
STILLWATER TOWNSHIP

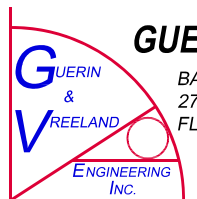
MUNICIPAL STORMWATER MANAGEMENT PLAN

*New Jersey Pollution Discharge
Elimination System Permit Number
NJG0149632*

PI ID # 214882

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By



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Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for Stillwater Township to address stormwater related water quality, groundwater recharge and water quantity impacts of new "major development"¹. This MSWMP addresses these impacts by incorporating stormwater design and performance standards for such development. Creation of this plan is required by N.J.A.C. 7:14A-25 Municipal Stormwater Regulations.

This MSWMP contains the required elements described in N.J.A.C. 7:8 Stormwater Management Rules. Specifically, this MSWMP:

- Addresses the goals of Municipal Stormwater Management Planning*
- Contains a general discussion on stormwater management*
- Contains a general description of the municipality*
- Incorporates stormwater design and performance standards intended to minimize stormwater related water quality, groundwater recharge and water quantity impacts*
- Addresses review and update of existing ordinances, the Township Master Plan, and other planning documents to allow for project designs that include low impact development techniques*
- Contains preventative and corrective maintenance strategies to ensure long-term effectiveness of stormwater management facilities*
- Outlines safety standards for stormwater infrastructure to be implemented to protect public safety*
- Addresses coordinating stormwater management with other agencies*
- Contains maps of the municipality, land use, zoning, well head protection areas, groundwater recharge areas, HUC 14 watershed areas, water bodies and wetlands*
- Contains draft stormwater control ordinances*

¹ For the purpose of this plan "Major development" is limited to projects that ultimately disturb one or more acres of lands (N.J.A.C. 7:8-4.2(a))

Goals

This MSWMP has been designed to achieve the following Municipal Stormwater Management Planning goals set forth in N.J.A.C. 7:8 Stormwater Management Rules:

- *Reduce flood damage, including damage to life and property*
- *Minimize, to the extent practical, any increase in stormwater runoff from any new development*
- *Reduce soil erosion from any development or construction project*
- *Assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures*
- *Maintain groundwater recharge*
- *Prevent, to the greatest extent feasible, an increase in nonpoint pollution*
- *Maintain the integrity of stream channels for their biological functions, as well as for drainage*
- *Minimize pollutants in stormwater runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the State, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water*
- *Protect public safety through the proper design and operation of stormwater basins*

To achieve these goals, this MSWMP outlines specific stormwater design and performance standards. This MSWMP includes preventative and corrective maintenance strategies to ensure long-term effectiveness of stormwater management facilities. This MSWMP outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

Stormwater Discussion

The hydrologic cycle is the continuous circulation of water from the atmosphere onto, over, through and under the land surface. In the hydrologic cycle precipitation occurs principally as rain or snow. A portion of the precipitation is intercepted and adheres to trees and vegetation where it is taken up or evaporated (evapotranspiration); A portion of precipitation seeps into the ground (infiltration); and A portion of the precipitation flows on the ground surface (runoff). Groundwater recharge is the portion of water that infiltrates into the ground and is not evapotranspired. Stormwater includes runoff, infiltration and water that is captured by drainage facilities. Figure No. 1. depicts a schematic of the hydrologic cycle.

Stormwater results from a combination of land features (land cover, land use, slope, soils, etc.) and climatic factors (precipitation intensity, pattern, aerial distribution, duration, etc.). Urbanization (or development) can change these land features and alter the hydrologic cycle of a site and ultimately an entire watershed. Studies indicate development can change how water flows in the watershed and what flows in the water. Post construction stormwater runoff can adversely impact water quality, groundwater recharge and water quantity. The land cover of greatest concern for stormwater management is impervious coverage created through the development process.

Water Quality

Land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to receiving water bodies. 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. During storm events, these pollutants quickly wash off and are rapidly delivered to receiving waterbodies. Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers. Pollutants can include bacteria, chlorides, hydrocarbons, metals, nutrients, organic matter, pathogens, pesticides, suspended solids, trash and debris.

As discussed below, the frequency and magnitude of storm flows increase after development. These conditions can create new and aggravate existing downstream flooding and erosion problems. More erosion of stream banks and scouring of channels degrades habitat for plant and animal life that depend on clear water. Sediment from eroded stream banks clogs the gills of fish and blocks light needed for plants. The sediment settles to fill in stream channels, lakes and reservoirs. This also increases flooding and the need for dredging to clear streams or lakes for boating.

Stormwater Discussion (continued)

In addition to increased pollutant loading, land development can adversely affect water quality and stream biota in more subtle ways. Stormwater falling on impervious surfaces or stored in detention or retention basins can become heated and raise the temperature of receiving waterbodies. These thermal impacts can adversely affecting cold water fish species. 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.

Groundwater Recharge

Groundwater is the sole water supply within the Township. Increases in impervious area can decrease opportunities for infiltration which reduces groundwater recharge and stream base flow. The loss of groundwater recharge can adversely impact the yield of water supply wells. Reduced base flows can negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Certain land uses and activities can also degrade groundwater quality if stormwater runoff is directed into the soil without adequate treatment.

Water Quantity

The volume of stormwater runoff increases as impervious cover increases. As such the frequency and magnitude of storm flows increase after development. Prior to development native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover. Without this beneficial vegetation the site's evapotranspiration and infiltration rates are reduces. Consequently, a larger portion of precipitation is converted directly to stormwater runoff. Clearing and grading a site can remove depressions that store rainfall. Construction activities may 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. This in tum causes flow in downstream waterways to peak faster and higher than natural conditions.

Setting of the Municipality

Community Profile

The Township encompasses approximately 28.37 square miles in Sussex County. The Township can be characterized as a rural residential and agricultural community with sparse low density residential development interspersed with higher density residential centers in the form of villages and lake communities. Published data from the US Bureau of the Census for New Jersey indicate the Township ranked 16th out of 24 Sussex County Municipalities in terms of housing density in year 2000. Table No. 1 presents a summary of Sussex County housing density data from the US Bureau of the Census. Figure No. 2 presents the Township with respect to cultural and natural features illustrated on USGS Quadrangles.

Land use within the Township is primarily a mixture of residential development, agricultural lands, open space and vacant lands. The vast majority of the Township land area is within residential zones and is in farmland assessment. Large tracts of protected land exist within parks, recreation areas and open spaces. Very little of the Township land area is classified as commercial or industrial. The NJDEP has produced GIS coverage of Land Use. Sussex County has produced GIS coverage of Zoning. Figure No. 3 presents Land Use within the Township. Figure No. 4 presents Zoning within the Township.

Published data from US Bureau of the Census for New Jersey indicate the Township's population has increased over the past 60 years from 679 people in 1940 to 4,267 people in 2000. Published census data indicate the Township has experienced new development along with the population growth. The reported number of housing units within the Township increased from 1,805 units in year 1990 to 2,030 units in year 2000. Table No. 2 presents a summary of population data from the US Bureau of the Census for New Jersey.

The primary objective of the stormwater rules is to keep New Jersey's waters clean and plentiful. Information regarding the water resources within Stillwater Township is presented below.

Setting of the Municipality (continued)

Groundwater Resources

All drinking water within the Township is obtained from wells of varying depths. Most of the Township is served by private wells. One public community water supply system is located within the Township and serves the lake community associated with Paulins Kill Lake (Stillwater Water District 1). The NJDEP New Jersey Geological Survey (NJGS) has produced GIS coverage of well head protection areas (WHPA) around the public community water supply wells that serve this water system. The area delineates the horizontal extent of ground water captured by a well pumping at a specific rate over a two-, five-, and twelve-year period. WHPA delineation methods are described in "Guidelines for Delineation of Well Head Protection Areas in New Jersey" (i.e., DGS97-1). Figure No. 5 presents Well Head Protection Areas within the Township.

The NJDEP has completed and issued a Source Water Assessment Report and Summary for the Stillwater Water District 1 public community water system. The goal of this assessment was to measure the system's susceptibility to contamination, not actual (if any) contamination measured in a water supply system. The assessment involved Identifying the area (known as the source water assessment area) that supplies water to the public drinking water system; Inventorying any significant potential sources of contamination in the area; and Analyzing how susceptible the drinking water source is to the potential sources of contamination. Table No. 3 presents a summary of the source water assessment. The Township may want to adopt specific ordinances to protect source water and wellhead protection areas to minimize the infiltration of pollutants into aquifers. Additional information regarding the source water assessment report or summary can be obtained by contacting the NJDEP's Bureau of Safe Drinking Water 609-292-5550.

The NJGS has calculated and published GIS coverage of groundwater recharge (GWR). As previously indicated, groundwater recharge is the water that infiltrates the ground and reaches the water table. It supports aquifer recharge, stream baseflow and wetlands. It has been estimated using the methodology outlined in "A Method of Evaluating Ground-Water-Recharge Areas in New Jersey" (i.e., GSR-32). The GSR-32 methodology uses both cultural and natural calculation factors that are a function of the site's municipality, soil, and land use/land cover (LULC). Figure No. 6 present Groundwater Recharge Areas within the Township.

Setting of the Municipality (continued)

Surface Water Resources

New Jersey is divided into the four physiographic provinces (i.e., Valley and Ridge, Highlands, Piedmont, and Coastal Plain Physiographic Provinces). Each province defines a region in which relief, landforms, and geology are significantly different from that of the adjoining and nearby regions. Stillwater township is located within the Valley and Ridge Provinces. As the name suggests, this provinces is characterized by a series of nearly parallel ridges and valleys. The local topography is dominated by valleys and ridges oriented southwest to northeast. Generally, the drainage patterns follow the same orientation, flowing southwest to the Delaware River. Figure No. 2 presents the Township with respect regional topography.

The NJDEP has developed delineations of 20 major Watershed Management Areas (WMA) for New Jersey. These watersheds are organized under the umbrella of five Water Regions within the Division of Watershed Management. Stillwater Township is located within the Northwest Water Region within the Upper Delaware Watershed Management Area (a.k.a. Watershed Management Area 1). The Upper Delaware Watershed encompasses approximately 746 square miles and consists of 13 major drainage basins. Stillwater Township is located within the Paulins Kill, Trout Brook and VanCampens Brook drainage basins. These basins are comprised of various smaller drainage areas. In light of the Stormwater Management Rule, the hydrologic unit code 14 (HUC14) drainage areas as defined by the United States Geologic Survey are of particular interest for municipal stormwater management planning. Ten HUC14 drainage areas are represented within the Township. Figure No. 7 presents Major Drainage Basins within the Upper Delaware Watershed. Figure No. 8 presents HUC14 Watershed Areas within the Township. Figure No. 9 presents Lakes/Rivers/Streams within the Township. Figure No. 10 presents Wetlands within the Township.

New Jersey's Surface Water Quality Standards (SWQS) establish the designated uses to be achieved and specify the water quality (criteria) necessary to protect the State's waters. Designated uses include potable water, propagation of fish and wildlife, recreation, agricultural and industrial supplies, and navigation. These are reflected in use classifications assigned to specific waters. The NJDEP is designating a special level of protection, known as Category One (C1), for certain waterbodies. The C1 designation provides additional protections to waterbodies that help prevent water quality degradation and discourage development where it would impair or destroy natural resources and environmental quality. The stormwater rules emphasizes special buffer-area protections for C1 waterbodies. The NJDEP has produced GIS coverage of C1 waterbodies. Figure No. 11 presents Category One Waters within the Township. Additional information regarding SWQS can be obtained by contacting the NJDEP's Bureau of Water Quality Standards and Assessment at (609) 777-1753.

Setting of the Municipality (continued)

The SWQS form the basis for monitoring the degree of impairment of water bodies and for calculating total maximum daily loads (TMDLs). TMDLs are developed on a watershed basis to aid watershed management planning efforts. A TMDL is the amount of a pollutant that can be accepted by a waterbody without causing an exceedance of water quality standards or interfering with the ability to use a waterbody for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant, such as stormwater and wastewater discharges, which require an 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 (BMPs). The NJDEP has produced GIS coverage of TMDLs. Figure No. 12 presents TMDLs for Fecal Coliform within the Township. Additional information regarding TMDLs can be obtained by contacting the NJDEP's Division of Watershed Management at (609) 984-0058.

Pursuant to the requirements of the Clean Water Act, the State develops a list of impaired waters (303d) and a surface water quality inventory report (305b) every two years. The New Jersey Integrated Water Quality Monitoring and Assessment Report is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards and identifies waters that are impaired. Sublist 5 constitutes the list of waters impaired or threatened by pollutants for which one or more TMDLs are needed. Table No. 4 present a list of waterbodies within the Water Management Area 1 on Sublist 5 of the 2004 Integrated List of Waterbodies. Additional information regarding the New Jersey Integrated Water Quality Monitoring and Assessment Report can be obtained by contacting the NJDEP's Water Assessment Team in the Water Monitoring and Standards Element at (609)-292-1623.

Design and Performance Standards

The Township intends to adopt 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 adopting ordinance will be submitted to the appropriate county review agency for review and approval within 12 months from the adoption of this MSWMP.

To the maximum extent practicable, these standards shall be met by incorporating nonstructural stormwater management strategies set forth at N.J.A.C. 7:8-5.3. If these measures alone are not sufficient to meet these standards, structural stormwater management measures set forth at N.J.A.C. 7:8-5.7 necessary to meet these standards shall be incorporated into the design. The design and performance standards will include language for maintenance of stormwater management measures consistent with 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 inspectors will observe construction of projects to ensure the stormwater management measures are constructed and function as designed.

A Draft Stormwater Ordinance is included as Attachment A.

Plan Consistency

The Township is located within the Upper Delaware Water Quality Management Planning Area and the Sussex County Water Quality Management Planning Area. This MSWMP will be updated to be consistent with any future amendments to these WQMPs.

The 2003 Amendment to these Water Quality Management Plans (WQMP) included fecal coliform TMDLs for the following segments of the Paulins Kill River:

- *Upstream of, and including Paulins Kill Lake (Segment ID 01443440)*
- *Begins at the outlet of Paulins Kill Lake and extends to the Delaware River (Segment ID 01443500, 01443600)*

These TMDLs are expressed as a percentage reductions for a particular stream segment. Table No. 5 presents the TMDLs for these stream segments.

The NJDEP will address the sources of impairment through source trackdown, matching management strategies with sources, selecting responsible entities and aligning available resources to effect implementation. Additional monitoring to narrow the scope and sources of impairment are recommended for these sections. Additional information regarding this WQMP amendment can be obtained by contacting the NJDEP's Division of Watershed Management at (609) 984-0058.

On March 5, 2005 the NJDEP presented a draft Phosphorus TMDL for Swartswood Lake to the Swartswood Watershed Regional Stormwater Management Plan Committee. The NJDEP anticipates initiating the TMDL adoption process for this waterbody in April 2005. Additional information regarding this proposed TMDL can be obtained by contacting the NJDEP's Division of Watershed Management, Bureau of Environmental Analysis and Restoration at (609) 633-1441.

Stillwater Township is located within the Upper Delaware Management Project. At this time the project has developed technical methodology, published technical characterization and assessment reports and initiated education and outreach programs. Future project goals include developing a strategic plan to address root causes of identified stormwater problems. This MSWMP will be updated to be consistent with appropriate implementation plans developed by the project.

Plan Consistency (continued)

The NJDEP recently recognized the Swartswood Watershed Regional Stormwater Management Plan Committee as a Regional Stormwater Management Plan Committee with Stillwater Township as a Lead Planning Agency. Future Committee milestones include characterization and assessment of the drainage area, identify drainage area specific water quality, quantity and recharge objectives, selecting drainage area specific stormwater management measures and performance standards and preparation of a Regional Stormwater Management Plan. This MSWMP will be updated to be consistent with the Regional Stormwater Management Plan developed by the Committee.

The MSWMP is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. The municipality will utilize the most current update of the RSIS in the stormwater management review of residential areas. This MSWMP will be updated to be consistent with any future updates to the RSIS.

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

Nonstructural Stormwater Management Strategies

The Stormwater Management Rules require the maximum practical use of nonstructural stormwater management strategies before structural stormwater management measures are considered. Nonstructural stormwater management strategies can be grouped into the following types of low impact development (LID) techniques:

- *Vegetation and Landscaping*
Best Management Practices (BMPs) include preserving existing vegetated areas, creating vegetative filters and buffers, providing low-maintenance landscaping that encourages retention, planting native vegetation, minimizing the use of lawns, fertilizers and pesticides, etc.
- *Minimizing Site Disturbance*
BMPs include limiting clearing and grading, minimizing construction areas, access roads and storage areas, minimizing soil compaction, concentrating development on soils with lower permeability rates to minimize increase in runoff and retain high permeability areas for groundwater recharge, preserving existing runoff storage areas, etc.
- *Impervious Area Management*
BMPs include disconnecting impervious areas, minimizing pavement or cartway widths consistent with safety and traffic standards, providing vegetated or landscaped medians and islands, utilizing pervious paving material and sidewalks, locating parking beneath buildings, etc.
- *Time of Concentration Modification*
BMPs include increasing surface roughness by preserving existing native vegetation, using native plants to restore disturbed areas providing vegetated open-channel conveyance systems discharging into and through stable vegetated areas rather than piped conveyance systems, providing additional travel time by reducing slopes in graded areas, increasing travel paths, etc.
- *Pollutant Source Control*
BMPs include preventing or minimizing the use or exposure of pollutants, preventing accumulation of trash and debris in drainage systems, regular sweeping, addressing yard and pet waste, spill prevention and control, etc.

Nonstructural Stormwater Management Strategies (continued)

Municipalities are required to evaluate their master plan and ordinances to determine what adjustments may be needed to allow implementation of nonstructural stormwater management techniques. The Township Master Plan and Township Code have been reviewed. Specifically, the Municipal Regulations Checklist from New Jersey Stormwater Best Management Practices Manual was utilized during review of the "Comprehensive Land Development Chapter of the Revised General Ordinances of the Township of Stillwater" (i.e., Chapter 12). Some of the items identified for consideration are noted below. Once the ordinance texts are completed and adopted they will be submitted to the county review agency for review and approval. A copy will be sent to the NJDEP at the time of submission.

Vegetation and Landscaping

- *Maximum permitted yard requirements*
- *Locate buildings and improvement in disturbed areas*
- *Restrict enlarging turf lawn areas*
- *Type of vegetation required for buffer areas and landscaped islands*
- *Stream buffer ordinance*

Minimizing Site Disturbance

- *Open space and cluster development design*
- *Reduce setback requirements*
- *Maximum building envelope requirements*
- *Maximum permitted turf grass or impervious cover requirement in setbacks*

Impervious Area Management

- *Disconnect impervious surface requirement*
- *Maximum parking requirements*
- *Alternate frontage requirements*
- *Alternate curb design criteria*
- *Reduce minimum driveway width requirements*
- *Shared driveways*
- *Pervious driveways and sidewalks*
- *Landscaped islands*

Time of Concentration Modification

- *Design criteria for vegetated channels*

Pollutant Source Control

- *Pollutant source control and "good house keeping" requirements*

Land Use/Build-Out Analysis

A detailed land use analysis for the Township will be conducted.

Mitigation Plans

Mitigation is provided as an alternative to allow a variance or deviation from the strict interpretation of the stormwater management plan in conjunction with a major development project where due to unique or unusual circumstances, it is not practical or viable to meet the standards of stormwater management regulations (N.J.A.C. 7:8). Mitigation is an alternate proposal to correct or improve a stormwater condition.

Any developer wishing to pursue mitigation as an alternative to compliance with the stormwater management regulations for a development project, shall first check with the Township Engineer to determine if there are any sites or projects within the municipality which would be viable as mitigation in support of the variance being requested. If the municipality has no sites or projects available to support the variance request, it will be the responsibility of the developer to present a Mitigation Plan supporting the variance request which is acceptable to the municipality.

Mitigation Project Criteria

- *The mitigation project must be implemented in the same drainage area as the proposed development. The project must provide additional groundwater recharge benefits, or protection from stormwater runoff quality and quantity from previously developed property that does not currently meet the design and performance standards outlined in the Municipal Stormwater Management Plan. The developer must ensure the long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater BMP Manual.*
- *The mitigation project must provide comparable benefits to those being waived should the variance be granted.*
- *It shall be the developer's responsibility to prove to the satisfaction of the municipality that should the variance be granted and a mitigation project approved, there will be no detrimental impact on adjoining properties due to the granting of the variance.*
- *The developer shall enter into a developer's agreement with the municipality which addresses all issues relating to construction of and maintenance of the mitigation project.*

Additional Measures

Additional Measures are measures (non-numeric or numeric effluent limitations) that are expressly required to be included in the Stormwater Program by an area wide or Statewide Water Management Plan. Additional Measures may modify or be in addition to Statewide Basic Requirements. If a Municipality has to implement an Additional Measure, the NJDEP will provide written notice of the Additional Measure to the municipality.

At this time no Additional Measures have been adopted.

Other Measures

At the municipality's discretion, the Stormwater Program may include Other Measures, which are BMPs that are not implemented for Statewide Basic Requirements or Additional Measure but that prevent or reduce the pollution of the waters of the State. These BMPs may further enhance the Municipality's Stormwater Program and may target a specific pollutant of concern or problem affecting the municipality.

At this time no Other Measures have been adopted.

TABLES

TABLE NO. 1
Summary of 2000 Housing Density Data
For Sussex County

Geographic area	Population	Housing units	Area in square miles			Density per square mile of land area	
			Total area	Water area	Land area	Population	Housing units
Andover borough	658	273	1.47	0.01	1.46	451.90	187.50
Andover township	6,033	1,968	20.75	0.57	20.18	298.90	97.50
Branchville borough	845	377	0.59	0.00	0.59	1,421.60	634.30
Byram township	8,254	3,078	22.18	1.11	21.07	391.80	146.10
Crandon Lakes CDP	1,180	492	2.67	0.13	2.53	466.10	194.40
Frankford township	5,420	2,295	35.43	1.31	34.11	158.90	67.30
Franklin borough	5,160	1,997	4.55	0.06	4.49	1,150.20	445.10
Fredon township	2,860	1,019	17.94	0.19	17.76	161.10	57.40
Green township	3,220	1,069	16.31	0.13	16.18	199.00	66.10
Hamburg borough	3,105	1,233	1.16	0.01	1.16	2,686.60	1,066.90
Hampton township	4,943	2,026	25.31	0.69	24.62	200.70	82.30
Hardyston township	6,171	2,690	32.64	0.55	32.09	192.30	83.80
Highland Lake CDP	5,051	2,283	6.07	1.03	5.04	1,001.80	452.80
Hopatcong borough	15,888	6,190	12.34	1.38	10.96	1,449.70	564.80
Lafayette township	2,300	799	18.06	0.03	18.02	127.60	44.30
Lake Mohawk CDP	9,755	3,940	6.15	1.15	5.00	1,951.20	788.10
Montague township	3,412	1,588	45.34	1.33	44.01	77.50	36.10
Newton town	8,244	3,425	3.10	0.01	3.10	2,661.70	1,105.80
Ogdensburg borough	2,638	903	2.30	0.02	2.28	1,154.70	395.30
Sandyston township	1,825	907	43.31	0.70	42.61	42.80	21.30
Sparta township	18,080	6,590	39.22	1.83	37.39	483.50	176.20
Stanhope borough	3,584	1,419	2.21	0.34	1.87	1,913.60	757.70
Stillwater township	4,267	2,030	28.37	1.26	27.12	157.30	74.90
Sussex borough	2,145	961	0.62	0.02	0.60	3,597.90	1,611.90
Vernon township	24,686	9,994	70.54	2.14	68.39	360.90	146.10
Vernon Valley CDP	1,737	560	2.68	0.04	2.64	657.20	211.90
Walpack township	41	34	24.72	0.65	24.07	1.70	1.40
Wantage township	10,387	3,663	67.54	0.42	67.12	154.80	54.60

Source: U.S. Census Bureau Census 2000 Summary File 1

TABLE NO. 2
Summary of Population Data
For Stillwater Township

Year	Population	Population Change
1940	679	
1,950	816	137
1960	1339	523
1,970	2,158	819
1,980	3887	1,729
1,990	4,253	366
2,000	4,267	14

Source: US Bureau of the Census for New Jersey

Stillwater Water District 1- PWSID # 1920001

Stillwater Water District 1 is a public community water system consisting of 8 well(s), 0 wells under the influence of surface water, 0 surface water intake(s), 0 purchased ground water source(s), and 0 purchased surface water source(s).

This system's source water comes from the following aquifer(s) and/or surface water body(s) (if applicable): glacial sand and gravel, Jacksonburg limestone, Kittatinny Supergroup and H, Martinsburg Formation and Jutland klippe sequence

This system purchases water from the following water system(s) (if applicable):

Susceptibility Ratings for Stillwater Water District 1 Sources

The table below illustrates the susceptibility ratings for the seven contaminant categories (and radon) for each source in the system. The table provides the number of wells and intakes that rated high (H), medium (M), or low (L) for each contaminant category. For susceptibility ratings of purchased water, refer to the specific water system's source water assessment report.

The seven contaminant categories are defined at the bottom of this page. DEP considered all surface water highly susceptible to pathogens, therefore all intakes received a high rating for the pathogen category. For the purpose of Source Water Assessment Program, radionuclides are more of a concern for ground water than surface water. As a result, surface water intakes' susceptibility to radionuclides was not determined and they all received a low rating.

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels. As a result of the assessments, DEP may customize (change existing) monitoring schedules based on the susceptibility ratings.

	Pathogens			Nutrients			Pesticides			Volatile Organic Compounds			Inorganics			Radio-nuclides			Radon			Disinfection Byproduct Precursors		
Sources	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Wells - 8	2	4	2	7	1			5	3			8		1	7	1	7		7	1			8	
GUDI - 0																								
Surface water intakes - 0																								

- **Pathogens:** Disease-causing organisms such as bacteria and viruses. Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth, that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.
- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides:** Man-made chemicals used to control pests, weeds and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment. For more information go to <http://www.nj.gov/dep/rpp/radon/index.htm> or call (800) 648-0394.
- **Disinfection Byproduct Precursors:** A common source is naturally occurring organic matter in surface water. Disinfection byproducts are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

TABLE NO. 4
Waterbodies within Watershed Management Area 1 Noted on
Sublist 5 of the 2004 Integrated List of Waterbodies

Station Name/Waterbody	Site ID	Parameters	Data Source
Delaware River Zone 1	1E4	pH	DRBC
Delaware River Zone 1	1D2, 1D3, 1D4, 1D6	Total Dissolved Solids (Aquatic Life)	DRBC
Delaware River Zone 1	1D6, 1E2, 1E5	Fecal Coliform	DRBC
Delaware River Zone 1	Delaware River at Easton PA	Arsenic, Cadmium, Chromium, Copper, Lead, Mercury	304(I)
Delaware River Zone 1	Delaware River Zone 1	Fish-Mercury	NJDEP Fish Tissue Monitoring
Bear Creek at Dark Moon Rd in Frelinghuysen	AN0040A	Benthic Macroinvertebrates	NJDEP AMNET
Bear Creek near Alphano in Allamuchy	AN0040	Benthic Macroinvertebrates	NJDEP AMNET
Clove Brook at Rt 23 in Montague	AN0002	Benthic Macroinvertebrates	NJDEP AMNET
Crater Lake-01	Crater Lake	Fish-Mercury	NJDEP Fish Tissue Monitoring
Dunnfield Creek at Dunnfield	01442760	pH	NJDEP/USGS Data
Forest Lake-01	Forest Lake: Boardwalk Beach, Cove Beach, Harbor View Beach, Main Beach	Fecal Coliform	Sussex Co HD
Fox Hollow Lake-01	Fox Hollow Lake	Fecal Coliform	Sparta Twp HD
Furnace Brook at Pequest Rd in White	AN0042	Benthic Macroinvertebrates	NJDEP AMNET
Furnace Lake-01	Furnace Lake Beach	Fecal Coliform	Warren Co HD
Green Valley Beach Campground	Green Valley Beach Campground	Fecal Coliform	Sussex Co HD
Hainesville Pond-01	Hainesville Pond	Fish-Mercury	NJDEP Fish Tissue Monitoring
Honey Run near Hope	01445900	Dissolved Oxygen , Fecal Coliform	NJDEP/USGS Data
Jacobs Creek at Bear Tavern Rd in Hopewell	AN0106A	Benthic Macroinvertebrates	NJDEP AMNET
Lackawanna Lake-01	Lake Lackawanna: Speers Beach	Fecal Coliform	Sussex Co HD
Lake Hopatcong-01	Lake Hopatcong, Byram Bay Comm Club, Davis Cove, Beck Lane Prop, Crescent Cove, Dox Incorp, E Shores POA, Elba Pt Homeowners, Homestead Beach, Hopatcong Shores Property, Hoptacong Gardens Comm. Club, Ingram Cove Comm, Jewish Center, Colony Club	Fecal Coliform, Fish Community, Fish-Mercury	Sussex Co HD, NJDEP Clean Lakes, Freshwater Fisheries, NJDEP Fish Tissue Monitoring
Lake Winona-01	Lake Winona Civic Association	Fecal Coliform	Jefferson Twp HD
Lopatcong Creek at Main St in Phillipsburg	DRBCNJ0028	Fecal Coliform	DRBC
Lubbers Run at Waterloo Rd (N of Rt 604) in Byram	AN0069A	Benthic Macroinvertebrates	NJDEP AMNET
Merrill Cr Reservoir-01	Merrill Creek Reservoir	Fish-Mercury	NJDEP Fish Tissue Monitoring
Musconetcong River at Lockwood	01455801	Phosphorus, Fecal Coliform, Temperature	NJDEP/USGS Data
Musconetcong River at Beattystown	01456200, 1-MUS-3	Temperature, Arsenic	NJDEP/USGS Data, EWQ, Metal Recon
Musconetcong River at Lake Hopatcong	01455500	pH, Temperature	NJDEP/USGS Data
Musconetcong River at New Hampton Rd in Lebanon	AN0072	Benthic Macroinvertebrates	NJDEP AMNET
Musconetcong River at Riegelsville	01457400, DBRCNJ0025, 1-MUS-5	Phosphorus, Temperature, Total Suspended Solids	NJDEP/USGS Data, DRBC, Metal Recon
Musconetcong River at Rt 206 in Netcong	AN0063A	Benthic Macroinvertebrates	NJDEP AMNET
Musconetcong River at Rt 604 (abv Saxton Lk) in Mt Olive	AN0069E	Benthic Macroinvertebrates	NJDEP AMNET
Musconetcong River at S of Rt 604 & Rt 80 in Mt Olive	AN0069D	Benthic Macroinvertebrates	NJDEP AMNET
Musconetcong River blw Waterloo Village lower dam in Mt Olive	AN0069C	Benthic Macroinvertebrates	NJDEP AMNET
Musconetcong River near Bloomsbury	01457000, EWQ0072, 1-MUS-4	pH	NJDEP/USGS Data, EWQ, Metal Recon
Musconetcong River off Rt 604 (blw Lubbers Run) in Lockwood	AN0069B	Benthic Macroinvertebrates	NJDEP AMNET

TABLE NO. 4
Waterbodies within Watershed Management Area 1 Noted on
Sublist 5 of the 2004 Integrated List of Waterbodies

Station Name/Waterbody	Site ID	Parameters	Data Source
Paulins Kill at Balesville	01443440, 1-PAU-1	Arsenic	NJDEP/USGS Data, EWQ, Metal Recon
Paulins Kill at Blairstown	01443500	Temperature	NJDEP/USGS Data
Paulins Kill at Rt 46 Bridge near I-80	DRBCNJ0036	Temperature	DRBC
Paulins Kill at Rt 46 in Knowlton	AN0032	Benthic Macroinvertebrates	NJDEP AMNET
Paulins Kill at Rt 663 in Lafayette	AN0015	Benthic Macroinvertebrates	NJDEP AMNET
Paulins Kill at Warbasse Junction Rd near Lafayette	01443250	Phosphorus, Fecal Coliform, Dissolved Oxygen	NJDEP/USGS Data
Paulins Kill Trib at Rt 94 & Old Beaver Run Rd in Lafayette	AN0016A	Benthic Macroinvertebrates	NJDEP AMNET
Paulins Kill Trib at Van Sickle Rd in Lafayette	AN0021A	Benthic Macroinvertebrates	NJDEP AMNET
Pequest River at Pequest	01445500, 1-PEQ-2	Phosphorus, pH, Total Suspended Solids	NJDEP/USGS Data, EWQ, Metal Recon
Pequest River at Rt 206 in Andover	AN0035	Benthic Macroinvertebrates	NJDEP AMNET
Pequest River on Water Street at Belvidere	01446400, DRBCNJ0033, 1-PEQ-3	Phosphorus, pH, Temperature, Arsenic, Cadmium, Chromium, Lead, Mercury	NJDEP/USGS Data, DRBC, Metal Recon
Pequest River UNK Trib at Brighton Rd in Green	AN0036	Benthic Macroinvertebrates	NJDEP AMNET
Plum Brook at Pine Hill Rd in Delaware	AN0093	Benthic Macroinvertebrates	NJDEP AMNET
Pohatcong Creek at Buttermilk Bridge Rd in Washington	AN0057	Benthic Macroinvertebrates	NJDEP AMNET
Pohatcong Creek at New Village	01455200	Phosphorus, Fecal Coliform, pH, Temperature	NJDEP/USGS Data, EWQ
Pohatcong Creek at O'Brian Rd in Mansfield	AN0054A	Benthic Macroinvertebrates	NJDEP AMNET
Pohatcong Creek at River Rd Bridge	DRBCNJ0027	Phosphorus, Fecal Coliform	DRBC
Pohatcong Creek at Tunnel Hill Rd in Mansfield	AN0055	Benthic Macroinvertebrates	NJDEP AMNET
Pohatcong Creek at Tunnel Hill Rd in Mansfield	EWQ0055	Temperature	EWQ
Sawmill Pond-01	Sawmill Pond	Fish-Mercury	NJDEP Fish Tissue Monitoring
Shipetaukin Creek at Rt 583 in Lawrence	AN0111	Benthic Macroinvertebrates	NJDEP AMNET
Steenykill Lake-01	Steenykill Lake	Fish-Mercury	NJDEP Clean Lakes, NJDEP Fish Tissue Monitoring
Swartswood Lake-01	Swartswood Lake	Phosphorus, Fish Community, Fish-Mercury	NJDEP Clean Lakes, NJDEP Fish Tissue Monitoring, NJDEP Freshwater Fisheries, Northern Region
Trout Brook at Rt 57 in Hackettstown	AN0068	Benthic Macroinvertebrates	NJDEP AMNET
Trout Brook at Rt 612 in Allamuchy	AN0038	Benthic Macroinvertebrates	NJDEP AMNET
Wills Brook at Acorn St in Mt Olive	AN0064C	Benthic Macroinvertebrates	NJDEP AMNET
Wills Brook at Erie Lackawanna RR Bridge in Mt Olive	AN0064B	Benthic Macroinvertebrates	NJDEP AMNET

Source: NEW JERSEY 2004 INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT (305(b) AND 303(d)), June 2004

TABLE NO. 5
TMDLs for Fecal Coliform-Impaired Stream Segments
within Stillwater Township

	Load Allocation (LA) and Margin of Safety (MOS)					
Segment ID	Summer N	Summer geometric mean CFU/100ml	MOS as % of target concentration	% reduction without MOS	% reduction with MOS	Wasteload Allocation (WLA)
1443440	8	1537	53%	2%	98%	98%
1443500 1443600	38	216	29%	9%	78%	78%

Source: NJDEP Total Maximum Daily Loads for Fecal Coliform to
Address 28 Streams in the Northwest Water Region, April 2003

FIGURES

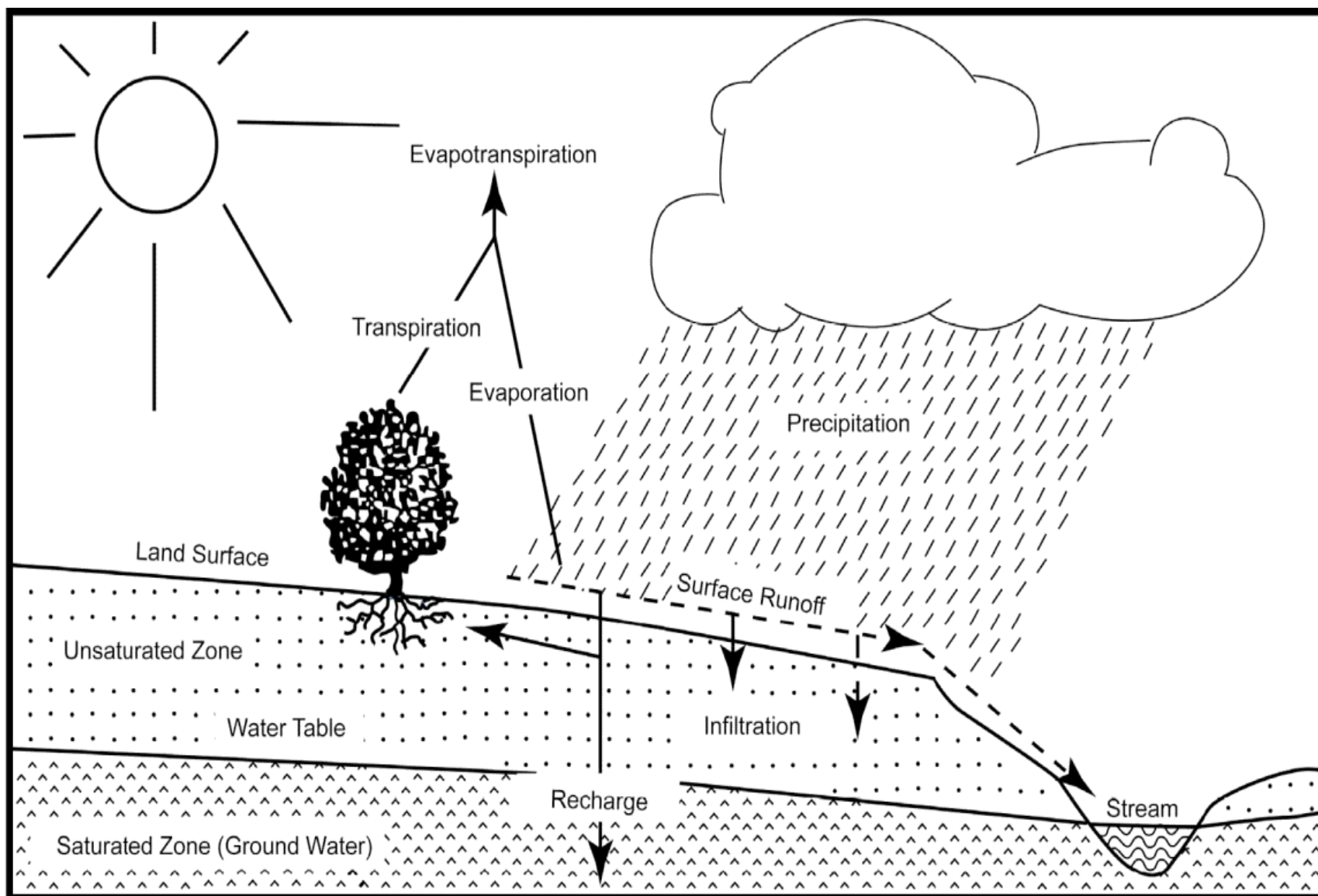
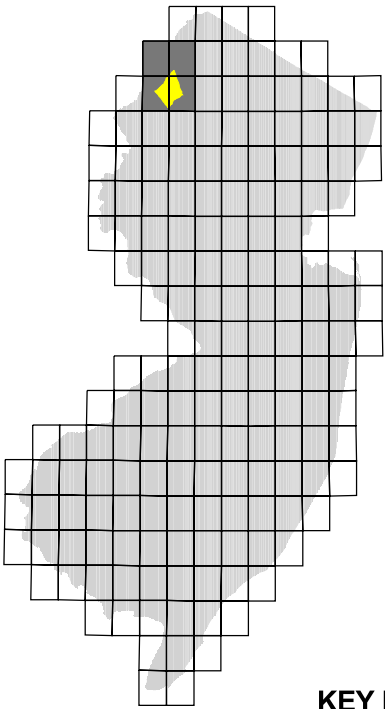
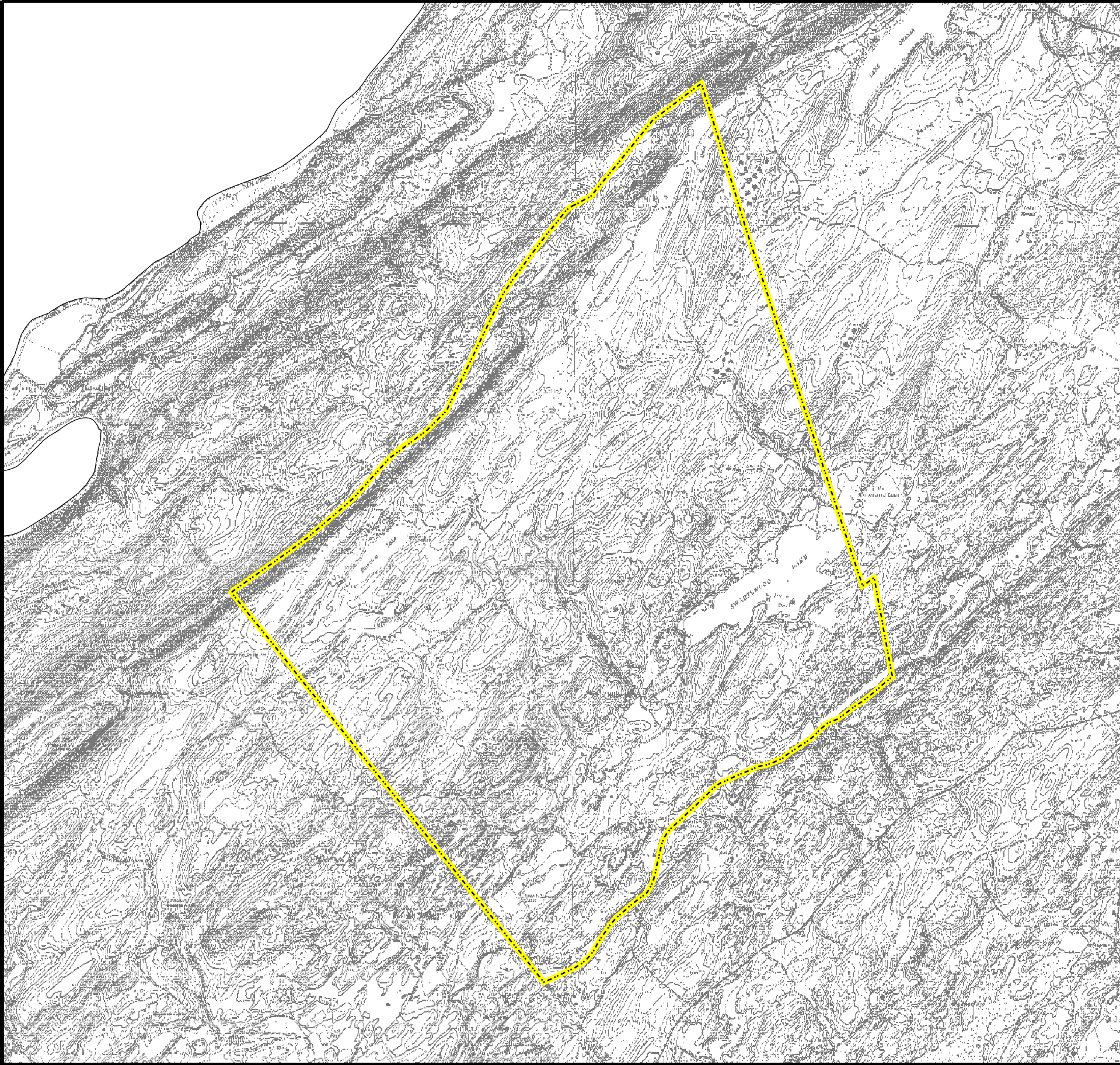


Figure 1: Groundwater Recharge Hydrologic Cycle

(Source: New Jersey Geological Survey Report GSR-32.)



KEY MAP



LEGEND

-  Municipality
-  New Jersey 7-1/2' Quadrangle Index
-  Lake Maskenzha, Culvers Gap, Flatbrookville & Newton West Quadrangles

NOTES

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REFERENCES

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- QUADRANGLE INFORMATION: NEW JERSEY GEOLOGICAL SURVEY, DGS99-1 MONOCHROMATIC BIT-MAPPED TOPOGRAPHIC IMAGES OF NEW JERSEY, 1999.

GRAPHIC SCALE



MUNICIPAL STORMWATER MANAGEMENT PLAN
QUADRANGLE LOCATION MAP
STILLWATER TOWNSHIP, SUSSEX COUNTY, NEW JERSEY

REVISIONS	
Date	Description



GUERIN & VREELAND ENGINEERING, INC.
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Cert. of Authorization 24GA28049400

SCALE: 1"= 6000'	DATE: MAR '05
DRAWN BY: MGV	CHECKED BY: RPG
FIGURE NO. 2	PROJECT NO.: 1107

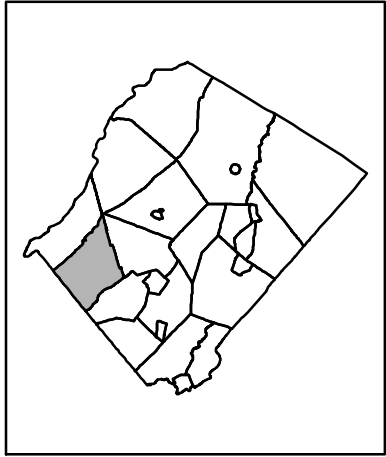
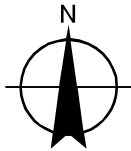


Sussex County New Jersey

Stillwater Township

Stormwater Management Plan

Land Use



Legend

- Municipal Street
- County Route**
- CR**
- 500 Series
- 600 Series
- 700 Park Service
- State Route
- River/Stream
- Streams
- Lakes
- Landuse**
- Landuse Type**
- AGRICULTURE
- BARREN LAND
- FOREST
- URBAN
- WATER
- WETLANDS
- Municipality



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Department of Engineering and Planning

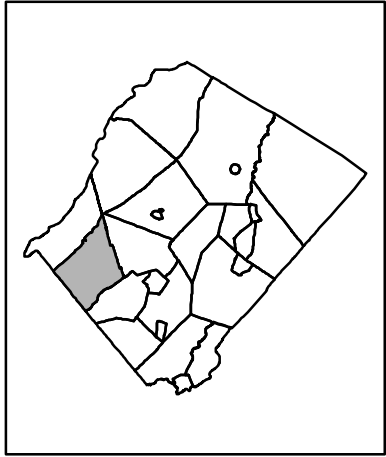
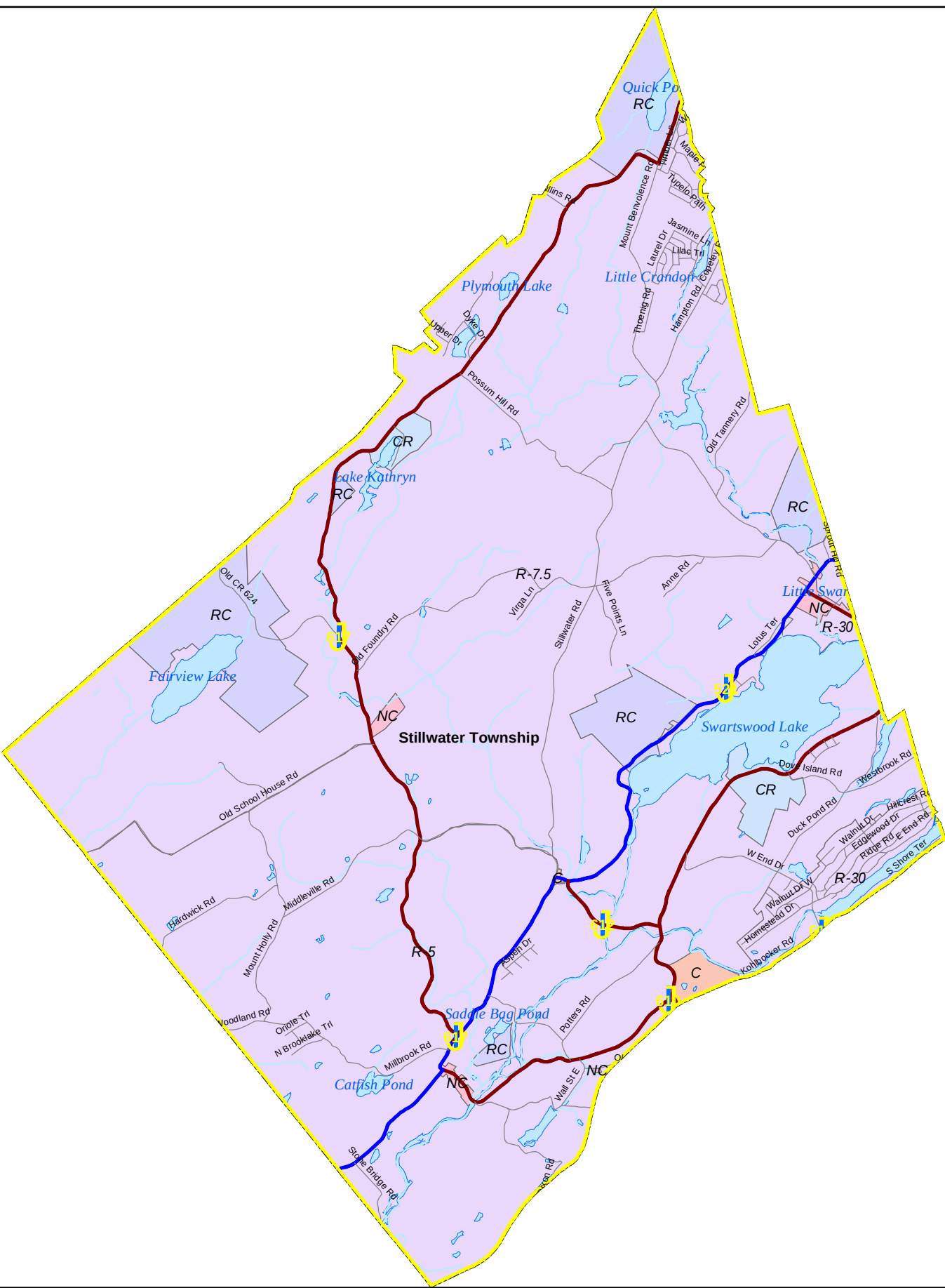


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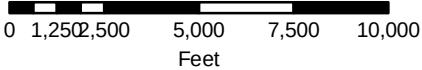
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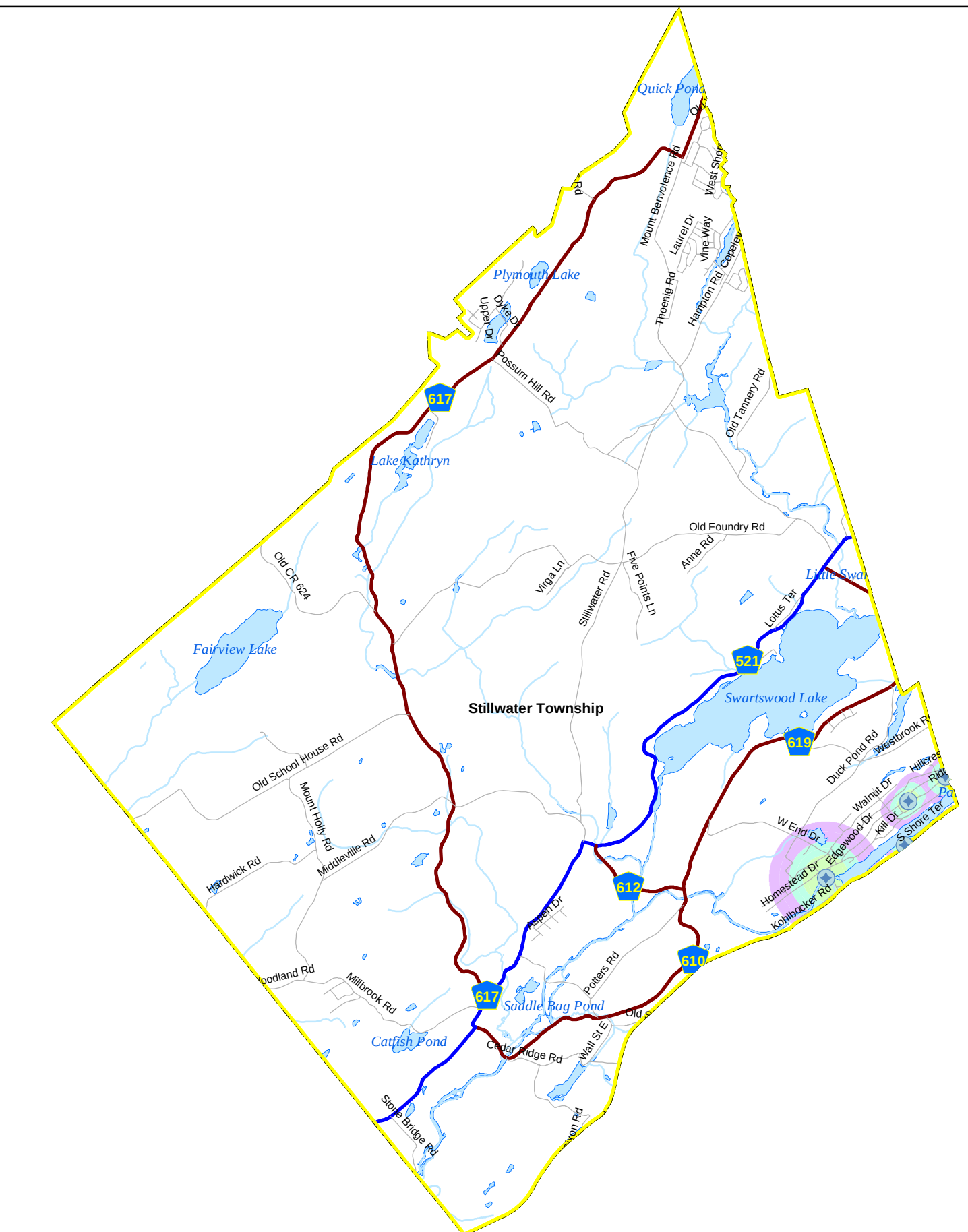


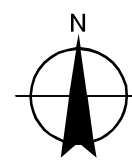
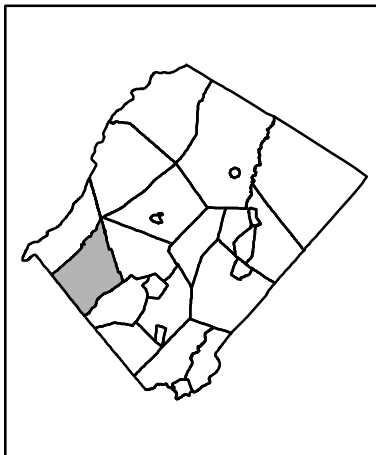
- Legend**
- Municipal Street
 - County Route**
 - CR**
 - 500 Series
 - 600 Series
 - 700 Park Service
 - State Route
 - River/Stream Streams
 - Lakes
 - Municipality



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Department of Engineering and Planning





Legend

- Public Community Water System
- Municipal Street
- County Route**
- CR**
- 500 Series
- 600 Series
- 700 Park Service
- State Route
- Public Community Wellhead Protection Areas**
- TIER**
- 2 year
- 5 year
- 12 year
- River/Stream Streams
- Municipality
- Lakes



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Department of Engineering and Planning

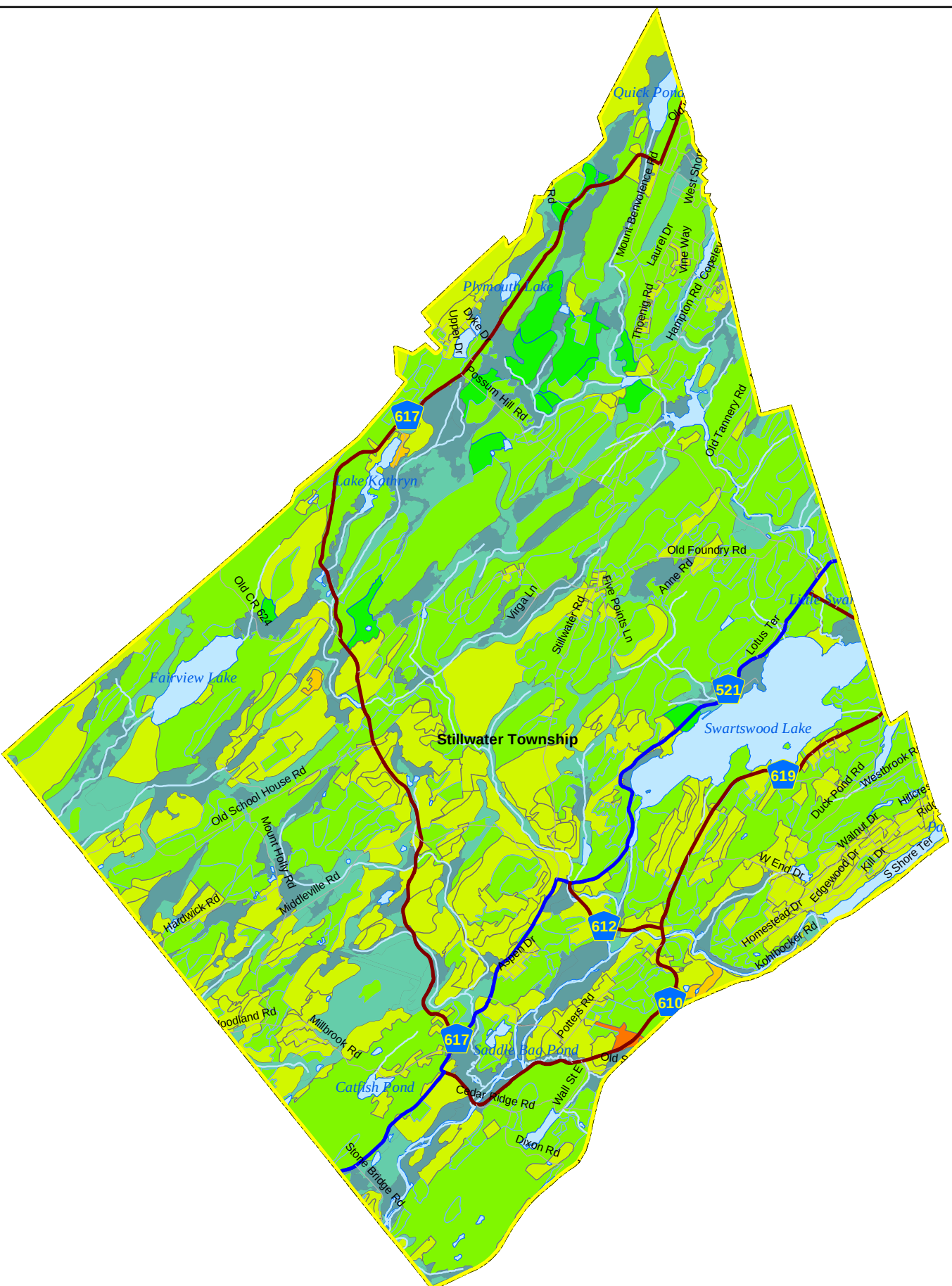


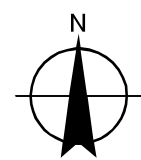
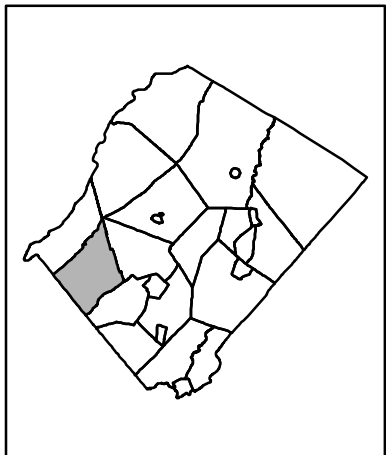
Data Sources:
Wellhead Protection Area: NJDEP, 02/2004.
Public Community Water System: NJDEP, 3/2004.

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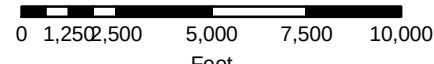



Legend

- Municipal Street
- County Route**
- CR**
- 500 Series
- 600 Series
- 700 Park Service
- State Route
- River/Stream Streams
- Lakes
- Groundwater Recharge**
- INCH**
- 0 in/yr
- 1 - 5 in/yr
- 6 - 11 in/yr
- 12 - 14 in/yr
- 15 - 18 in/yr
- 19 - 21 in/yr
- Hydric Soils
- Wetlands and Open Water
- No Recharge Calculated
- Municipality

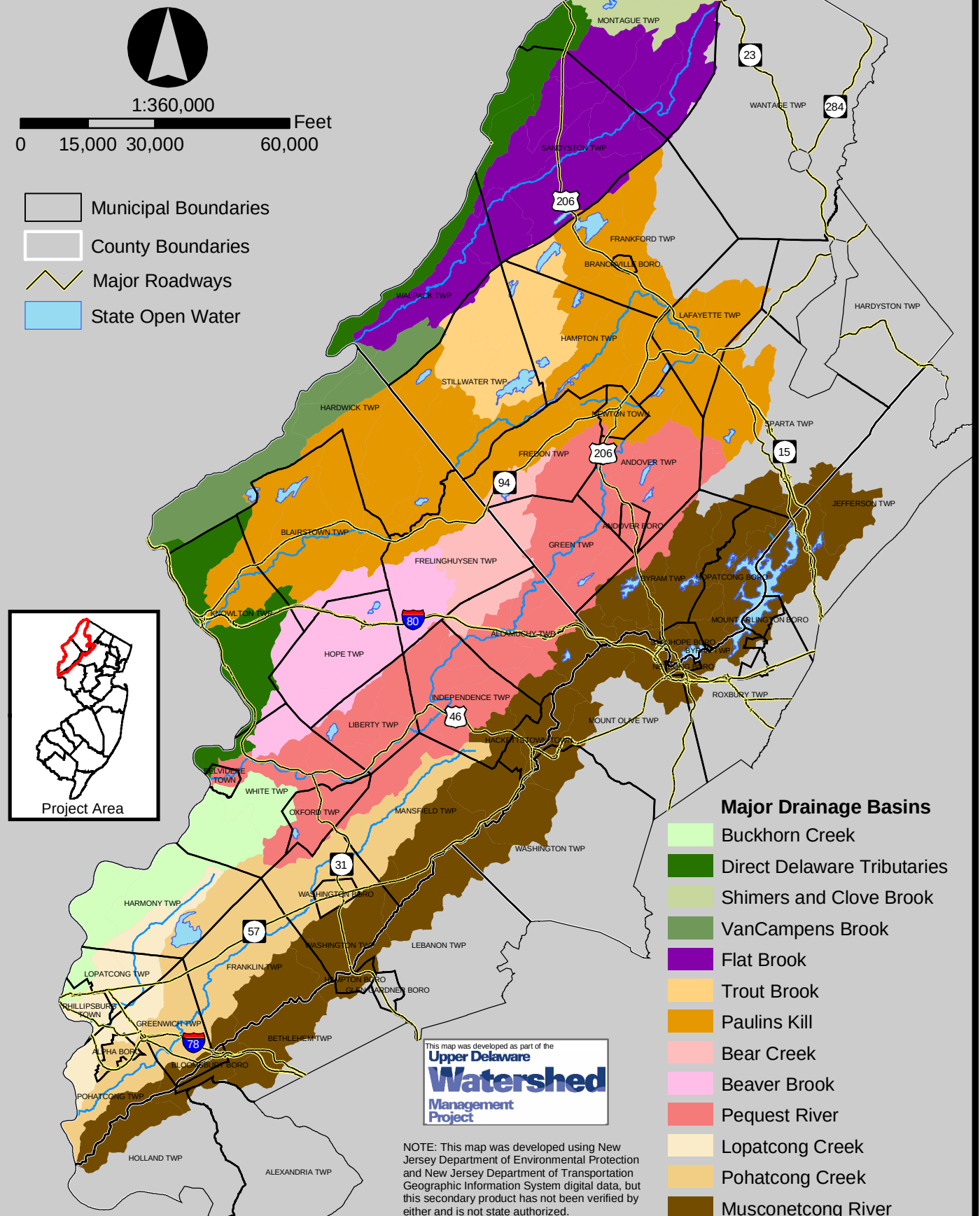


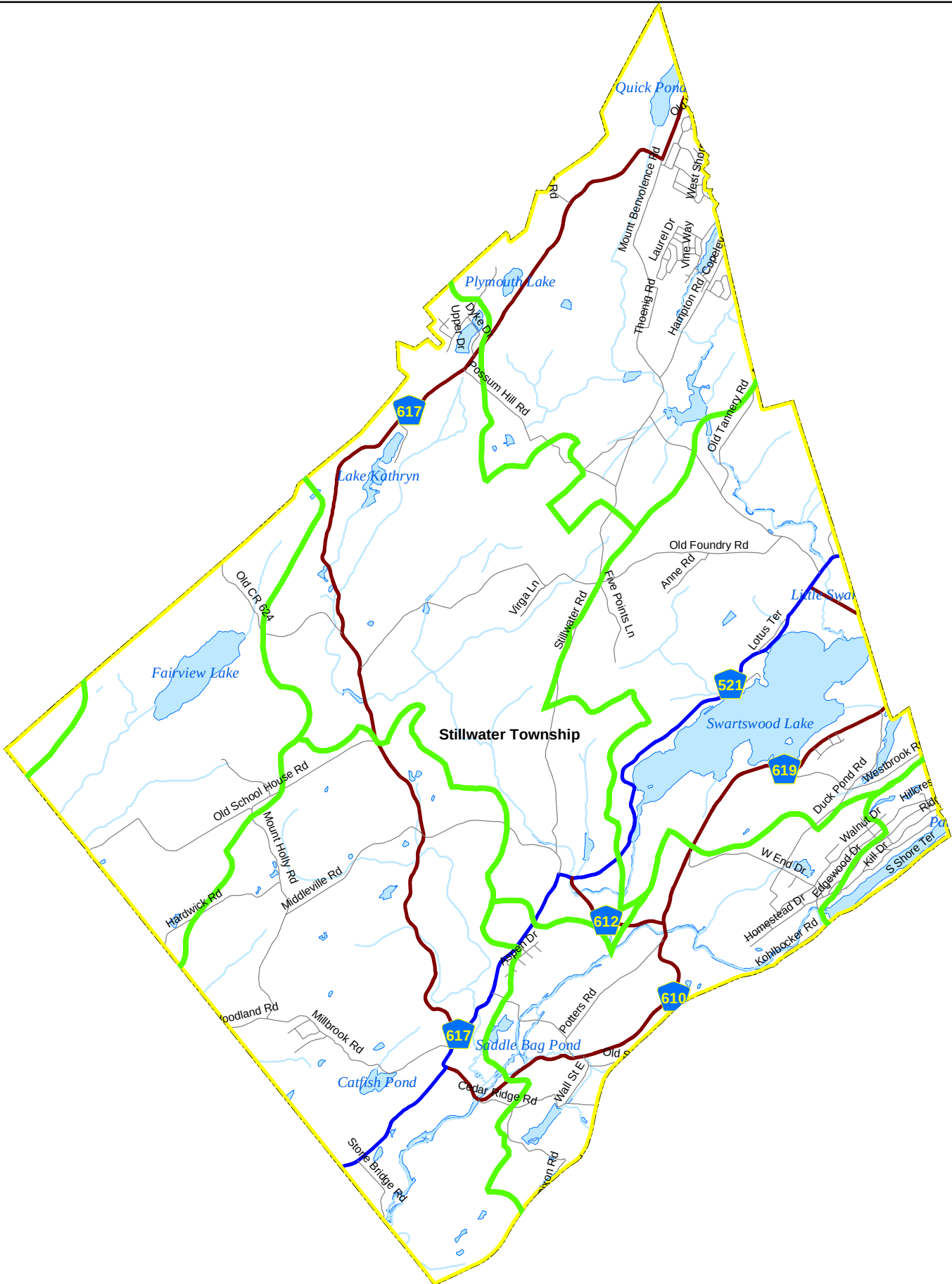
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Division of Engineering
Department of Engineering and Planning

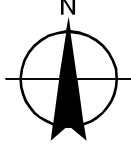
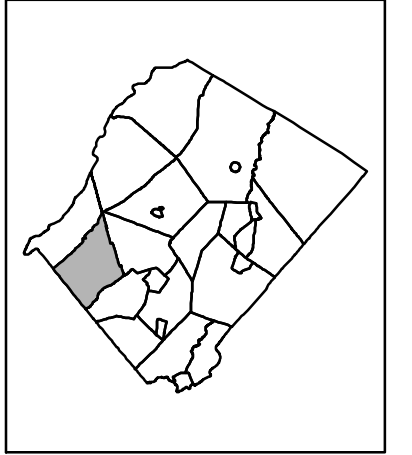


Data Sources:
Groundwater Recharge: NJDEP, 1997.

Figure 1 Upper Delaware Watershed





Legend

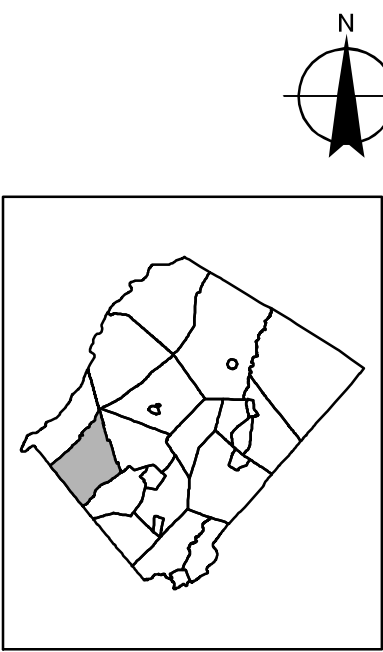
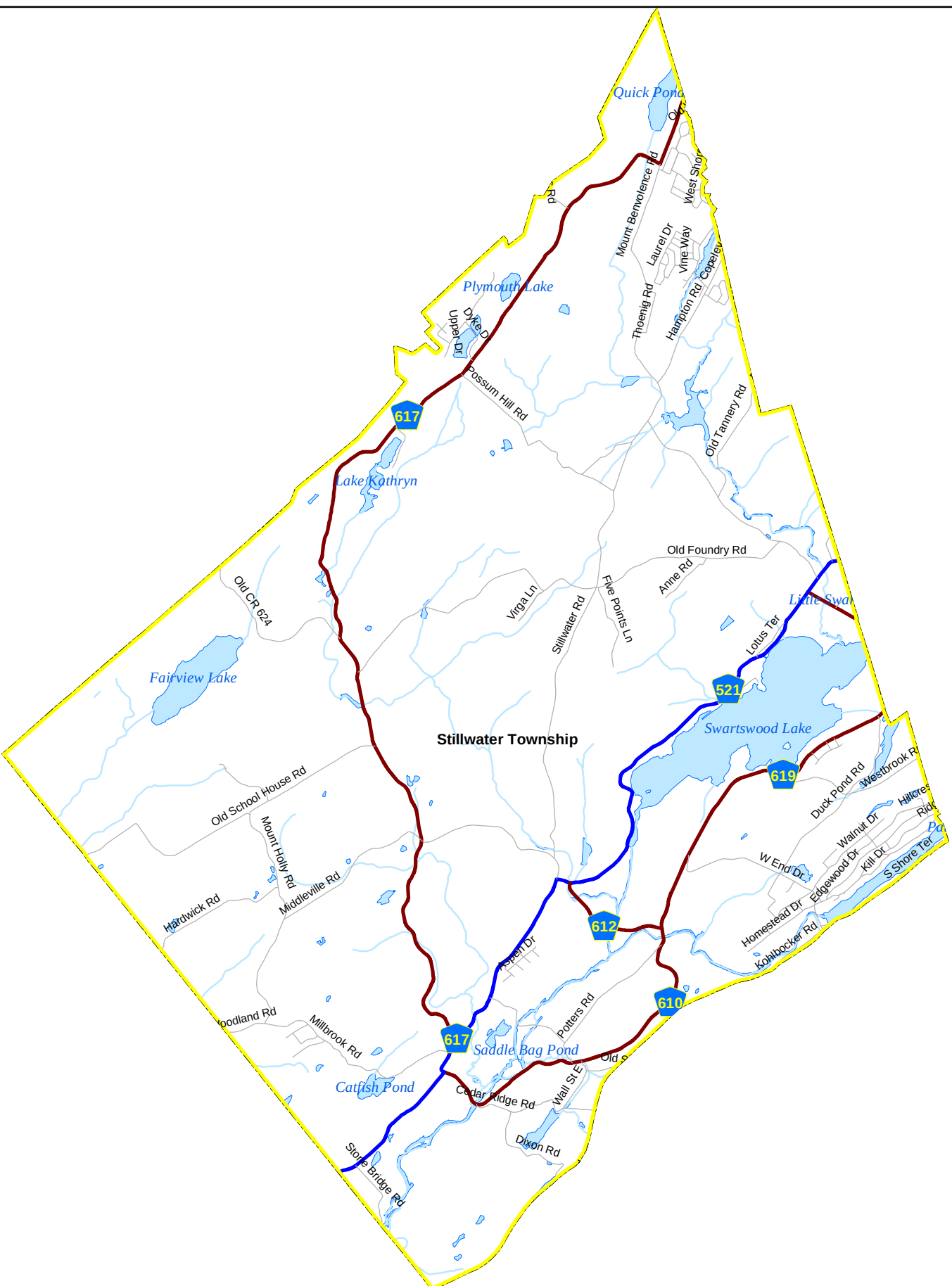
- Municipal Street
- County Route
- CR
- 500 Series
- 600 Series
- 700 Park Service
- State Route
- River/Stream
- Lakes
- Municipality
- HUC14 Watershed Area



Office of GIS Management
Division of Engineering
Department of Engineering and Planning



0 1,250 5,000 7,500 10,000
Feet

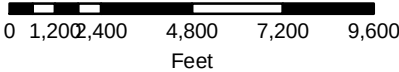


Legend

- Municipal Street
- County Route
- CR
 - 500 Series
 - 600 Series
 - 700 Park Service
 - State Route
- River/Stream
- Lakes
- Municipality



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Department of Engineering and Planning



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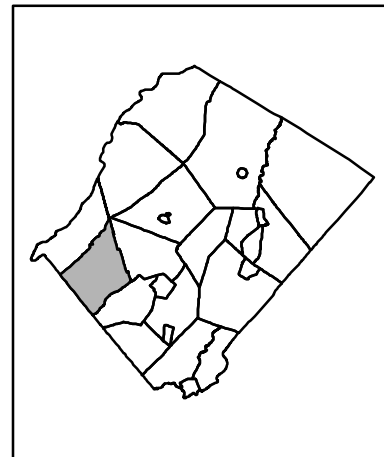
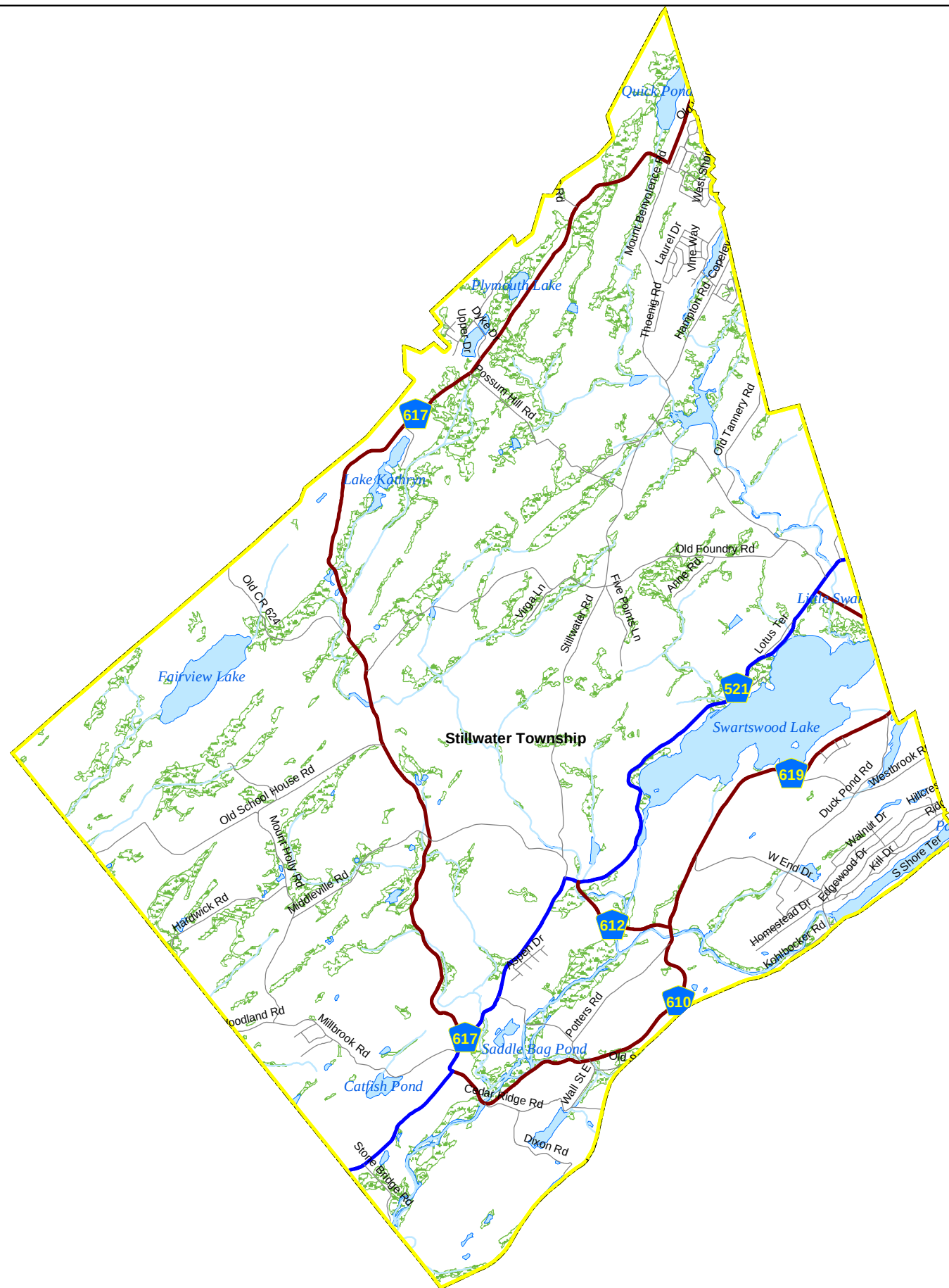
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Data Sources:
Lakes/Rivers/Streams: NJDEP, 1998.



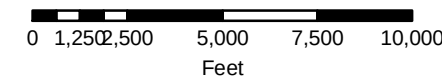
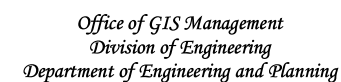
Stormwater Management Plan Wetland

Stillwater Township



Legend

- Municipal Street
County Route
CR
— 500 Series
— 600 Series
— 700 Park Service
— State Route
— River/Stream *Streams*
— Lakes
— Wetland
— Municipality

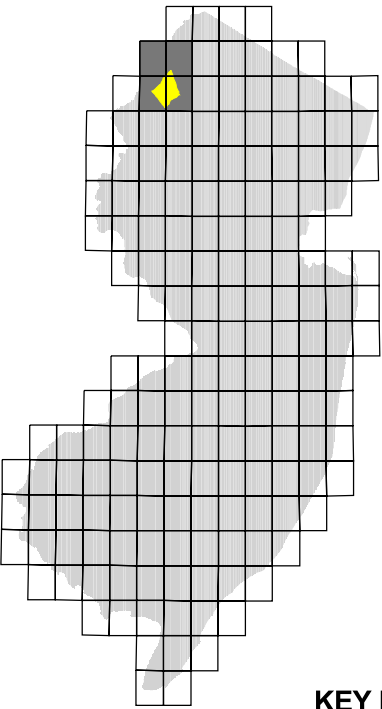
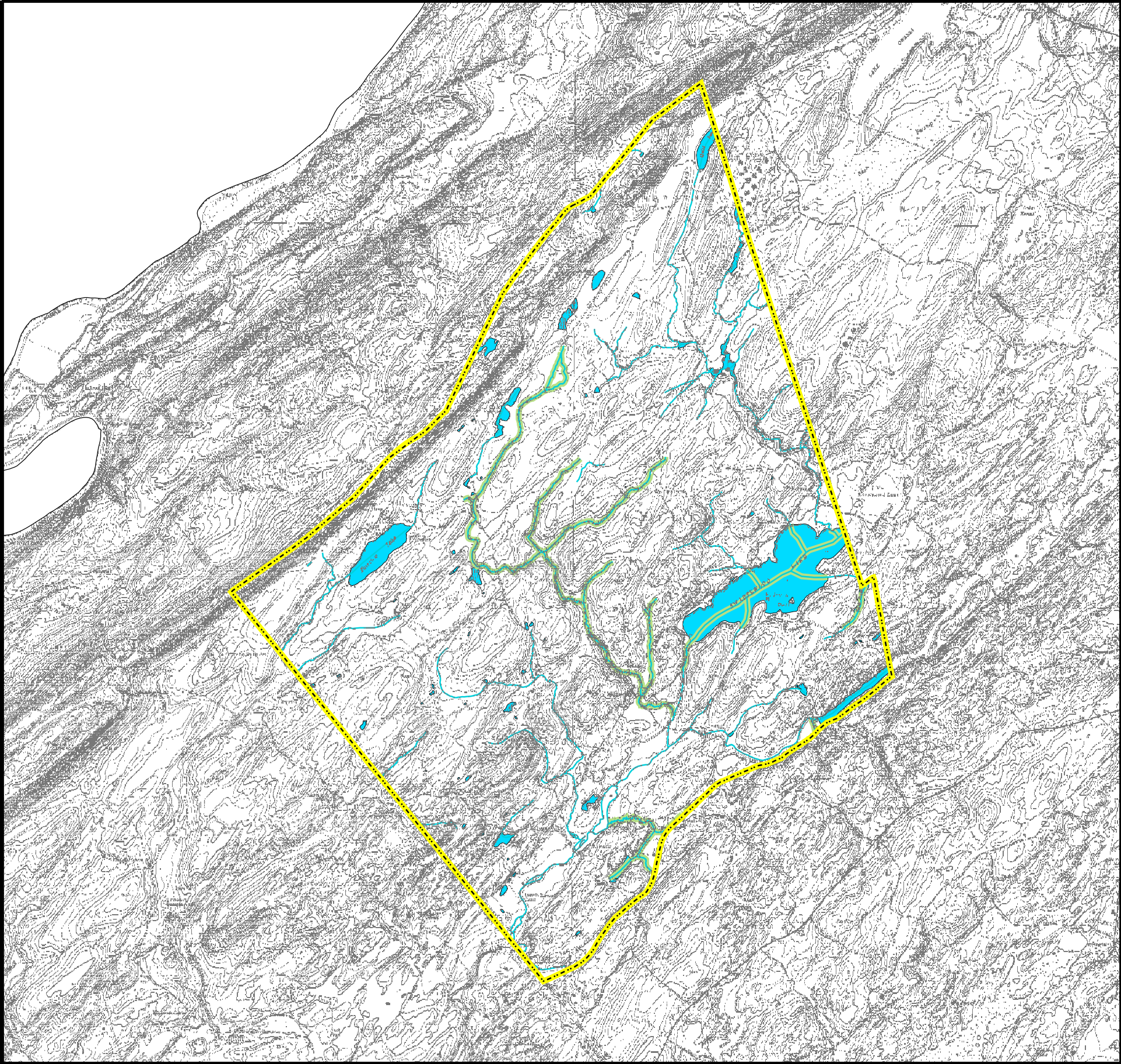


Data Sources:
Wetland: NJDEP, 1986.

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Information contained within this map has not been verified or authorized by any of the secondary parties.



KEY MAP



LEGEND

- Municipality
- New Jersey 7-1/2' Quadrangle Index
- Lake Maskenozha, Culvers Gap, Flatbrookville & Newton West Quadrangles
- Waterbody
- C1 Waterbody

NOTES

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REFERENCES

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2. QUADRANGLE INFORMATION: NEW JERSEY GEOLOGICAL SURVEY, DGS99-1 MONOCHROMATIC BIT-MAPPED TOPOGRAPHIC IMAGES OF NEW JERSEY, 1999.
3. SURFACE WATER QUALITY STANDARDS: NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, DIVISION OF LANDUSE MANAGEMENT, BUREAU OF FRESHWATER & BIOLOGICAL MONITORING, 2003.

GRAPHIC SCALE

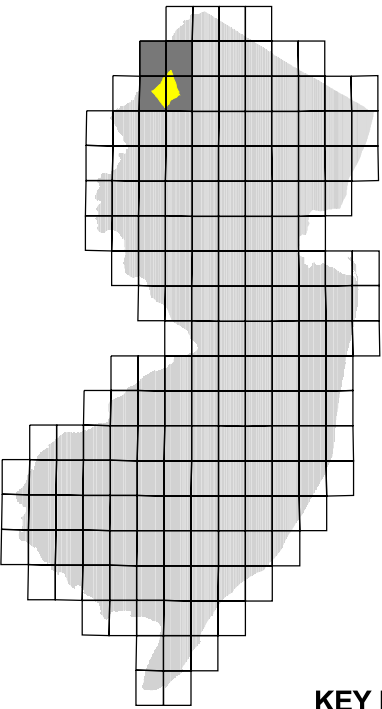
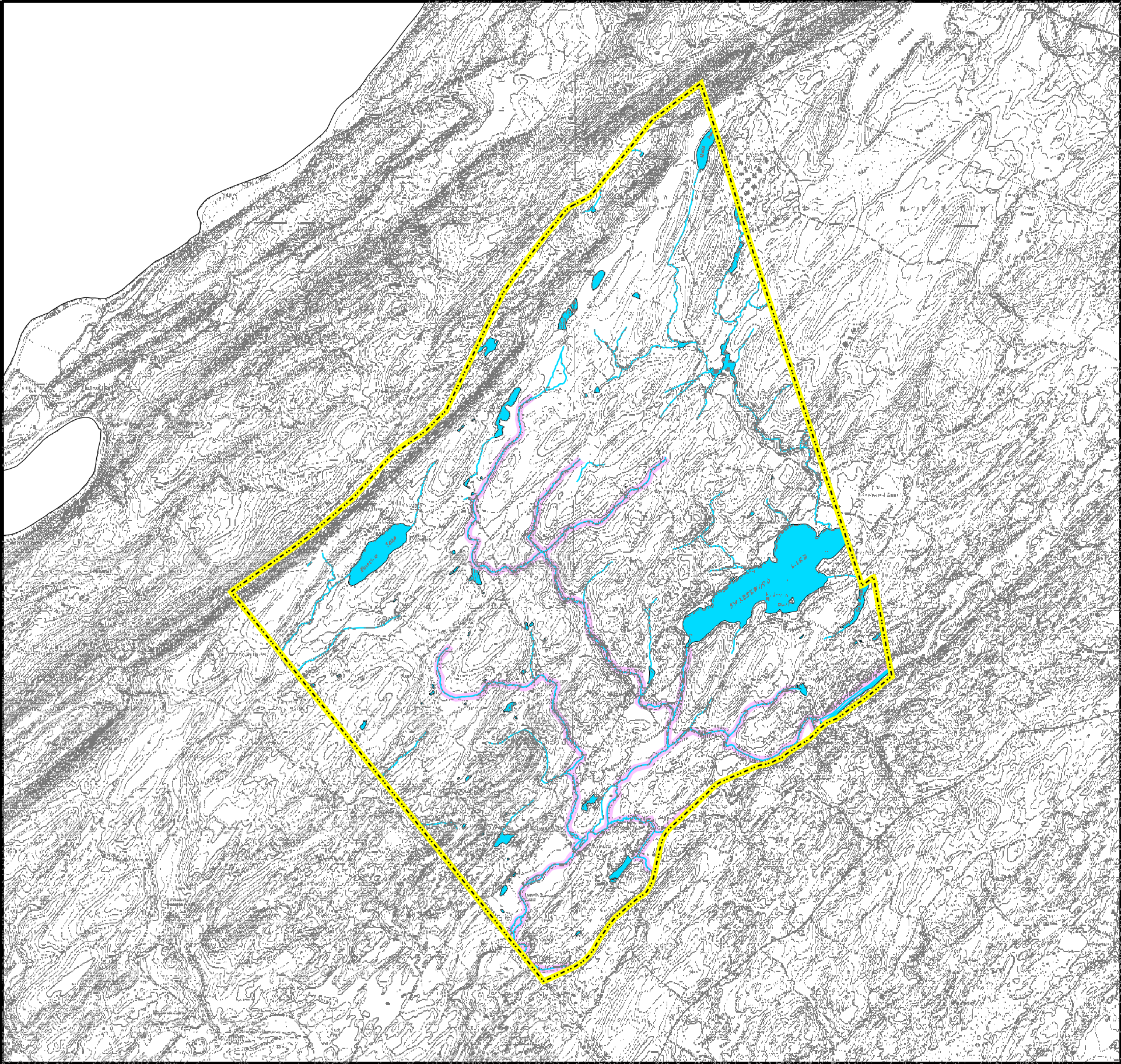


MUNICIPAL STORMWATER MANAGEMENT PLAN
CATEGORY ONE (C1) WATERBODIES
STILLWATER TOWNSHIP, SUSSEX COUNTY, NEW JERSEY

REVISIONS	
Date	Description

GUERIN & VREELAND ENGINEERING, INC.
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272 ROUTE 206
FLANDERS, NJ 07836
(973) 252-9340
FAX: (973) 252-3069
www.guerinvreeland.com
Cert. of Authorization 24GA28049400

SCALE: 1"= 6000'	DATE: MAR '05
DRAWN BY: MGV	CHECKED BY: RPG
FIGURE NO. 11	PROJECT NO.: 1107



KEY MAP



LEGEND

-  Municipality
-  Waterbody
-  New Jersey 7-1/2' Quadrangle Index
-  FECAL COLIFORM TMDL
-  Lake Maskenozha, Culvers Gap, Flatbrookville & Newton West Quadrangles

NOTES

1. THIS MAP WAS DEVELOPED USING DIGITAL DATA PRODUCED BY THE NJDEP, BUT THIS SECONDARY PRODUCT HAS NOT BEEN VERIFIED BY THE NJDEP AND IS NOT STATE-AUTHORIZED.
2. DIGITAL DATA FILES ARE PERIODICALLY UPDATED. FILES ARE DATED AND USERS ARE RESPONSIBLE FOR OBTAINING THE LATEST VERSION OF THE DATA.

REFERENCES

1. MUNICIPALITY BOUNDARY INFORMATION: NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION GIS RESOURCE DATA, SERIES I, VOLUME III, 1996.
2. QUADRANGLE INFORMATION: NEW JERSEY GEOLOGICAL SURVEY, DGS99-1 MONOCHROMATIC BIT-MAPPED TOPOGRAPHIC IMAGES OF NEW JERSEY, 1999.
3. TMDL INFORMATION: NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, BUREAU OF ENVIRONMENTAL ANALYSIS AND RESTORATION (BEAR), TOTAL MAXIMUM DAILY LOADS (TMDLs) FOR FECAL STREAMS, 2003.

GRAPHIC SCALE



MUNICIPAL STORMWATER MANAGEMENT PLAN
TOTAL MAXIMUM DAILY LOADS (TMDL)
STILLWATER TOWNSHIP, SUSSEX COUNTY, NEW JERSEY

REVISIONS	
Date	Description



GUERIN & VREELAND ENGINEERING, INC.
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Cert. of Authorization 24GA28049400

SCALE: 1"= 6000'	DATE: MAR '05
DRAWN BY: MGV	CHECKED BY: RPG
FIGURE NO. 12	PROJECT NO.: 1107

ATTACHMENT A
DRAFT STORMWATER ORDINANCE

Section 1: Scope and Purpose

A. Policy Statement

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

B. Purpose

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

C. Applicability

1. This ordinance shall be applicable to all site plans and subdivisions for the following major developments that require preliminary or final site plan or subdivision review:
 - a. Non-residential major developments; and
 - b. Aspects of residential major developments that are not pre-empted by the Residential Site Improvement Standards at N.J.A.C. 5:21.
2. This ordinance shall also be applicable to all major developments undertaken by Stillwater Township.

D. Compatibility with Other Permit and Ordinance Requirements

Development approvals issued for subdivisions and site plans pursuant to this ordinance are to be considered an integral part of development approvals under the subdivision and site plan review process and do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance. In their interpretation and application, the provisions of this ordinance shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare. This ordinance is not intended to interfere with, abrogate, or annul any other ordinances, rules or regulations, statutes, or other provision of law except that, where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.

Section 2: Definitions

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

D “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. 7:8E-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.

R “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.

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

A county planning agency; or

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

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

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

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

“Development” means the division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, by any person, for which permission is required under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq. In the case of development of agricultural lands, development means: any activity that requires a State permit; any activity reviewed by the County Agricultural Board (CAB) and the State Agricultural Development Committee (SADC), and municipal review of any activity not exempted by the Right to Farm Act, N.J.S.A 4:1C-1 et seq.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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Section 3: General Standards

A. Design and Performance Standards for Stormwater Management Measures

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

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Section 4: Stormwater Management Requirements for Major Development

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

4. *The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under D.3 above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of Sections 4.F and 4.G that were not achievable on-site.*

E. *Nonstructural Stormwater Management Strategies*

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

- i. *Provide other source controls to prevent or minimize the use or exposure of pollutants at the site, in order to prevent or minimize the release of those pollutants into stormwater runoff. Such source controls include, but are not limited to:*

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- (1) *Site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Section 4.E.3. below;*
 - (2) *Site design features that help to prevent discharge of trash and debris from drainage systems;*
 - (3) *Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and*
 - (4) *When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules.*

- A**
3. *Site design features identified under Section 4.E.2.i.(2) above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see Section 4.E.3.c below.*
- F**

- a. *Design engineers shall use either of the following grates whenever they use a grate in pavement or another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:*
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- (1) *The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or*
- (2) *A different grate, if each individual clear space in that grate has an area of no more than seven (7.0) square inches, or is no greater than 0.5 inches across the smallest dimension.*

Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of spacer bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater basin floors.

D Whenever design engineers use a curb-opening inlet, the clear space in that curb opening (or each individual clear space, if the curb opening has two or more clear spaces) shall have an area of no more than seven (7.0) square inches, or be no greater than two (2.0) inches across the smallest dimension.

R c. This standard does not apply:

(1) Where the review agency determines that this standard would cause inadequate hydraulic performance that could not practically be overcome by using additional or larger storm drain inlets that meet these standards;

(2) Where flows from the water quality design storm as specified in Section 4.G.1 are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:

a. A rectangular space four and five-eighths inches long and one and one-half inches wide (this option does not apply for outfall netting facilities); or

b. A bar screen having a bar spacing of 0.5 inches.

(3) Where flows are conveyed through a trash rack that has parallel bars with one-inch (1") spacing between the bars, to the elevation of the water quality design storm as specified in Section 4.G.1; or

(4) Where the New Jersey Department of Environmental Protection determines, pursuant to the New Jersey Register of Historic Places Rules at N.J.A.C. 7:4-7.2(c), that action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property.

4. Any land area used as a nonstructural stormwater management measure to meet the performance standards in Sections 4.F and 4.G shall be dedicated to a government agency, subjected to a conservation restriction filed with the appropriate County Clerk's office, or subject to an approved equivalent restriction that ensures that measure or an equivalent stormwater management measure approved by the reviewing agency is maintained in perpetuity.

5. Guidance for nonstructural stormwater management strategies is available in the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 7, or found on the Department's website at www.njstormwater.org.

F. Erosion Control, Groundwater Recharge and Runoff Quantity Standards

1. This subsection contains minimum design and performance standards to control erosion, encourage and control infiltration and groundwater recharge, and control stormwater runoff quantity impacts of major development.
 - a. The minimum design and performance standards for erosion control are those established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq. and implementing rules.
 - b. The minimum design and performance standards for groundwater recharge are as follows:
 - (1) The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at Section 5, either:
 - a. Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100 percent of the average annual pre-construction groundwater recharge volume for the site; or
 - b. Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the 2-year storm is infiltrated.

- (2) *This groundwater recharge requirement does not apply to projects within the “urban redevelopment area”, or to projects subject to (3) below.*
- (3) *The following types of stormwater shall not be recharged:*

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- (a) *Stormwater from areas of high pollutant loading. High pollutant loading areas are areas in industrial and commercial developments where solvents and/or petroleum products are loaded/unloaded, stored, or applied, areas where pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than “reportable quantities” as defined by the United States Environmental Protection Agency (EPA) at 40. CFR 302.4; areas where recharge would be inconsistent with Department approved remedial action work plan or landfill closure plan and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities, and*

- (b) *Industrial stormwater exposed to “source material.” “Source material” means any material(s) or machinery, located at an industrial facility, 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 material; intermediate products; final products; waste materials; by-products; industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.*

- (4) *The design engineer shall assess the hydraulic impact on the groundwater table and design the site so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonally high water table so as to cause surficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems and other subsurface structures in the vicinity or downgradient of the groundwater recharge area.*

c. *In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at Section 5, complete one of the following:*

D (1) *Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the two, 10, and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;*

R (2) *Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the two, 10, and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area;*

A (3) *Design stormwater management measures so that the post-construction peak runoff rates for the 2, 10 and 100 year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed. The percentages shall not be applied to post-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*

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

2. Any application for a new agricultural development that meets the definition of major development at Section 2 shall be submitted to the appropriate 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 the 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 manufacturing of agriculturally related products.

G. Stormwater Runoff Quality Standards

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

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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		

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

3. *If more than one BMP in series is necessary to achieve the required 80 percent TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:*

$$R = A + B - (A \times B) / 100$$

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 BMP	
Best Management Practice	TSS Percent Removal Rate
Bioretention Systems	90
Constructed Stormwater Wetland	90
Extended Detention basin	40 - 60
Infiltration Structure	80
Manufactured Treatment Device	See Section 6.C
Sand Filter	80
Vegetative Filter Strip	60 - 80
Wetpond	50 - 90

4. *If there is more than one onsite drainage area, the 80 percent TSS removal rate shall apply to each drainage area, unless the runoff from the subareas converge on site in which case the removal rate can be demonstrated through a calculation using a weighted average.*
5. *Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include nonstructural strategies and structural measures that optimize nutrient removal while still achieving the performance standards in Sections 4.F and 4.G.*
6. *Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Section 7.*

7. *In accordance with the definition of FW1 at N.J.A.C. 7:9B-1.4, stormwater management measures shall be designed to prevent any increase in stormwater runoff to waters classified as FW1.*
8. *Special water resource protection areas shall be established along all waters designated Category One at N.J.A.C. 7:9B, and perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the USGS Quadrangle Maps or in the County Soil Surveys, within the associated HUC14 drainage area. These areas shall be established for the protection of water quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:*
 - a. *The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:*
 - (1) *A 300-foot special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the waterway from the top of the bank outwards or from the centerline of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession is provided.*
 - (2) *Encroachment within the designated special water resource protection area under Subsection (1) above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or maintained lawn area). The encroachment shall only be allowed where applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable. In no case shall the remaining special water resource protection area be reduced to less than 150 feet as measured perpendicular to the top of bank of the waterway or centerline of the waterway where the bank is undefined. All encroachments proposed under this subparagraph shall be subject to review and approval by the Department.*
 - b. *All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the Standard for Off-Site Stability in the "Standards For Soil Erosion and Sediment Control in New Jersey", established under the Soil Erosion and Sediment Control Act N.J.S.A. 4:24-39 et seq.*

- c. *If stormwater discharged outside of and flowing through the special water resource protection area cannot comply with the Standard For Off-Site Stability in the "Standards for Soil Erosion and Sediment Control in New Jersey", established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., then the stabilization measures in accordance with the requirements of the above standards may be placed within the special water resource protection area, provided that:*

(1) *Stabilization measures shall not be placed within 150 feet of the Category One waterway;*

(2) *Stormwater associated with discharges allowed by this section shall achieve a 95 percent TSS post-construction removal rate;*

(3) *Temperature shall be addressed to ensure no impact on the receiving waterway;*

(4) *The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable;*

(5) *A conceptual project design meeting shall be held with the appropriate Department staff and Soil Conservation District staff to identify necessary stabilization measures; and*

(6) *All encroachments proposed under this section shall be subject to review and approval by the Department.*

- d. *A stream corridor protection plan may be developed by a regional stormwater management planning committee as an element of a regional stormwater management plan, or by a municipality through an adopted municipal stormwater management plan. If a stream corridor protection plan for a waterway subject to Section 4.G(8) has been approved by the Department of Environmental Protection, then the provisions of the plan shall be the applicable special water resource protection area requirements for that waterway. A stream corridor protection plan for a waterway subject to 4.G.8 shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in 4.G.8.a.(1) above. In no case shall a stream corridor protection plan allow the reduction of the Special Water Resource Protection Area to less than 150 feet as measured perpendicular to the waterway subject to this subsection.*

- e. *Paragraph G.8 does not apply to the construction of one individual single family dwelling that is not part of a larger development on a lot receiving preliminary or final subdivision approval on or before February 2, 2004 , provided that the construction begins on or before February 2, 2009.*

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Section 5: Calculation of Stormwater Runoff and Groundwater Recharge

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

1. The design engineer shall calculate runoff using one of the following methods:

a. The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook Section 4 – Hydrology and Technical Release 55 – Urban Hydrology for Small Watersheds; or

b. The Rational Method for peak flow and the Modified Rational Method for hydrograph computations.

2. For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the pre-construction condition of a site or portion thereof is a wooded land use with good hydrologic condition. The term “runoff coefficient” applies to both the NRCS methodology at Section 5.A.1.a and the Rational and Modified Rational Methods at Section 5.A.1.b. A runoff coefficient or a groundwater recharge land cover for an existing condition may be used on all or a portion of the site if the design engineer verifies that the hydrologic condition has existed on the site or portion of the site for at least five years without interruption prior to the time of application. If more than one land cover have existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations. In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is pasture, lawn, or park), with good cover (if the land use type is woods), or with good hydrologic condition and conservation treatment (if the land use type is cultivation).

3. In computing pre-construction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts, that may reduce pre-construction stormwater runoff rates and volumes.

4. *In computing stormwater runoff from all design storms, the design engineer shall consider the relative stormwater runoff rates and/or volumes of pervious and impervious surfaces separately to accurately compute the rates and volume of stormwater runoff from the site. To calculate runoff from unconnected impervious cover, urban impervious area modifications as described in the NRCS Technical Release 55 – Urban Hydrology for Small Watersheds and other methods may be employed.*

5. *If the invert of the outlet structure of a stormwater management measure is below the flood hazard design flood elevation as defined at N.J.A.C. 7:13, the design engineer shall take into account the effects of tailwater in the design of structural stormwater management measures.*

B. *Groundwater recharge may be calculated in accordance with the following:*

1. *The New Jersey Geological Survey Report GSR-32 A Method for Evaluating Ground-Water Recharge Areas in New Jersey, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual; at <http://www.state.nj.us/dep/njgs/>; or at New Jersey Geological Survey, 29 Arctic Parkway, P.O. Box 427 Trenton, New Jersey 08625-0427; (609) 984-6587.*

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Section 6: 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 (1") spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than one-third (1/3) the width of the diameter of the orifice or one-third (1/3) the width of the weir, with a minimum spacing between bars of one-inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of Section 8.D.
 3. Structural stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement.
 4. At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half inches in diameter.
 5. Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Section 8.
- B. Stormwater management measure guidelines are available in the New Jersey Stormwater Best Management Practices Manual. Other stormwater management measures may be utilized provided the design engineer demonstrates that the proposed measure and its design will accomplish the required water quantity, groundwater recharge and water quality design and performance standards established by Section 4 of this ordinance.
- C. Manufactured treatment devices may be used to meet the requirements of Section 4 of this ordinance, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.

Section 7: Sources for Technical Guidance

- A. *Technical guidance for stormwater management measures can be found in the documents listed at 1 and 2 below, which are available from Maps and Publications, New Jersey Department of Environmental Protection, 428 East State Street, P.O. Box 420, Trenton, New Jersey, 08625; telephone (609) 777-1038.*
1. *Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended. Information is provided on stormwater management measures such as: bioretention systems, constructed stormwater wetlands, dry wells, extended detention basins, infiltration structures, manufactured treatment devices, pervious paving, sand filters, vegetative filter strips, and wet ponds.*
 2. *The New Jersey Department of Environmental Protection Stormwater Management Facilities Maintenance Manual, as amended.*
- B. *Additional technical guidance for stormwater management measures can be obtained from the following:*
1. *The "Standards for Soil Erosion and Sediment Control in New Jersey" promulgated by the State Soil Conservation Committee and incorporated into N.J.A.C. 2:90. Copies of these standards may be obtained by contacting the State Soil Conservation Committee or any of the Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey 08625; (609) 292-5540;*
 2. *The Rutgers Cooperative Extension Service, 732-932-9306;*
 3. *The Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey, 08625, (609) 292-5540.*

Section 8: Safety Standards for Stormwater Management Basins

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

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

1. *A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures. Trash racks shall be installed at the intake to the outlet from the stormwater management basin to ensure proper functioning of the basin outlets in accordance with the following:*

a. *The trash rack shall have parallel bars, with no greater than six inch spacing between the bars.*

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

c. *The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack.*

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

2. *An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:*

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

b. *The overflow grate spacing shall be no less than two inches across the smallest dimension.*

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

3. *For purposes of this paragraph, escape provisions means the permanent installation of ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management basins. Stormwater management basins shall include escape provisions as follows:*

a. *If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Section 8.C a freestanding outlet structure may be exempted from this requirement.*

b. *Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half feet. Such safety ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall be located approximately two and one-half feet below the permanent water surface, and the second step shall be located one to one and one-half feet above the permanent water surface. See Section 8.D for an illustration of safety ledges in a stormwater management basin.*

c. *In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than 3 horizontal to 1 vertical.*

C. *Variance or Exemption from Safety Standards*

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

Section 9: Requirements for a Site Development Stormwater Plan

A. Submission of Site Development Stormwater Plan

1. Whenever an applicant seeks municipal approval of a development subject to this ordinance, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan at Section 9.C below as part of the submission of the applicant's application for subdivision or site plan approval.
2. The applicant shall demonstrate that the project meets the standards set forth in this ordinance.
3. The applicant shall submit 16 copies of the materials listed in the checklist for site development stormwater plans in accordance with Section 9.C of this ordinance.

B. Site Development Stormwater Plan Approval

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

C. Checklist Requirements

The following information shall be required:

1. Topographic Base Map

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

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

3. *Project Description and Site Plan(s)*

A map (or maps) at the scale of the topographical base map indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural facilities for stormwater management and sediment control, and other permanent structures. The map(s) shall also clearly show areas where alterations occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high ground water elevations. A written description of the site plan and justification of proposed changes in natural conditions may also be provided.

4. *Land Use Planning and Source Control Plan*

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

5. *Stormwater Management Facilities Map*

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

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

6. *Calculations*

- a. Comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in Section 4 of this ordinance.

- b. *When the proposed stormwater management control measures (e.g., infiltration basins) depends on the hydrologic properties of soils, then a soils report shall be submitted. The soils report shall be based on onsite boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soils present at the location of the control measure.*

7. *Maintenance and Repair Plan*

The design and planning of the stormwater management facility shall meet the maintenance requirements of Section 10.

8. *Waiver from Submission Requirements*

The municipal official or board reviewing an application under this ordinance may, in consultation with the municipal engineer, waive submission of any of the requirements in Sections 9.C.1 through 9.C.6 of this ordinance when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

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Section 10: Maintenance and Repair

A. Applicability

1. *Projects subject to review as in Section 1.C of this ordinance shall comply with the requirements of Sections 10.B and 10.C.*

B. General Maintenance

1. *The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.*
2. *The maintenance plan shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual. If the maintenance plan identifies a person other than the developer (for example a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's agreement to assume this responsibility, or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.*
3. *Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.*
4. *If the person responsible for maintenance identified under Section 10.B.2 above is not a public agency, the maintenance plan and any future revisions based on Section 10.B.7 below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.*
5. *Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of non-vegetated linings.*

6. *The person responsible for maintenance identified under Section 10.B.2 above shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.*
 7. *The person responsible for maintenance identified under Section 10.B.2 above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.*
 8. *The person responsible for maintenance identified under Section 10.B.2 above shall retain and make available, upon request by any public entity with administrative, health, environmental, or safety authority over the site, the maintenance plan and the documentation required by Sections 10.B.6 and 10.B.7 above.*
 9. *The requirements of Sections 10.B.3 and 10.B.4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.*
 10. *In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have fourteen (14) days to effect maintenance and repair of the facility in a manner that is approved by the municipal engineer or his designee. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the municipality or County may immediately proceed to do so and shall bill the cost thereof to the responsible person.*
- C. *Nothing in this section shall preclude the municipality in which the major development is located from requiring the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53.*

Section 11: Penalties

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

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Section 12: Effective Date

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

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Section 13: Severability

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

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