# TOWNSHIP OF CHESTERFIELD

# MUNICIPAL STORMWATER MANAGEMENT PLAN

***PREPARED FOR:***

**TOWNSHIP OF CHESTERFIELD**
300 Bordentown Chesterfield Road
Chesterfield Township, New Jersey 08620

**NJPES #NJG 0153559**
**PI ID # 171646**
Burlington County

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## 1.0 Introduction

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

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

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

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

## 2.0 Tier B NJPDES Requirements

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

Under Section E.1 of the Tier B NJPDES Permit, the Township of Chesterfield is required to develop stormwater program that includes all the statewide basic requirements. The statewide basic requirements for a Tier B municipality include the following elements that will be fully described in this stormwater management plan:

A. Stormwater Program

- A.1 Local Public Education
- A.2. Storm Drain Inlet Labeling
- A.3 Additional Measures (non numeric or numeric effluent limitations)
- A.4 Other Voluntary Measures

B. Stormwater Management Plan

- B.1 Stormwater Control Ordinance
- B.2 Compliance with the Residential Site Improvement Standards
- B.3 Long term operation and maintenance of Best Management Practices

## 2.1 Stormwater Program

Under Section F.3 of the Tier B NJPDES Permit, the Township of Chesterfield is required to develop and begin implementation of a Local Public Education Program that starts 12 months from the effective date of the permit authorization, or by April 1, 2005. The municipality is required to copy and distribute educational brochure material provided by the State Department of Environmental Protection to residents and businesses and conduct a yearly educational event with brochures. The yearly event will be held at the Crosswicks Village festival in September. A sample of the brochure material is shown on the following pages.

# Solutions to Stormwater Pollution

*Easy Things You Can Do Every Day To Protect Our Water*

## A Guide to Healthy Habits for Cleaner Water

Pollution on streets, parking lots and lawns is washed by rain into storm drains, then directly to our drinking water supplies and the ocean and lakes our children play in. Fertilizer, oil, pesticides, detergents, pet waste, grass clippings: You name it and it ends up in our water.

Stormwater pollution is one of New Jersey's greatest threats to clean and plentiful water, and that's why we're all doing something about it.

By sharing the responsibility and making small, easy changes in our daily lives, we can keep common pollutants out of stormwater. It all adds up to cleaner water, and it saves the high cost of cleaning up once it's dirty.

As part of New Jersey's initiative to keep our water clean and plentiful and to meet federal requirements, many municipalities and other public agencies including colleges and military bases must adopt ordinances or other rules prohibiting various activities that contribute to stormwater pollution. Breaking these rules can result in fines or other penalties.

**As a resident, business, or other member of the New Jersey community, it is important to know these easy things you can do every day to protect our water.**

### Limit your use of fertilizers and pesticides

- Do a soil test to see if you need a fertilizer.
- Do not apply fertilizers if heavy rain is predicted.
- Look into alternatives for pesticides.
- Maintain a small lawn and keep the rest of your property or yard in a natural state with trees and other native vegetation that requires little or no fertilizer.
- If you use fertilizers and pesticides, follow the instructions on the label on how to correctly apply it.

Make sure you properly store or discard any unused portions.

### Properly use and dispose of hazardous products

- Hazardous products include some household or commercial cleaning products, lawn and garden care products, motor oil, antifreeze, and paints.
- Do not pour any hazardous products down a storm drain because storm drains are usually connected to local waterbodies and the water is not treated.

- If you have hazardous products in your home or workplace, make sure you store or dispose of them properly. Read the label for guidance.
- Use natural or less toxic alternatives when possible.
- Recycle used motor oil.
- Contact your municipality, county or facility management office for the locations of hazardous-waste disposal facilities.

## Keep pollution out of storm drains

- Municipalities and many other public agencies are required to mark certain storm drain inlets with messages reminding people that storm drains are connected to local waterbodies.
- Do not let sewage or other wastes flow into a stormwater system.

## Clean up after your pet

- Many municipalities and public agencies must enact and enforce local pet-waste rules.
- An example is requiring pet owners or their keepers to pick up and properly dispose of pet waste dropped on public or other people's property.
- Make sure you know your town's or agency's requirements and comply with them. It's the law. And remember to:
  - Use newspaper, bags or pooper-scoopers to pick up wastes.
  - Dispose of the wrapped pet waste in the trash or un-wrapped in a toilet.
  - Never discard pet waste in a storm drain.

## Don't feed wildlife

- Do not feed wildlife, such as ducks and geese, in public areas.
- Many municipalities and other public agencies must enact and enforce a rule that prohibits wildlife feeding in these areas.

## Don't litter

- Place litter in trash receptacles.
- Recycle. Recycle. Recycle.
- Participate in community cleanups.

## Dispose of yard waste properly

- Keep leaves and grass out of storm drains.
- If your municipality or agency has yard waste collection rules, follow them.
- Use leaves and grass clippings as a resource for compost.
- Use a mulching mower that recycles grass clippings into the lawn.

## Contact information

For more information on stormwater related topics, visit www.njstormwater.org or www.nonpointsource.org

Additional information is also available at U. S. Environmental Protection Agency Web sites www.epa.gov/npdes/stormwater or www.epa.gov/nps

New Jersey Department of Environmental Protection
Division of Water Quality
Bureau of Nonpoint Pollution Control
Municipal Stormwater Regulation Program
(609) 633-7021

April 2004

# Pet Waste Pollutes Our Waters

## *What You Can Do To Help Protect Our Water*

Clean and plentiful water is important to our families, our environment, our economy and our quality of life.

Did you know that animal waste from pets can pollute our waters? When left on the ground, pet waste is washed by rain and melting snow and ice into storm drains that carry it to our rivers, lakes, the ocean and drinking water.

Animal waste contains a high concentration of nutrients as well as bacteria and disease-causing microorganisms that can cause problems.

### What you can do

Pet owners or anyone who takes your pet for walks must properly dispose of the waste by picking it up, wrapping it and either placing it in the trash or flushing it unwrapped down the toilet.

Your municipality is required to adopt and enforce local pet-waste laws. At a minimum, your community must require that pet owners or their keepers **immediately** and **properly** dispose of their pet's solid waste deposited on **any public or private property not owned or possessed by that person.** People with assistance animals such as Seeing Eye dogs are exempt.

Make sure you know what your municipality requires – and follow it.

Thank you for doing your part to keep New Jersey's waters clean.

**For more information, please contact the following:**

New Jersey Department of Environmental Protection
Division of Water Quality
Bureau of Nonpoint Pollution Control
Municipal Stormwater Regulation Program
(609) 633-7021

Visit www.njstormwater.org or www.nonpointsource.org

Additional information is also available at U. S. Environmental Protection Agency Web sites www.epa.gov/npdes/stormwater or www.epa.gov/nps

Under Section F.3.b of the Tier B NJPDES Permit, the Township of Chesterfield is required to develop a Storm Drain Labeling Program that starts 12 months from the effective date of the permit authorization, or by April 1, 2005. Storm drain labels must be placed on municipal storm drains that are next to sidewalks or within municipal plazas, parking areas or maintenance yards. Fifty percent (50%) of the labeling is to be completed within 36 months of the effective date of the permit authorization, or by April 1, 2007. All remaining inlets are to be labeled within 60 months of the effective date of the permit authorization, or by April 1, 2009.

Under Section G.1 of the Tier B NJPDES Permit, the Township of Chesterfield may be required to take Additional Measures to improve non-point source pollution through non-numeric or numeric effluent limitations. As of April 2004, no Additional Measures have been adopted. The New Jersey Department of Environmental Protection will provide written notice of the adoption of any additional measures to Chesterfield Township.

Under Section G.2 of the Tier B NJPDES Permit, the Township of Chesterfield may voluntarily adopt other measures to prevent or reduce water pollution. In the Tier B Guidance Manual the suggested other measures are:

- Wildlife management
- Fertilizer and Pesticide Management Ordinances
- Retrofit of Existing Stormwater Management Measures
- Road De-icing
- Adoption of Abandoned Stormwater Management Basins
- Planting of Native Vegetation in Existing Landscapes

**2.2 Statewide Basic Requirements**

Under Section F.2.a.i of the Tier B NJPDES Permit, the Township of Chesterfield is required to adopt a municipal stormwater management plan in accordance with NJAC 7:8-4 within 12 months of the effective date of the permit authorization, or by April 1, 2005. The municipal stormwater management plan is abbreviated as the MSWMP.

Under Section F.2.a.ii of the Tier B NJPDES Permit, the Township of Chesterfield is required to adopt stormwater control ordinances to implement the municipal stormwater management plan 12 months after the adoption of the municipal stormwater plan. In effect, municipalities have 24 months from the effective date of the permit authorization, or by April 1, 2006 to implement ordinances that set forth exact stormwater management design standards for development and redevelopment.

The municipal plan is required to conform to the regional stormwater management plan and must be reviewed and approved by the County review agency and NJDEP. In the Township of Chesterfield, the municipal stormwater management plan and ordinances must be reviewed and approved by Burlington County.

Subchapter 4 of NJAC 7:8 sets forth the specific requirements of a Municipal Stormwater Management Plan. The more rigorous planning requirements of the municipal stormwater management plan, NJAC 7:8-4.2(c)8 and 9 requiring evaluation of the municipalities entire master plan, official map and development regulations, zoning ordinances, projected land use assuming full development, and future non-point source pollutant load assuming full build are required for municipalities with more than one square mile of vacant or agricultural land within the municipality. The planning evaluations required under subsections 8 and 9 are not required until February 2, 2006.

Subchapter 5 of NJAC 7:8 sets forth the groundwater recharge, water quantity, and water quality standards (reduction of total suspended solids). The Township of Chesterfield will not allow any exceptions from the design and performance standards for development projects submitted to the Land Use Planning Board. Therefore, the stormwater management plan does not include a mitigation option.

Under Section H.2.a of the Tier B NJPDES Permit, the Township of Chesterfield is required to file an Annual Report and Certification to the New Jersey Department of Environmental Protection on or before July 1, 2005 and every 12 months thereafter. The Annual Report and Certification shall be maintained by the municipality for a period of five years.

## 3.0 Stormwater Management Plan Goals

The goals of the Stormwater management Plan are to:

- Reduce flood damage, including damage to life and property.
- Minimize, to the greatest extent feasible, any increase in stormwater runoff from any new development.
- Reduce soil erosion from any development or construction project and consequent silting from total suspended solids.
- Assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures.
- Improve baseflow to streams by maintaining groundwater recharge through site design practices that allow stream base flows to approximate pre-development conditions.
- Prevent, to the greatest extent feasible, an increase in nonpoint pollution.
- Protect public health, safeguard fish and aquatic life and scenic and ecological values, and enhance the domestic, municipal, recreational, industrial, and other uses of water.
- Protect public safety through the proper design and operation of stormwater basins.
- Identify methods to equitably distribute water supplies while encouraging water conservation and re-use.

To achieve these goals, this plan outlines specific stormwater design and performance standards for new development. Additionally, the plan proposes stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies are included in the plan to ensure long-term effectiveness of stormwater management facilities. The plan also outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

## 4.0 Stormwater Discussion

Land development can dramatically alter the hydrologic cycle (See Figure 1) of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration.

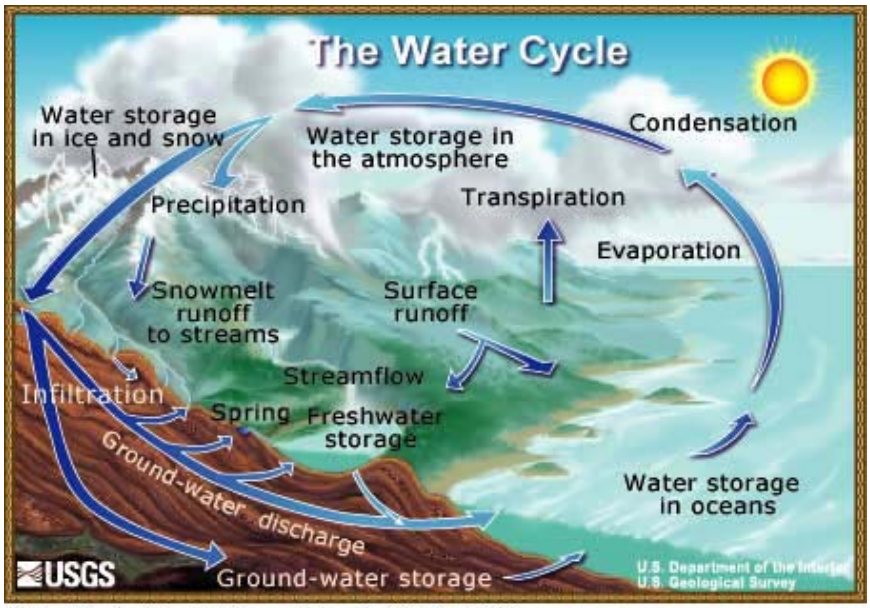


Illustration by John M. Evans, Colorado District, USGS

Figure 1. Hydrologic Cycle

Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new drainage conditions and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Downstream erosion, sediment deposits can be seen in Photograph 1.

Photograph 1. Stream conditions in Chesterfield

Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows.

In addition to increases in runoff peaks, volumes, and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate a variety of pollutants from the atmosphere, fertilizers, animal wastes, and leakage and wear from vehicles. Pollutants can include metals, suspended solids, hydrocarbons, pathogens, and nutrients.

Land development can adversely affect water quality and stream biota in more subtle ways. For example, stormwater falling on impervious surfaces or stored in detention or retention basins can become heated and raise the temperature of the downstream waterway, adversely affecting the stream biology. Development can remove trees along stream banks that normally provide shading, stabilization, and leaf litter that falls into streams and becomes food for the aquatic community.

## 5.0 Chesterfield Township Background

### 5.1 Population and Land Use

The Township of Chesterfield encompasses a 22 square mile area of Burlington County, New Jersey. In recent years the Township has been under significant development pressure, as indicated by the number of new construction permits issued since 1991 (see Table 1). The population of the Township has increased from 3867 in 1980 to 5126 in 1990 to 5955 in 2000. The resulting development has likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality.

**Table 1 - New Residential Building Permits**

| Year | Units |
|---|---|
| 1991 | 3 |
| 1992 | 4 |
| 1993 | 11 |
| 1994 | 26 |
| 1995 | 33 |
| 1996 | 28 |
| 1997 | 26 |
| 1998 | 7 |
| 1999 | 12 |
| 2000 | 5 |
| 2001 | 9 |
| 2002 | 11 |
| 2003 | 22 |
| 2004 | 35 |

Chesterfield Township has embraced the principles of smart growth planning. Chesterfield has won a Smart Growth award for the Transfer Development Rights (TDR) Program. Chesterfield Township has developed a sending area comprised of maintaining farmland and a receiving area which is where the proposed growth will take place. The majority of development activity will be concentrated in the Township's centrally located redevelopment area.

Groundwater recharge are shown in the Appendix, on **Map 2, Groundwater Recharge Areas**. It is important to note that there are no well head protection areas within the limits of Chesterfield. Soil types, which correspond to the recharge areas, are shown in the Appendix, on **Map 7, Soil Types.**

### 5.2 Description of Watershed

The State of New Jersey is divided into twenty major watershed areas as shown in the Appendix on **Map 6, New Jersey's Watershed, Watershed Management Areas and Water Regions**. Within each major watershed, the United States Geologic Survey (USGS) uses a 14 digit Hydrologic Unit Code (HUC 14) to delineate and name each sub-watershed.

The Township of Chesterfield is located in Watershed Management Area 20, which contains the Assiscunk Creek, Crosswicks Creek and Doctors Creek. The northern portion of Chesterfield drains to the Crosswicks Creek which flows in a westerly direction to the Delaware River. The majority of the southern portion of Chesterfield drains into Blacks Creek, Fern Brook and Bacons Run which then all flow into Blacks Creek and meet Crosswicks Creek right before it intersects with the Delaware River. The very southern tip of Chesterfield drains to the Crafts Creek and the Assiscunk Creek which flow in a westerly direction to the Delaware River.

There are nine sub-watersheds located within Chesterfield as shown the in the Appendix on **Map 4, HUC-14 Delineation on USGS Quadrangle Map.** The area flowing to Crosswicks Creek divides into three sub-watersheds, (1) the Ellisdale tributary, (2) Crosswicks Creek (Doctors Creek to Ellisdale tributary) , and (3) Crosswicks Creek (below Doctors Creek). The drainage sheds flowing to Blacks Creek divide into three sub-watersheds, (1) Blacks Creek above 40d06m10s, (2) Blacks Creek (Bacons Run to 40d06m10s, and (3) Blacks Creek below Bacons Run.

A small sub-watershed at the southern end of Chesterfield flows in a westerly direction and forms the headwaters of Crafts Creek. Another small sub-watershed at the southern end of Chesterfield flows in the southwesterly direction and is part of the headwaters of the Assiscunk Creek watershed. A third sub-watershed flows in a southerly direction to the North Run above the Wrightstown Bypass.

### 5.3 State Monitoring System

The New Jersey Department of Environmental Protection (NJDEP) and the USGS collect a variety of water quality information on the rivers within New Jersey. The NJDEP has established and maintains an Ambient Biomonitoring Network (AMNET) of monitoring sites to document the health of the state's

waterways. There are over 800 AMNET sites throughout the state of New Jersey. These sites are sampled for benthic macro invertebrates by NJDEP on a five-year cycle. Benthic macro invertebrates include aquatic insects, worms, snails, crayfish and clams. Every five years, streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of bioethics related to benthic macroinvertebrate community dynamics. The AMNET sampling serves as an indicator of the stream health, but does not provide any information on the cause of the impairment. There are two AMNET sites within the Township of Chesterfield as shown in the Appendix on **Map 5, Amnet and Stream Quality Monitoring Stations.** These sites are at the following stations:

- AN0132, Crosswicks Creek at Chesterfield–Georgetown Rd., Moderately Impaired
- AN0126A, Crosswicks Creek at Iron Bridge Road, Severely Impaired

The New Jersey Integrated Water Quality Monitoring and Assessment Report, 305(b) and 303(d) is required by the Federal Clean Water Act. The report identifies waters that are impaired by watershed area. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants in priority order. The list for Watershed 20 is included in Attachment 3. A review of Attachment 3 for AMNET water quality information indicates:

| Stream Segment | Impairment |
|---|---|
| Bacon Run in Georgetown-Bordentown Rd | Benthic Macoinvertebrates |
| Blacks Creek at Chesterfield–Georgetown Rd | Benthic Macoinvertebrates, Phosphorus |
| Crosswicks Creek at Extonville | Phosphorus, Fecal Coliform |
| Crosswicks Creek at Groveville | Phosphorus, Fecal Coliform |
| Crosswicks Creek at Iron Bridge Road | Benthic Macoinvertebrates |

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

safety. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan is developed to identify how the various sources will be reduced to the designated allocations. Implementation strategies may include improved stormwater treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems, and other best management practices or BMPs.

There are no current or proposed TMDLs reported to the Federal Environmental Protection Agency for Crosswicks Creek, Blacks Creek, Crafts Creek or Assiscunk Creek. A TMDL was established for Doctors Creek at Allentown New Jersey on September 23, 2003 for fecal coliform. Doctors Creek runs parallel to Crosswicks Creek in Chesterfield and no sub-watersheds in Chesterfield drain into Doctors Creek. The TMDL for Doctors Creek will not impact Chesterfield Township. A TMDL was established for PCB's in the Delaware River on December 15, 2003. The Environmental Protection information indicates that the state impairment is a "placeholder to provide linkage for unlisted impairments and/or unlisted waters". The Delaware River Basin Commission on January 16, 2000 also identified that the Delaware River is above the assimilative capacity for certain VOC's. Since the watersheds in Chesterfield drain to the Delaware River, Chesterfield may be required to take additional measures with regard to the Delaware River Zone 2 TMDL's for PCBs and VOC's when numerical limits are established.

**6.0 Stormwater Management Plan**

An aerial view of the Township, which illustrates the major waterways, is provided in the Appendix on **Map 1, Existing Conditions**. This Municipal Stormwater Management Plan documents the Township's strategy to manage the impact of stormwater and do its part to advance this goal for the region and state. Specifically, it addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating design and performance standards for new development that disturb one or more acre of land. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities by stressing best management practices.

The Township of Chesterfield Stormwater Management Plan is prepared to reflect advances in stormwater management practices and new regulations, stemming from the Clean Water Act, as reflected in the State of New Jersey's Municipal Stormwater Regulations (N.J.A.C. 7:14A-25). It contains the required elements described in the Stormwater Management Rules, N.J.A.C. 7:8 Subchapter 4. The plan addresses the

review and update of existing ordinances, and other planning documents to allow for project designs that include non-structural strategies and low impact development techniques.

Chesterfield Township currently utilizes the Residential Site Improvement Standards (RSIS) for stormwater management design for all residential development before the Land Use Board. Non-residential projects are currently reviewed under the Residential Site Improvement Standards as the design standards of the Township. In the Receiving Area of the Township the commercial development is integrated with the residential development, thus RSIS governs.

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

The Township has adopted the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the stormwater management rules at N.J.A.C. 7:8-5.8 Maintenance Requirements, and language for safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins. Township owned facilities will be operated and maintained by the Chesterfield Public Works Department. The Principal Public Works Manager will be responsible for ensuring that privately owned facilities are properly operated and maintained. The ordinances were submitted to Burlington County for review and approval prior to final adoption.

During construction of projects, Township inspectors' will observe the construction to ensure that projects are built in conformance with their various approvals. As part of this effort they ensure projects are constructed in accordance with the various permits issued for the project. In particular by ordinance requirements all new development and redevelopment plans must comply with New Jersey Soil Erosion and Sediment Control Standards. Township inspectors' ensure that the stormwater management measures and

onsite soil erosion and sediment control measures are installed and functioning properly. Any inconsistencies or noncompliance by contractors that they cannot resolve are reported to the Burlington County Soil Conservation District.

**Storm Inlet in Conformance with**
**Attachment C of Stormwater Regulations**

## 7.0 Evaluation of Master Plan

Element 8 of N.J.A.C. 7:8-4.2. requires the evaluation of the Township's entire master plan (including the land use element), official map and development regulations (including the zoning ordinance). An illustration of the Township's agricultural, forest, and wetlands is provided in the Appendix on **Map 3, Land Uses** to help guide any revisions to land use and zoning code amendments. The review of the Master Plan adopted in 1997 and re-examined in 2003 found that all of the elements with the exception of "Utility Services, Facilities & Stormwater Management Plan Element" are consistent with this plan and do not require any revision. The first portion of the "Utility Services, Facilities & Stormwater Management Plan Element" deals with stormwater management (pages 95-98) and will be replaced in its entirety by this plan. The following two sections on Water Service and Sanitary Service Alternatives in this element do not need revisions and are will not be changed.

Land Development Ordinance Chapter 130 was reviewed with regard to incorporating nonstructural stormwater management strategies. This was accomplished utilizing the BMP Manual Municipal Regulations Checklist. An annotated copy of the checklist is included in **Attachment 4.** Several changes were made for consistency as follows:

**§130-52 Curbs or curbs and gutters. (N.J.A.C. 5:21-4.3) –** Revised to permit shoulders and vegetative swales for stormwater management purposes to allow disconnection of impervious areas.

**§130-66 Sidewalks and bikeways construction standards. (N.J.A.C. 5:21-4.18) –** Revised list of acceptable materials to include pervious materials for bikeways construction.

**§130-80 Landscape Standards –** Revised paragraph 'A' to encourage indigenous species where applicable.

**8.0 Land Use Build-Out Analysis**

The Land Use/Build-Out Analysis is element 9 of N.J.A.C. 7:8-4.2. This analysis determines the pollutant loads to the streams in the municipality under maximum development permitted in the zoning code. In the appendix **Map 3** illustrates the existing land use in the Township based on GIS information from NJDEP. **Map 4A** illustrates the HUC14s within the Township. The Township Zoning Map is shown in **Map 4B. Map 4C** is a composite drawing of the constrained land uses with the HUC-14 boundaries within the Township. **Table C-1** below presents the pollutant loading coefficients by land cover as published in the NJDEP's Stormwater BMP Manual. An additional column was added to the State's table to correlate the State's land cover designations to the Chesterfield Township zoning district designations. The developable acres in each of the HUC-14 subwatersheds for each zoning district is shown in **Table C-2** by subtracting out the constrained land area from the total area in each zoning district within the HUC14. The pollutant loads at build-out are presented in **Table C-3** for the developable acres. This table illustrates the importance of controlling the impacts from development. Blacks Creek and Crosswicks Creek are already impaired by having too high a concentration of phosphorus. Development along those stream corridors has the potential to contribute more than 14,000 pounds of phosphorus per year to these creeks. Through the TDR program much of the agricultural area will be preserved and remain as its current land. While many would perceive this as beneficial protecting land from development, Table C-3 shows that agricultural type of land use generates the highest rate of suspended solids as a result of erosion and has the potential to generate over 3,000,000 pounds per year in Chesterfield. This can significantly affect stream water quality through the accelerated rate of sedimentation if it is not controlled properly and poses the largest challenge for the Township. Implementation of this MSWMP and the new stormwater ordinance will provide the mechanisms to minimize the impacts.

**Table C-1 Pollutant Loads by Land Cover**

| NJDEP Land Cover Categories | Chesterfield Corresponding Zoning Districts | Total Phosphorus Load (lbs/acre/year) | Total Nitrogen Load (lbs/acre/year) | Total Suspended Solids Load (lbs/acre/year) |
|---|---|---|---|---|
| High, Medium Density Residential | PVD | 1.4 | 15 | 140 |
| Low Density, Rural Residential | R-1 | 0.6 | 5 | 100 |
| Commercial | C & OP | 2.1 | 22 | 200 |
| Industrial | n/a | 1.5 | 16 | 200 |
| Urban, Mixed Urban, Other Urban | V | 1.0 | 10 | 120 |
| Agricultural | AG | 1.3 | 10 | 300 |
| Forest, Water, Wetlands | n/a | 0.1 | 3 | 40 |
| Barrenland/Transitional Area | n/a | 0.5 | 5 | 60 |

Source: NJDEP Stormwater BMP Manual 2004.

PVD - Planned Village Development (receiving area)
AG- Agriculture
R-1 - Residential
V – Village
C - Commercial
OP – Office Park

Insert Table C-2

Insert Table C-3

## 9.0 Exemptions from Standards

The Township of Chesterfield will not grant exemption or waivers from the proposed stormwater design standards. All future development in Chesterfield has been carefully planned through the transfer of development rights program and should meet all design standards. A mitigation plan is not proposed as part of the stormwater management plan.

## 10.0 Summary

The Stormwater Management Plan was adopted on July 27, 2005 by the Township of Chesterfield Land Use Board. The adoption of this plan is required for the Township of Chesterfield to meet the requirements of the Chesterfield Township NJPDES MS4 permit. The final adopted stormwater management plan will become an element of the Chesterfield Township Master Plan.

The ordinances included as Attachments to the Township of Chesterfield Municipal Stormwater Management Plan must be reviewed and adopted by the Township of Chesterfield Council prior to April 1, 2006 in order to go into effect and to meet the requirements of the Chesterfield Township NJPDES MS4 permit.

A copy of the adopted Township of Chesterfield Stormwater Management Plan will be submitted to Burlington County Planning for review and approval.

The Township of Chesterfield Stormwater Management Plan represents the beginning of a new process in which municipalities participate in improving water quality conditions from non-point source pollution. The Township of Chesterfield Stormwater Management Plan will improve the non-point source pollution conditions to the Delaware River, Crosswicks Creek, and Blacks Creek.

# EXISTING CONDITIONS

## MUNICIPAL STORMWATER MANAGEMENT PLAN
## TOWNSHIP OF CHESTERFIELD
## BURLINGTON COUNTY, NEW JERSEY

ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY

SOURCE:

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

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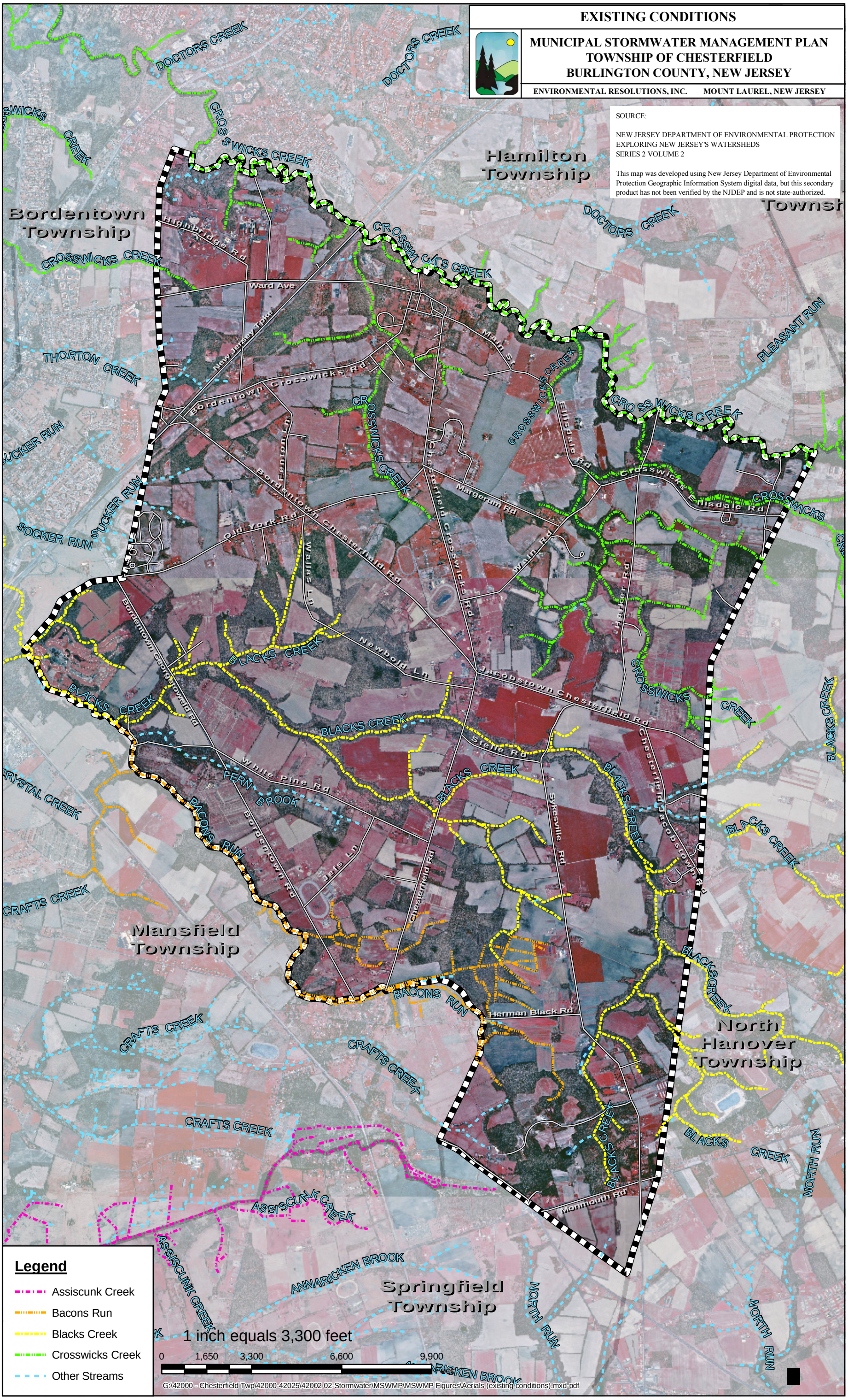


Map 1

0 0.5 1 Miles

1 inch equals 3,300 feet

**SOURCE:**

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

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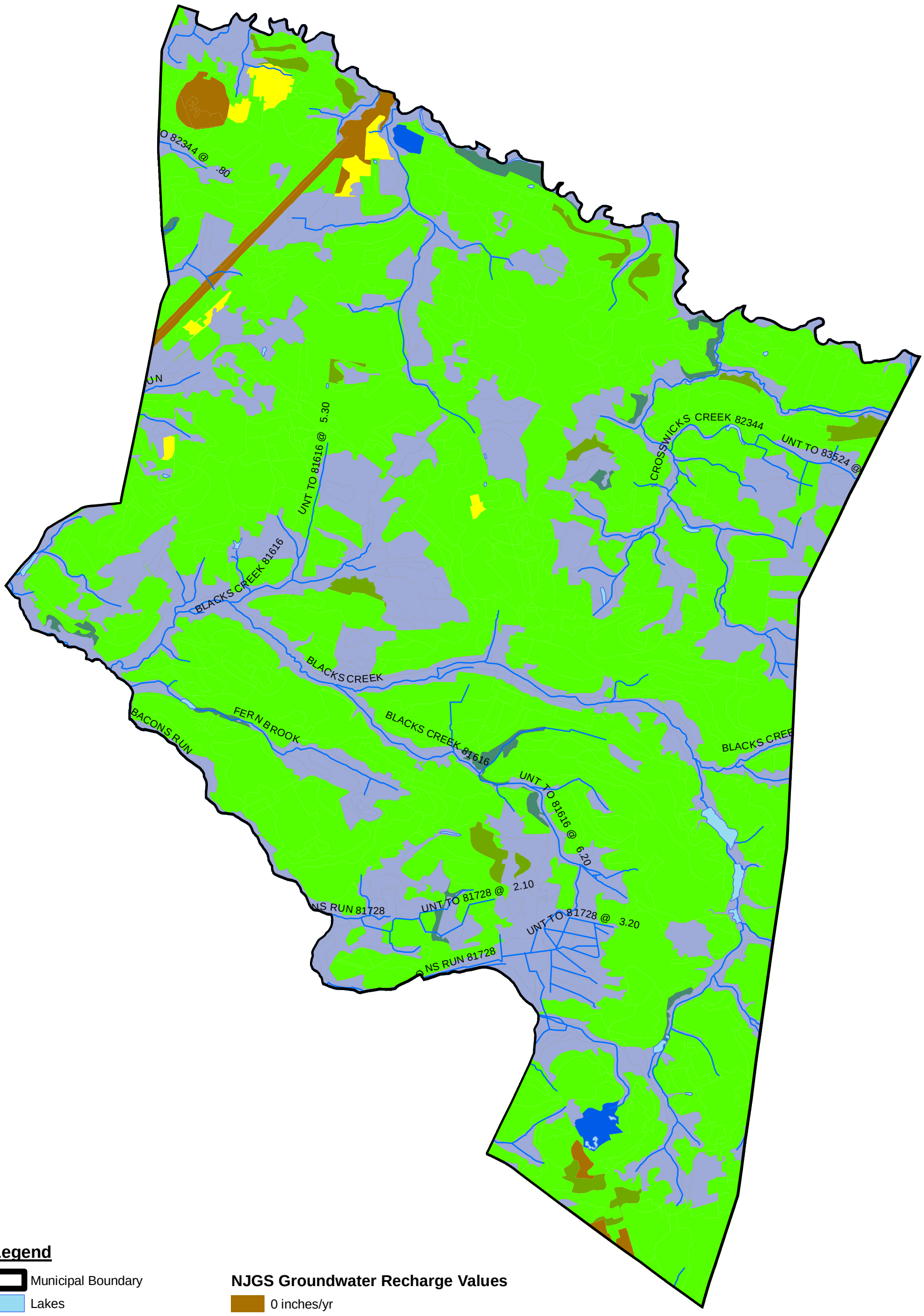


## Legend

- Municipal Boundary
- Lakes
- Streams

**Wellhead Protection Areas (WPAs)**

- Tier 1
- Tier 2
- Tier 3

**NJGS Groundwater Recharge Values**

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

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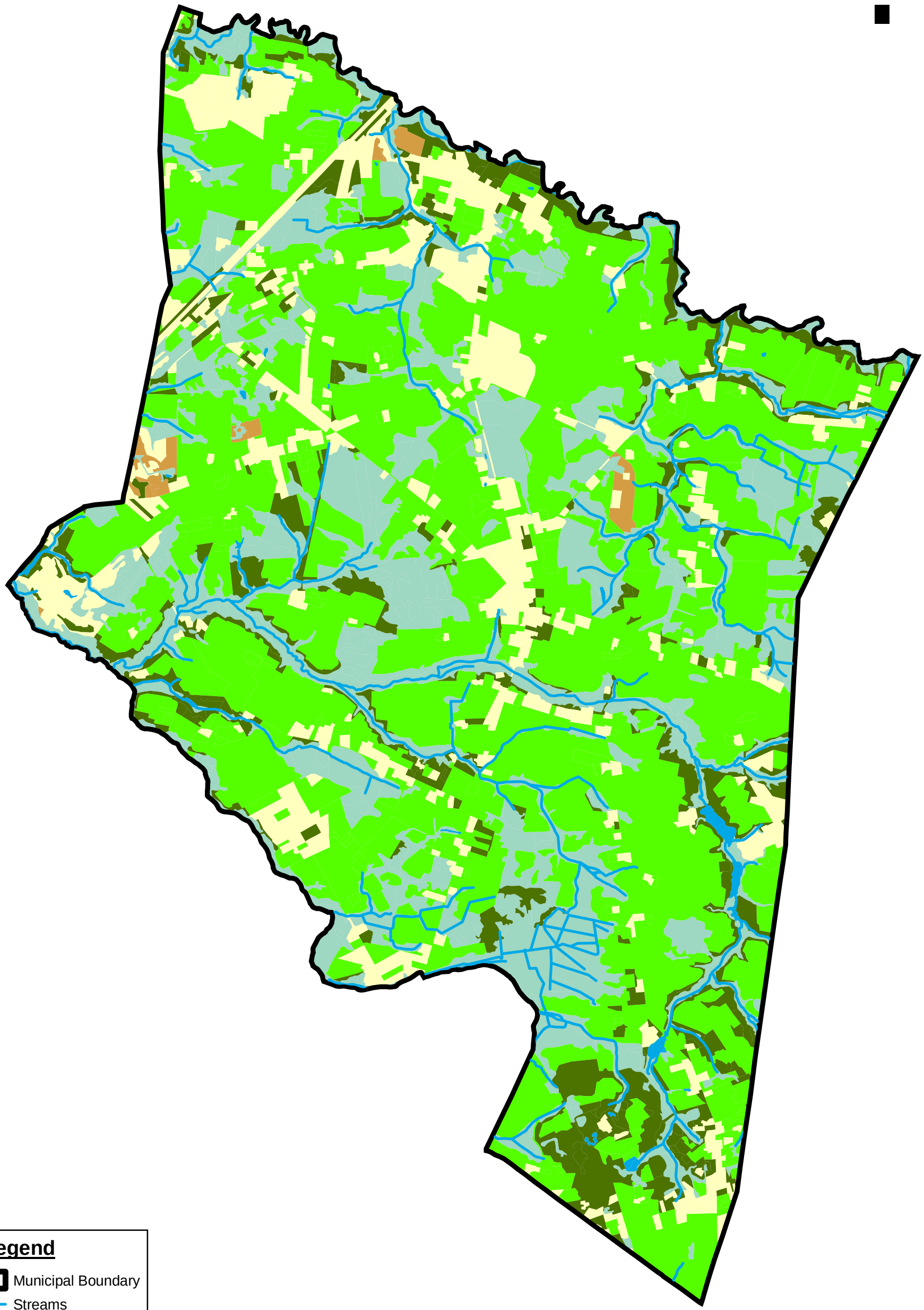
**GROUNDWATER RECHARGE AND WELLHEAD PROTECTION AREAS (WPAs)**

**MUNICIPAL STORMWATER MANAGEMENT PLAN**
**TOWNSHIP OF CHESTERFIELD**
**BURLINGTON COUNTY, NEW JERSEY**

ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY

Map 2

G:\42000 - Chesterfield Twp\42000-42025\42002 02-Stormwater\MSWMP\MSWMP Figures\Wetlands.mxd-pdf




**Legend**

- Municipal Boundary
- Streams

**LAND USE**

- AGRICULTURE
- BARREN LAND
- FOREST
- URBAN
- WATER
- WETLANDS

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

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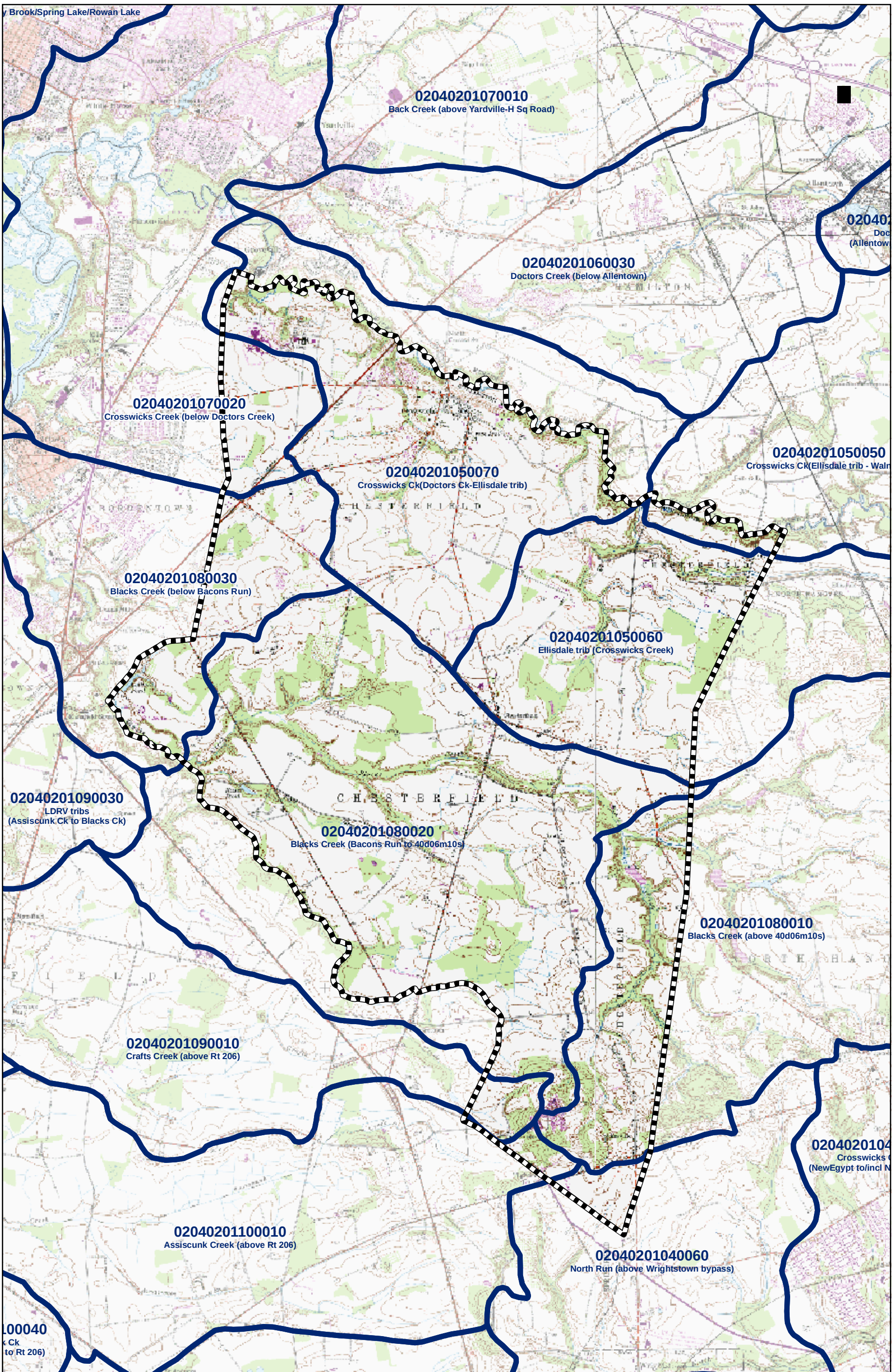
**LAND USE - WETLANDS DESIGNATIONS**

**MUNICIPAL STORMWATER MANAGEMENT PLAN**
**TOWNSHIP OF CHESTERFIELD**
**BURLINGTON COUNTY, NEW JERSEY**

ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY

Map 3




SOURCE:

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

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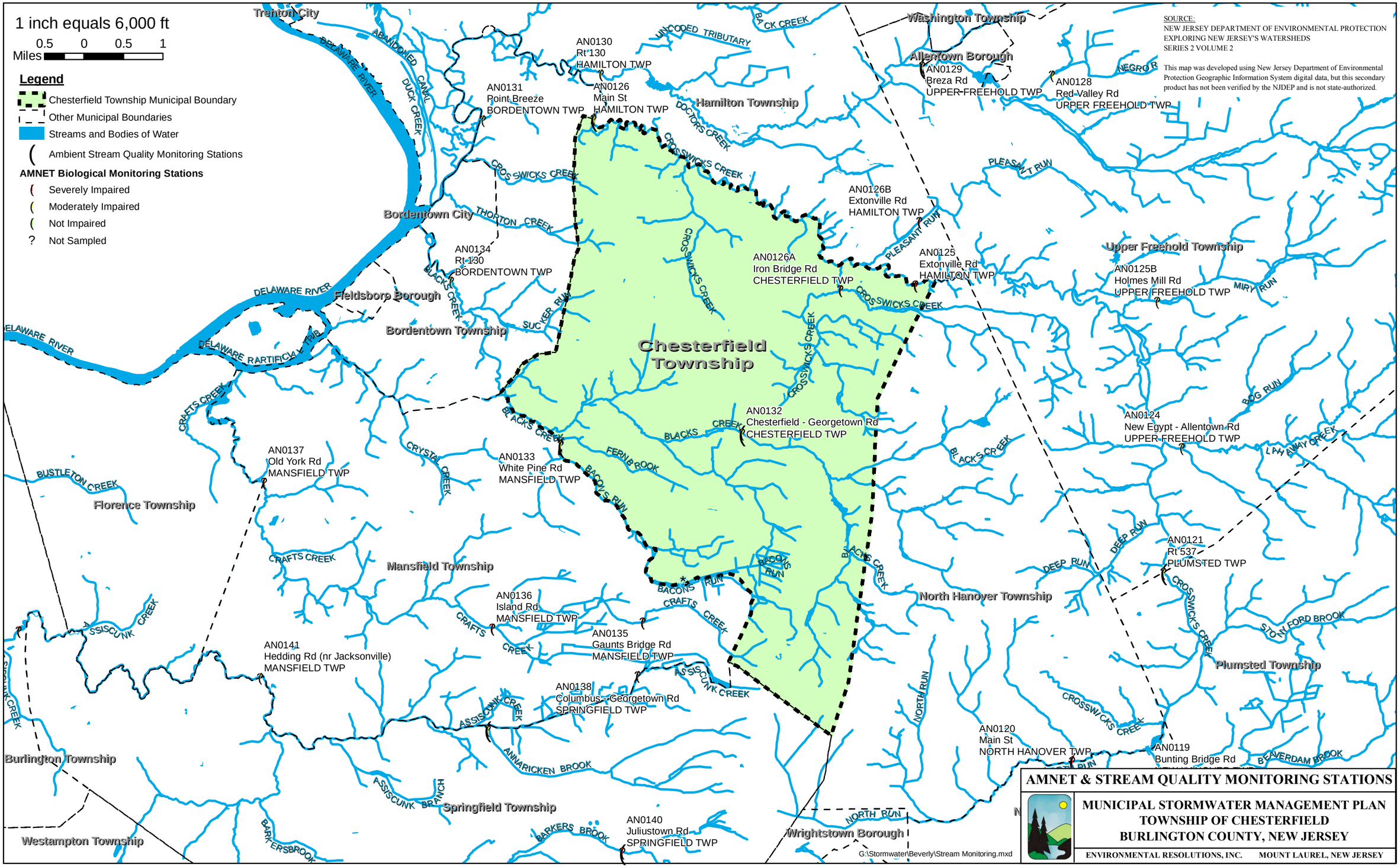
**HUC-14 DELINEATION ON USGS QUADRANGLE MAP**

**MUNICIPAL STORMWATER MANAGEMENT PLAN**
**TOWNSHIP OF CHESTERFIELD**
**BURLINGTON COUNTY, NEW JERSEY**

ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY

Map 4


1 inch equals 6,000 ft
0.5 0 0.5 1
Miles
Legend
Chesterfield Township Municipal Boundary
Other Municipal Boundaries
Streams and Bodies of Water
Ambient Stream Quality Monitoring Stations
AMNET Biological Monitoring Stations
Severely Impaired
Moderately Impaired
Not Impaired
Not Sampled
SOURCE:
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
EXPLORING NEW JERSEY'S WATERSHEDS
SERIES 2 VOLUME 2
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Trenton City
Washington Township
Allentown Borough
Hamilton Township
Bordentown City
Fieldsboro Borough
Bordentown Township
Chesterfield Township
Upper Freehold Township
Florence Township
Mansfield Township
North Hanover Township
Plumsted Township
Burlington Township
Springfield Township
Westampton Township
Wrightstown Borough
DELAWARE RIVER
ABANDONED CANAL
DUCK CREEK
UNCODED TRIBUTARY
BACK CREEK
NEGRO R
DOCTORS CREEK
CROSSWICKS CREEK
PLEASANT RUN
THORTON CREEK
BLACKS CREEK
SUCKER RUN
DELAWARE RARITAN CANAL
CRAFTS CREEK
BUSTLETON CREEK
CRYSTAL CREEK
FERN BROOK
BACONS RUN
ASSISCUNK CREEK
ANNARICKEN BROOK
ASSISCUNK BRANCH
BARKERS BROOK
BARKERSBROOK
NORTH RUN
DEEP RUN
MIRY RUN
BOG RUN
LAHAWAY CREEK
STONEFORD BROOK
BEAVERDAM BROOK
AN0130 Rt 130 HAMILTON TWP
AN0131 Point Breeze BORDENTOWN TWP
AN0126 Main St HAMILTON TWP
AN0129 Breza Rd UPPER FREEHOLD TWP
AN0128 Red Valley Rd UPPER FREEHOLD TWP
AN0126B Extonville Rd HAMILTON TWP
AN0125 Extonville Rd HAMILTON TWP
AN0126A Iron Bridge Rd CHESTERFIELD TWP
AN0125B Holmes Mill Rd UPPER FREEHOLD TWP
AN0134 Rt 130 BORDENTOWN TWP
AN0132 Chesterfield - Georgetown Rd CHESTERFIELD TWP
AN0124 New Egypt - Allentown Rd UPPER FREEHOLD TWP
AN0137 Old York Rd MANSFIELD TWP
AN0133 White Pine Rd MANSFIELD TWP
AN0121 Rt 537 PLUMSTED TWP
AN0136 Island Rd MANSFIELD TWP
AN0135 Gaunts Bridge Rd MANSFIELD TWP
AN0141 Hedding Rd (nr Jacksonville) MANSFIELD TWP
AN0138 Columbus - Georgetown Rd SPRINGFIELD TWP
AN0120 Main St NORTH HANOVER TWP
AN0119 Bunting Bridge Rd
AN0140 Juliustown Rd SPRINGFIELD TWP
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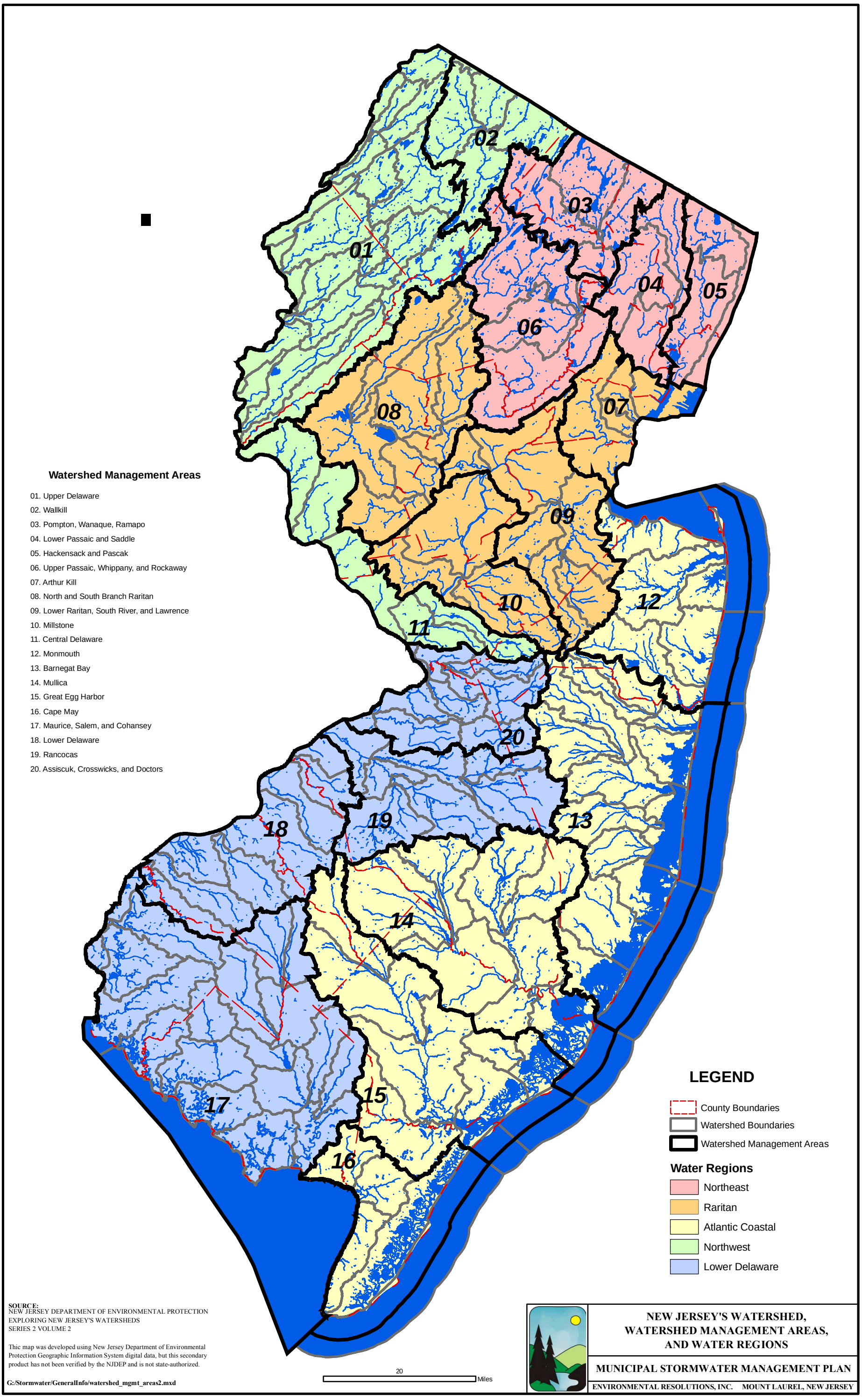
AMNET & STREAM QUALITY MONITORING STATIONS
MUNICIPAL STORMWATER MANAGEMENT PLAN
TOWNSHIP OF CHESTERFIELD
BURLINGTON COUNTY, NEW JERSEY
ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY

Map 5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20
Watershed Management Areas
01. Upper Delaware
02. Wallkill
03. Pompton, Wanaque, Ramapo
04. Lower Passaic and Saddle
05. Hackensack and Pascak
06. Upper Passaic, Whippany, and Rockaway
07. Arthur Kill
08. North and South Branch Raritan
09. Lower Raritan, South River, and Lawrence
10. Millstone
11. Central Delaware
12. Monmouth
13. Barnegat Bay
14. Mullica
15. Great Egg Harbor
16. Cape May
17. Maurice, Salem, and Cohansey
18. Lower Delaware
19. Rancocas
20. Assiscuk, Crosswicks, and Doctors
LEGEND
County Boundaries
Watershed Boundaries
Watershed Management Areas
Water Regions
Northeast
Raritan
Atlantic Coastal
Northwest
Lower Delaware
SOURCE:
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
EXPLORING NEW JERSEY'S WATERSHEDS
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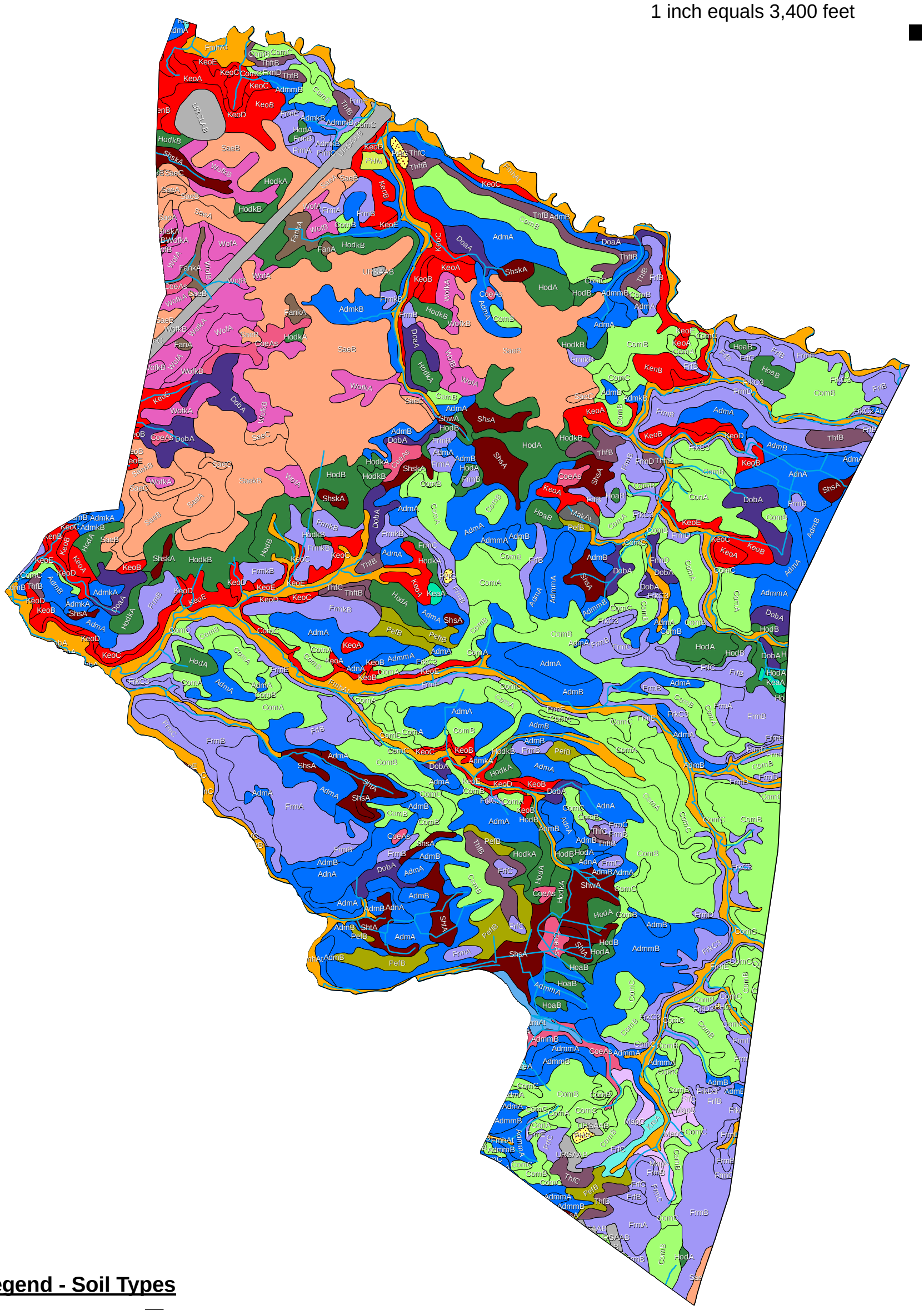
20
Miles
NEW JERSEY'S WATERSHED,
WATERSHED MANAGEMENT AREAS,
AND WATER REGIONS
MUNICIPAL STORMWATER MANAGEMENT PLAN
ENVIRONMENTAL RESOLUTIONS, INC. MOUNT LAUREL, NEW JERSEY

Map 6

0 0.5 1 Miles

1 inch equals 3,400 feet



## Legend - Soil Types

- Adelphia
- Colemantown loam
- Collington
- Donlonton
- Fallsington
- Fluvaquents
- Freehold
- Holmdel
- Humaquepts
- Keansburg
- Keyport
- Kresson
- Manahawkin muck
- Marlton
- Pemberton sand
- Pits, clay
- Pits, sand and gravel
- Sassafras
- Shrewsbury
- Tinton sand
- Urban land
- Water
- Woodstown

**SOURCE:**
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
EXPLORING NEW JERSEY'S WATERSHEDS
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**SOIL TYPES**

**MUNICIPAL STORMWATER MANAGEMENT PLAN**
**TOWNSHIP OF CHESTERFIELD**
**BURLINGTON COUNTY, NEW JERSEY**

**ENVIRONMENTAL RESOLUTIONS, INC.** **MOUNT LAUREL, NEW JERSEY**

**SOURCE:**
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**FLOODPRONE AREAS**

**MUNICIPAL STORMWATER MANAGEMENT PLAN**
**TOWNSHIP OF CHESTERFIELD**
**BURLINGTON COUNTY, NEW JERSEY**

**ENVIRONMENTAL RESOLUTIONS, INC.** **MOUNT LAUREL, NEW JERSEY**

Map 8