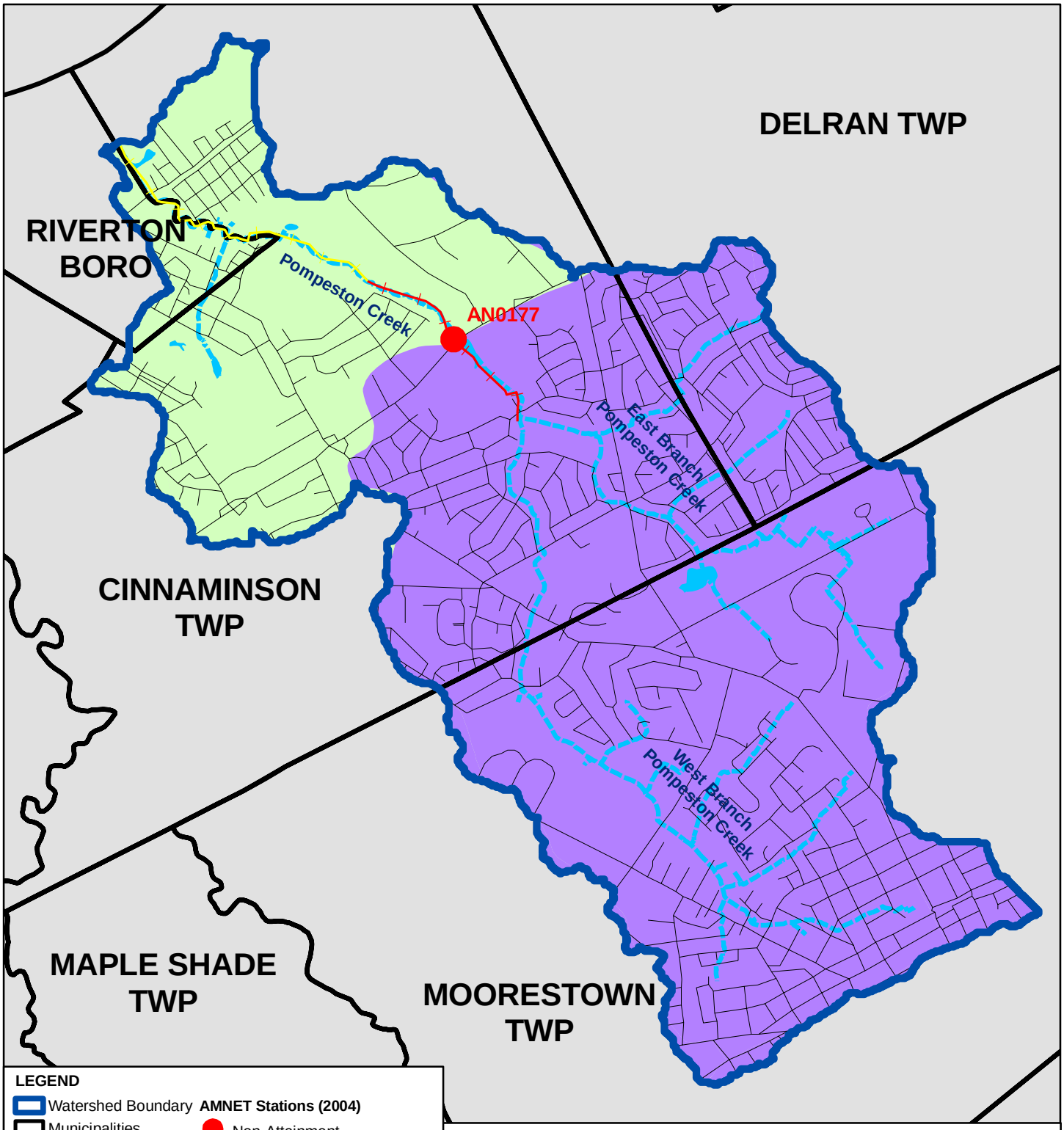

LEGEND

- Watershed Boundary
- Municipalities
- Major Roads
- Rivers & Streams
- Lakes

Subwatersheds

- Upper
- Lower

AMNET Stations (2004)

- Non-Attainment

2004 Impaired Status (Overall)

- Fish Advisory Only
- Non-Attainment (Aquatic Life)

MAP 16 - 2004 IMPAIRED WATERBODIES MAP

Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; NJDEP 2004 List of Impaired Waterbodies, 2004

N W E S

0 2,800 Feet

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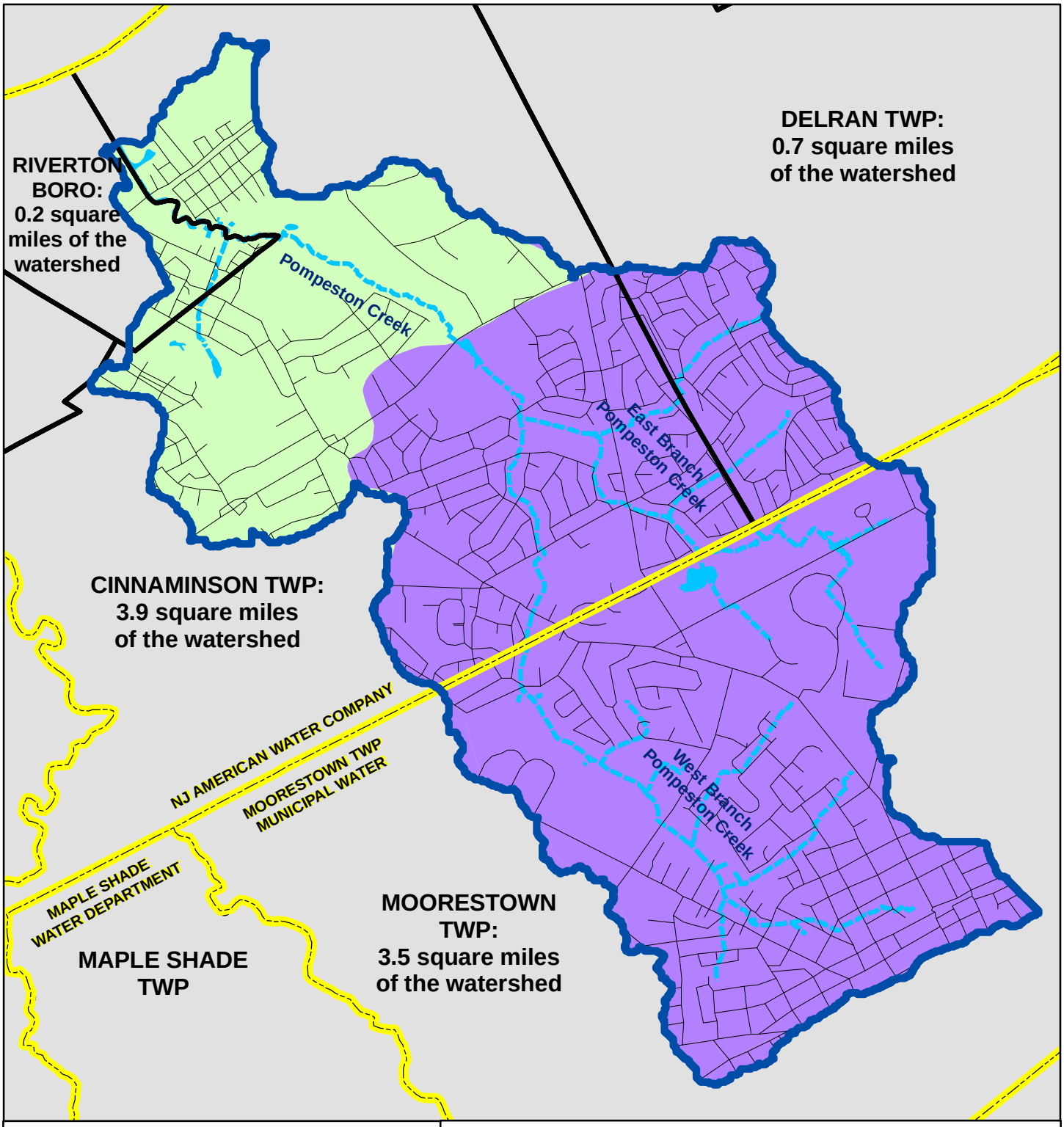

LEGEND

- Watershed Boundary
- Municipalities
- Major Roads
- Rivers & Streams
- Lakes

Subwatersheds

- Upper
- Lower
- Water Purveyor Boundary

MAP 17 - JURISDICTIONAL BOUNDARIES OF THOSE AGENCIES RESPONSIBLE FOR STORMWATER MANAGEMENT
Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; NJDEP Water Purveyor Service Areas, 1998

N W E S

0 2,800 Feet

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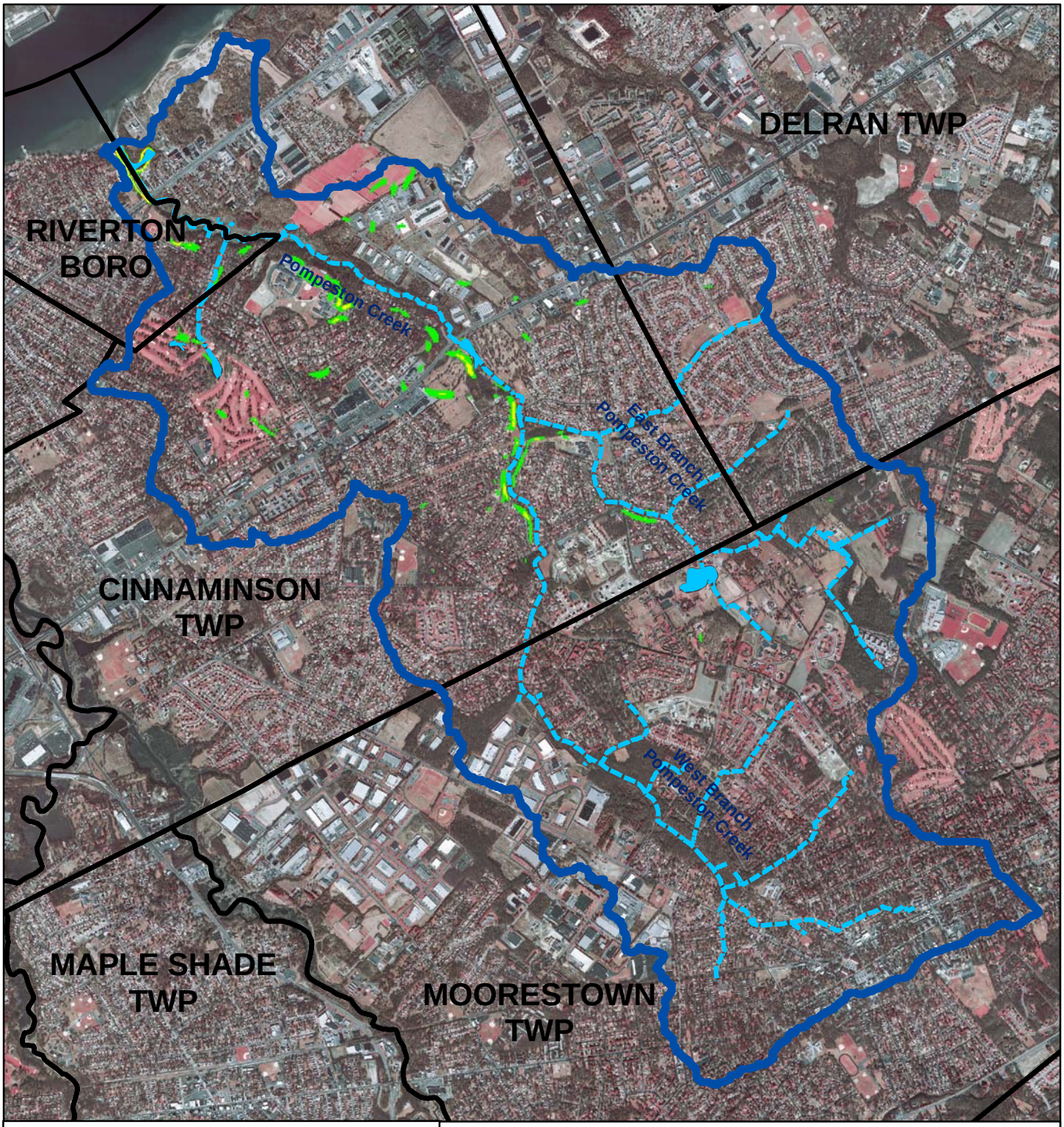

LEGEND

- Watershed Boundary
- Municipalities
- Rivers & Streams
- Lakes

Slope Data

- 5 - 8%
- 8 - 12%
- 12 - 15%
- > 15%

MAP 18 - SLOPES MAP

Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; NJDEP 10m Digital Elevation Grid, 2002; NJDEP Digital Orthophotos, 2002

N W E S

0 2,800 Feet

NEW JERSEY AGRICULTURAL EXPERIMENT STATION
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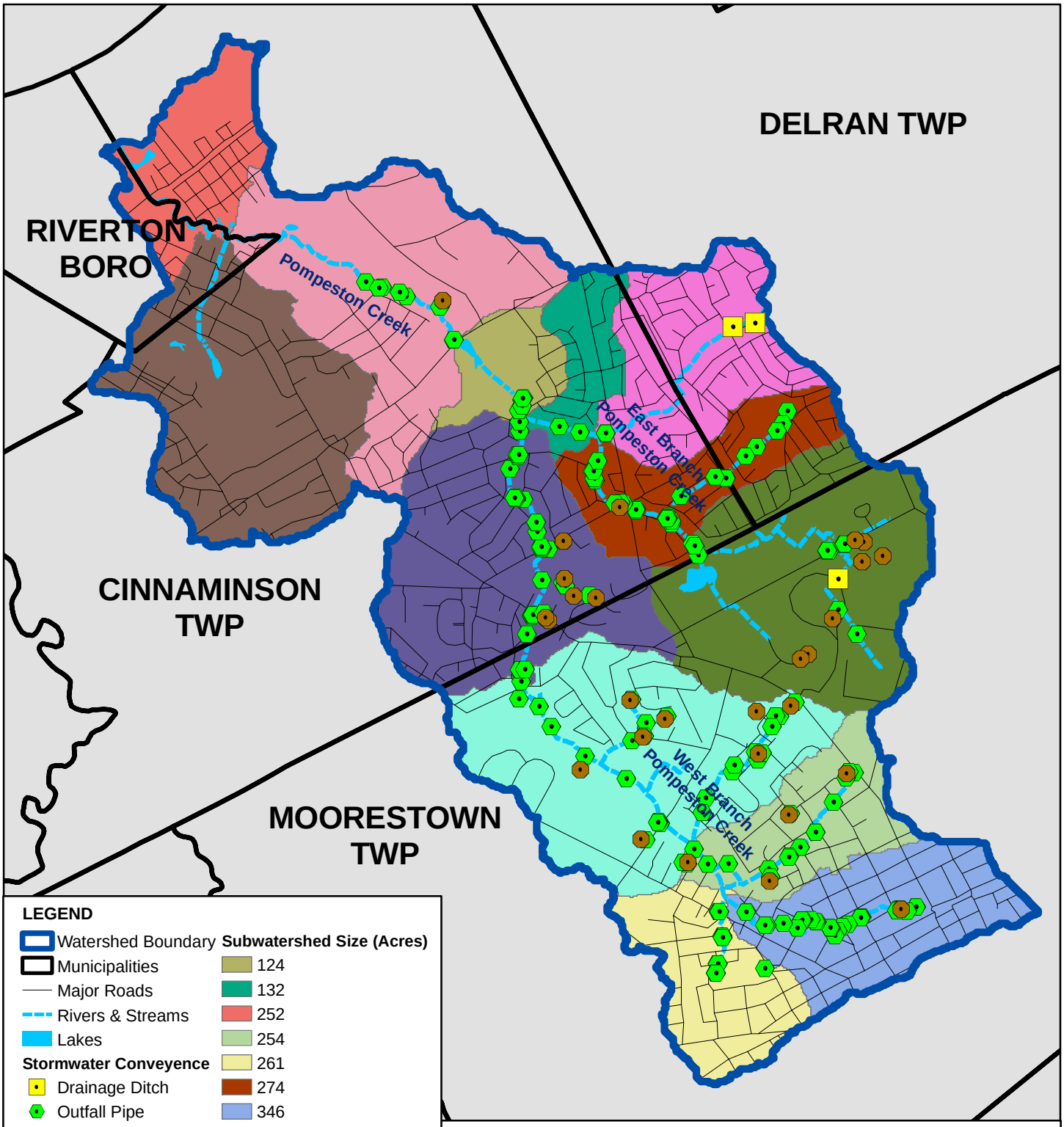

LEGEND

- Watershed Boundary
- Municipalities
- Major Roads
- Rivers & Streams
- Lakes

Stormwater Conveyence

- Drainage Ditch
- Outfall Pipe
- Detention Basin

Subwatershed Size (Acres)

124, 132, 252, 254, 261, 274, 346, 355, 610, 625, 625, 651, 699

MAP 19 - MAN-MADE STORMWATER CONVEYENCE, STORAGE & DISCHARGE SYSTEMS MAP
Pompeston Creek Regional Stormwater Management Plan

Data Source: NJDEP GIS Data CD-ROM, 1996; GPS Mapping Completed by RCRE Water Resources Program, 2005; Subwatersheds Delineated by HEC-RAS Model
* RCRE Water Resources Program acknowledges that this map is incomplete.

N W E S

0 2,800 Feet

NEW JERSEY AGRICULTURAL EXPERIMENT STATION
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RCRE Water Resources Program
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Appendix C:

NJDEP Known Contaminated Sites List within the Pompeston Creek Watershed

Status	Date of Status Reporting	Name	NJ Site ID	Address	Municipality
ACTIVE	2000	75 SECOND STREET EAST	NJL800568958	75 SECOND ST E	MOORESTOWN
ACTIVE	2000	MILL STREET WOODWORKING COMPANY	NJD982274953	310 MILL ST	MOORESTOWN
ACTIVE	2000	300 MILL ST	NJL800578460	300 MILL ST	MOORESTOWN
ACTIVE	2000	909 CEDAR ST	NJL800597460	909 CEDAR ST	RIVERTON BOROUGH
ACTIVE	1999	BLUE CHIP GRAPHICS INCORPORATED	NJL500051438	400 CHURCH ST N	MOORESTOWN
ACTIVE	1998	CITGO SERVICE STATION MOORESTOWN TWP	NJD982186710	2 MAIN ST E	MOORESTOWN
ACTIVE	1998	711 LIPPINCOTT AVENUE	NJL800376303	711 LIPPINCOTT AVE	MOORESTOWN
NFA-E	1998	THE SOLARIS GROUP	NJL500049390	1130 CHURCH ST N	MOORESTOWN
PENDING	1997	301 MILL STREET	NJL800204794	301 MILL ST	MOORESTOWN
ACTIVE	1997	ALFORD INDUSTRIES INCORPORATED	NJD980647713	390 NEW ALBANY RD	MOORESTOWN
ACTIVE	1997	MOBIL SERVICE STATION MOORESTOWN TWP	NJD986604650	CHESTER AVE & PLUM ST	MOORESTOWN
PENDING	1997	CINNAMINSON TWP DEPT OF PUBLIC WORKS	NJL600236244	1601 UNION LANDING RD	CINNAMINSON
ACTIVE	1997	FLORENCE TOLLGATE CONDOMINIUM ASSOCIATE	NJL800310708	CEDAR & 9TH ST	FLORENCE
ACTIVE	1996	HOLLINGSHEAD COMPANY INCORPORATED	NJL600000327	309 CHESTNUT AVE	MOORESTOWN
ACTIVE	1995	HUGHES INDUSTRIES INCORPORATED	NJL500045364	501 BELLVIEW AVE N	CINNAMINSON
PENDING	1995	U HAUL COMPANY	NJD986614295	2101 RTE 130 S	CINNAMINSON
ACTIVE	1995	MOORESTOWN MUNICIPAL BUILDING	NJD981177355	111 2ND ST W	MOORESTOWN
PENDING	1995	CINNAMINSON HIGH SCHOOL	NJD138064258	RIVERTON RD	CINNAMINSON
PENDING	1994	1703 HIGHLAND AVENUE	NJL000071910	1703 HIGHLAND AVE	CINNAMINSON
NFA	1994	SHELL SERVICE STATION MOORESTOWN TWP	NJD986594075	253 W MAIN & UNION STS	MOORESTOWN
ACTIVE	1993	CHEVRON CHEMICAL COMPANY	NJD075485342	1130 CHURCH ST N	MOORESTOWN
PENDING	1993	NEW JERSEY AMERICAN WATER WELLS 13 & 27	NJL000030692	HIGHLAND AVE	CINNAMINSON
ACTIVE	1993	EVERGREEN EPISCOPAL HOME	NJL600149207	309 BRIDGEBORO RD	MOORESTOWN
AA	1993	NEW JERSEY AMERICAN WATER CO WELL 14	NJL000068411	NEW ALBANY RD	CINNAMINSON
ACTIVE	1992	NORTH AMERICAN SALVAGE COMPANY	NJL880001391	2691 RTE 130 & BURLINGTON ST	BORDENTOWN
ACTIVE	1989	MOBIL SERVICE STATION CINNAMINSON	NJD986605061	RTE 130 & WILLOW ST	CINNAMINSON

Appendix D: Pollutant Loading Coefficients

NJDEP 1995/97 Land Use Type	**Aerial Loading Source Analysis: Loading Rates**										
	TP (lbs/acre/yr)	*TN (lbs/acre/yr)*	*TSS (lbs/acre/yr)*	*NH3-N (lbs/acre/yr)*	*LEAD (lbs/acre/yr)*	*ZINC (lbs/acre/yr)*	*COPPER (lbs/acre/yr)*	*CADMIUM (lbs/acre/yr)*	*BOD (lbs/acre/yr)*	*COD (lbs/acre/yr)*	*NO2+NO3 (lbs/acre/yr)*
High/Med Residential	1.4	15	140	0.65	0.2965	0.335	0.453	N/A	25.6	152.6	1.7
Low/Rural Residential	0.6	5	100	0.02	0.217	0.172	0.19	N/A	N/A	N/A	0.1
Commercial	2.1	22	200	1.9	0.955	0.873	0.784	0.002	42.1	662.6	3.1
Industrial	1.5	16	200	0.2	1.409	1.598	0.93	0.003	31.4	N/A	1.3
Mixed Urban	1	10	120	1.75	3.215	1.743	1.529	0.0025	67.2	184.8	3.55
Agriculture	1.3	10	300	N/A	0.071	0.089	0.027	N/A	15.45	N/A	N/A
Forest, Water, Wetlands	0.1	3	40	N/A	0.009	0.018	0.027	N/A	9.2	2	0.3
Barren Land	0.5	5	60	N/A	N/A	0.002	N/A	N/A	3.1	N/A	N/A
N/A: Data not available from sources used.											
The loading coefficients used in this table have been provided by the NJDEP in the "New Jersey Stormwater Best Management Practices Manual," February 2004.											

Appendix E:
Municipal Separate Stormwater Sewer Regulations

NJPDES Municipal Stormwater Regulation Program
Summary of Statewide Basic Requirements (SBRs)
Tier A Municipal Stormwater Permit (NJ0141852)
(Please refer to final permit for details on SBRs)

Statewide Basic Requirement	Implementation Schedule	
Stormwater Pollution SPPP describes the municipality's stormwater program, which includes **Prevention Plan** details on the implementation of required SBRs. **(SPPP)**	12 months from effective date of permit authorization (EDPA)	
Public Notice Comply with applicable State and local public	Upon EDPA	
Post-Construction Stormwater	**Management in New Development and Development**	
Stormwater Management Plan	Adopt stormwater management (SWM) plan in accordance with N.J.A.C. 7:8-4	Complete 12 mos. from EDPA
Stormwater Control Ordinance	Adopt and implement stormwater control ordinance in accordance with N.J.A.C. 7:8-4	Adopt ordinance 12 months from SWM plan adoption.
Residential Site Improvement Standards	Ensure compliance with Residential Site Improvement Standards for stormwater~nanagement (N.J.A.C. 5:21-7), including any exception, waiver, or special area standard approved under N.J.A.C. 5:21-3.	Upon EDPA
BMP Operation and Maintenance	Ensure adequate long-term operation and maintenance of BMPs.	EDPA for BMPs on municipal property, 24 months for BMPs elsewhere.
Storm Drain Inlets Design Standard for New Construction	New storm drain inlets must meet the design standards specified in Attachment C of the permit.	12 months from EDPA if municipally installed. Otherwise 24 mos. from EDPA
Local Public Education		
Local Public Education Program	Copy and distribute educational brochure (provided by the Department) annually to residents and businesses, and conduct a	Start 12 months from EDPA
Storm Drain Labeling	Label all municipal storm drain inlets that are next to sidewalks, or within plazas, parking areas or maintenance yards.	Within 60 months from EDPA
Improper Disposal of Waste		

Pet Waste Ordinance to	Adopt and enforce an ordinance requiring owners and keepers immediately and properly dispose of their pet's solid waste. Distribute information with pet licenses regarding the ordinance and the environmental benefits of proper disposal of pet waste.	Complete 18 mos. and ongoing
Litter Ordinance State litter	Adopt and enforce a litter ordinance, or enforce the existing statute (N.J.S.A. 13:1E-99.3).	Complete 18 mos. and ongoing
Improper Waste disposal Disposal Ordinance	Adopt and enforce an ordinance prohibiting spilling, dumping or of any materials other than stormwater into the MS4.	Complete 18 mos. from EDPA and ongoing