

# Township of Vernon, Sussex County **STORMWATER MANAGEMENT PLAN**

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**March 2023**



**J Caldwell  
& Associates, LLC**  
Community Planning Consultants

**STORMWATER MANAGEMENT PLAN**  
Vernon Township



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This Plan was funded by a grant from the New Jersey Highlands Council.

Cover Photo: Artistic Rendering of Highlands Lakes, Vernon NJ

*The original of this report was signed and sealed pursuant to N.J.A.C. Section 13:41-1.3.b:*

A handwritten signature in black ink, appearing to read 'Jessica Caldwell', is written over a horizontal line.

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# STORMWATER MANAGEMENT PLAN

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### Introduction

As a result of the U.S. Environmental Protection Agency's "Phase II" rules published in December 1999, the New Jersey Department of Environmental Protection has developed a Municipal Stormwater Regulation Program, N.J.A.C. 7:14A-25, aimed at addressing the problem of pollutants entering our waters from storm drainage systems owned and operated by local government agencies. These systems, also called "municipal separate storm sewer systems, or MS4s for short, are currently conduits for pollutants and sediments to enter into existing water systems. According to federal and state studies, it is now believed that up to 60% of our existing water pollution problems are attributable to stormwater/nonpoint pollution. The fundamental principal of this program is that by regulating the condition of stormwater entering into the MS4, also called nonpoint discharges, the stormwater exiting the MS4 pipe network, also called point discharges, into the impaired waterways can be a way of improving the quality of said waterways. Through public education programs that explain the problems associated with garbage disposal, lawn fertilizing, and pet waste control as they relate to non-point discharges to the diligence of the municipality in its review, approval, and implementation of new development and re-development projects, the Municipal Stormwater Regulation Program, over time, will have a positive effect on the quality of existing water systems.

The first step initiated by the Municipal Stormwater Regulation Program is to develop and institute a Municipal Stormwater Management Plan (MSWMP). This MSWMP is an instructional document intended to provide guidance for Vernon Township ("the Municipality") in the many facets of the regulation plan as how to address stormwater-related impacts to existing waterways, as required by the Municipal Stormwater Regulations. This plan contains all of the required elements described in N.J.A.C. 7:8 Stormwater Management Rules including how to address groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major developments. These projects are defined as those new projects or redevelopment projects that disturb one or more acres of land or those projects that increase the impervious site coverage by 0.25 acres. This plan describes standards to be initiated that are intended to minimize the adverse impact of stormwater run-off on water quality and water quantity, and the loss of groundwater recharge that provides base flow in receiving water bodies. This plan also describes long-term operation and maintenance measures for both existing and future stormwater facilities. The final component of the plan is a mitigation strategy for when variances or exemptions of the design and performance standards are sought when the required standard procedures cannot be met. As part of the mitigation section of the stormwater management plan, specific stormwater management measures are identified to lessen the impact of existing development. These mitigation measures suggest reducing impervious area in previously developed lots to reduce the impact of stormwater runoff within various watersheds in the Township. It is anticipated that this mitigation procedure will be a dynamic process requiring timely re-evaluation to ensure that the needs of the municipality are met by an applicant requesting such waivers.

Through the passage of New Jersey Highlands Water Protection and Planning Act in 2004, the New Jersey Highlands Water Protection and Planning Council (the Highlands Council) was created and charged with developing the Highlands Regional Master Plan (RMP). Adopted in 2008, the RMP serves as a guiding document for the long-term protection and restoration of the



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region's critical resources. Stormwater Management Plans are required by the New Jersey Department of Environmental Protection (NJDEP) (N.J.A.C. 7:14A-25). As part of the conformance to the Highlands Regional Master Plan, the Highlands Council has required each of the municipalities within the region to update their Stormwater Mitigation Plans which are then included within the municipal Stormwater Management Plans.

According to the NJDEP definition, stormwater is water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, is captured by separate storm sewers or other sewage or drainage facilities, or conveyed by snow removal equipment. In natural landscapes such as forests, the soil absorbs much of the stormwater, and plants help hold stormwater close to where it falls. In developed environments, unmanaged stormwater can travel quickly, creating potential flooding and water pollution. Stormwater also serves as an important water resource as demands for clean water exceed availability.

### Goals

As outlined in the New Jersey Stormwater Management Rules at N.J.A.C. 7:8-2.2, there are nine overarching goals of stormwater management planning:

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

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To achieve these goals, this plan outlines specific stormwater design and performance standards for new and redevelopment areas. Additionally, the plan proposes several best management practices to provide a more sustainable solution to stormwater management practices. Preventive and corrective maintenance strategies are included in the plan to ensure long term effectiveness of stormwater management facilities. The plan also outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

### Purpose

The specific purpose of this Municipal Stormwater Management Plan (MSWMP) is to provide a guidance document for the implementation of the N.J.D.E.P. Municipal Stormwater Regulation Program in order to protect our waterways from pollution related to point discharges as well as non-point discharges. Through the implementation of the aforementioned plan goals, it is believed that the quality of our existing waterways will be substantially improved.

### Background

The Township of Vernon is 70 square miles in area and located in the northeast corner of Sussex County. Vernon Township is surrounded by four different municipalities including: Wantage Township and Hardyston Township in Sussex County, West Milford Township in Passaic County, and the Town of Warwick in Orange County, New York. The population of Vernon has increased from 21,211 in 1990 to 23,943 in 2010 followed by a slight reduction in 2020 to 22,358. These population increases have resulted in the new development and subsequent changes in the landscape have the potential increase stormwater runoff volumes and pollutant loads to the waterways in and around the Township.

The landscape is generally made up of undeveloped forested lands, steep hills, and environmentally sensitive lands with small neighborhoods containing mostly single-family homes situated through the Township. Several lakes are surrounded by residential developments as well.

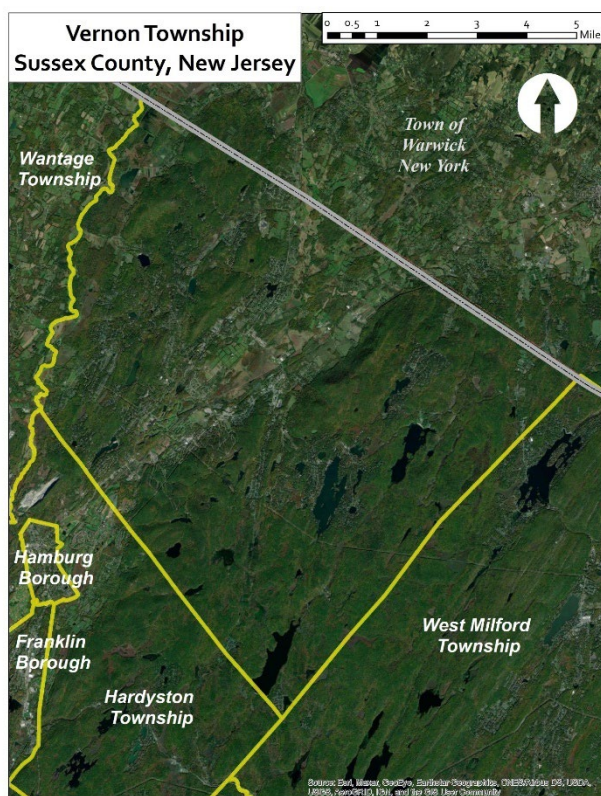


Figure 1: Vernon Township and Surrounding Municipalities

The Township is also home to multiple resort areas which are related to the mountains, specifically the Mountain Creek Resort, located along State Route 94, and the rest of the commercial and retail activity is located in an emerging Town Center in an area surrounding the

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intersection of State Route 94, Church Street and Main Street. As of 2020, the land uses in Vernon could be classified as follows: approximately 40 percent of land (17,546 Acres) consisted of publically-owned and conserved land; 21 percent (9,131 Acres) consisted of vacant land; 14.6 percent consisted of residential development (6,318 Acres); 6.81 percent (2,976 Acres) consisted of non-residential development; and 12.33 percent (5,385 Acres) is farm assessed property. Overall, just over 16 percent of the Township is developed, with the remaining 84 percent either forested, wetlands/water or agricultural land.

According to the Vernon Township Master Plan, the current planning goals for the development of the Township include the desire to achieve a balance between continued development and the preservation of the extensive natural resources of the community and direct the majority of future growth in the Township to the Vernon Center, Redevelopment Areas, and appropriate existing resort areas of the Township.

The Center-based approach to development encourages a mix of uses including residential, commercial, retail and industrial development in a walkable community. Vernon's Town Center was first approved by the State Planning Commission on July 16, 2003 and was reapproved through Plan Endorsement in July 7, 2021.

Vernon is the largest municipality in Sussex County by both land area and population. Despite its size and population, its designation as part of the Highlands Region limits the potential for development in the Preservation Area. Approximately 66 percent of the Township is located in the Highlands Preservation Area, where new development is limited to one acre per 88 acres of forested land or 25 acres of cleared land. Existing development remains permitted under existing zoning and can expand up to 125 percent of its existing footprint. The remaining approximately 34 percent of the municipality has less stringent restrictions on development. This area, designated as the Planning Area, may develop under current ordinances of the municipality, however environmental constraints and limited availability of public utilities continues to restrict overall development.

New development on public sewer and water outside of existing sewer service areas is highly unlikely given environmental constraints. Most future development in the Township is expected to be within the Town Center and existing or slightly expanded sewer service areas, low density development on septic systems, redevelopment of existing sites with limited expansion and single-family development allowed as an exception on pre-existing undeveloped lots.

The Township's economic development policies focus on agricultural, outdoor and ecological based tourism industries. The Mountain Creek ski resort caters to downhill skiers, snow boarders and tubing. The National Winter Activity Center (formerly Hidden Valley Ski Resort) offers ski lessons, racing and cross-country skiing for youth membership organizations. Vernon has a portion of the Appalachian Trail which includes two iconic sections of the trail including the Boardwalk, Stairway to Heaven and the Pinwheel Vista. The Township is also home to several lakes including Lake Waywayanda, Highlands Lakes, Vernon Valley Lake, Barry Lakes, Pleasant Valley Lake, Lake Pochung, Lake Panorama, Glenwood Lake, Lake Conway, Lake Walkkill, Lake Wanda, Scenic Lakes, Cliffwood Lake and Canistear Reservoir. The Township is also home to Waywayanda State Park and the Walkkill Wildlife Refuge.

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There Are Five (5) major waterways located within Vernon Township. These are the Walkkill River (classified as a FW2-Non-Trout C1 Waterway), Livingston Ponds Brook (classified as a FW2-Trout Producing C1 Waterway), the Pacack Brook (classified as a FW2-Non-Trout C1 Waterway), The Sawmill Pond Brook (classified as a FW2-Non-Trout C1 Waterway), and the Spring Brook (classified as a FW2-Trout Producing C1 Waterway). There are Thirty Two (32) major water bodies located within Vernon Township. These are Barry Lakes (Not Listed), Canistear Reservoir (Not Listed), Cliffwood Lake (Not Listed), Drew Lakes (Not Listed), East Highland Lake (Not Listed), Glenwood Lake (Not Listed), Great Gorge Lake (Not Listed), Hidden Valley Lake (Not Listed), Highland Lake (Not Listed), Kohout Lake (Not Listed), Lake Conway (Not Listed), Lake Lookout (Not Listed), Lake Wanda (Not Listed), Lake Wildwood (classified as a FW2-Non-Trout Producing C1 Waterway), Laurel Pond (Not Listed), Livingston Ponds (Not Listed), Louemma Lake (Not Listed), Marshal Pond (Not Listed), Mud Pond (classified as a FW2-Non Trout Producing C1 Waterway), Panorama Lake (Not Listed), Parker Lake (classified as a FW2-Non Trout Producing C1 Waterway), Pleasant Valley Lake (Not Listed), Scenice Lake (Not Listed), Sleep Valley (Not Listed), Upper East Highland Lake (Not Listed), Vernon Valley Lake (Not Listed), Walkkill Lake (Not Listed), Wawayanda Lake (classified as a FW2-Non Trout Producing C1 Waterway), and White Swan Lake (Not Listed). The listed designations associated with the aforementioned waterways and waterbodies are as published in the N.J.D.E.P. Surface Water Quality Standards N.J.A.C. 7:9B.

Almost all of the waterways and water bodies located in the Township are present within the Walkkill Watershed Management Area (WMA#2) and are associated with both the Pochuck Creek Watershed and Walkkill River Watershed. Association with the Pompton, Pequannock, Wanaque & Ramapo Watershed Management Area (WMA#3), and the Pequannock River Watershed also occurs. All of the waterways and water bodies classified as Category 1 Waters (C1), as well any tributary thereto, as indicated on the U.S.G.S. mapping or Soil Conservation District Mapping, would be subject to a Special Resource Protection Area (SRPA). This SRPA, measured 300' outwards from the banks associated with said waters, is meant to protect near stream vegetation that buffers pollutants from entering into waterways as well as environmentally sensitive areas associated with stream corridors.

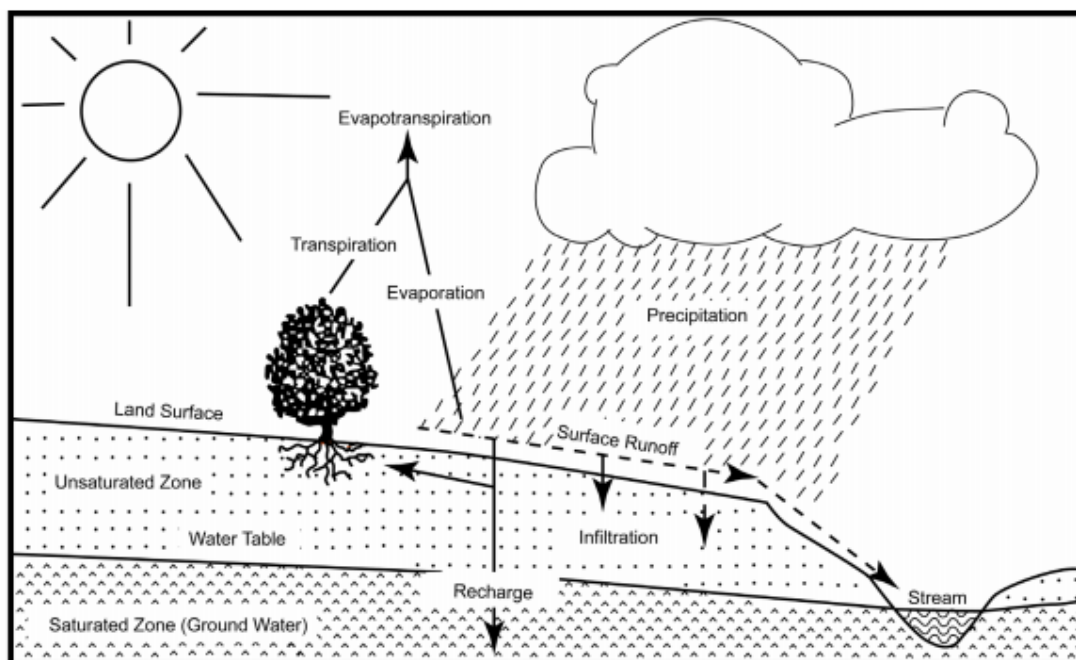
It is evident from the Non-Trout and Trout Maintenance classification assigned to most of the aforementioned waterways and waterbodies, with the exception of the Livingston Ponds Brook and Spring Brook, that said waters can be reasonably assumed to be impaired from an ecological and biological standpoint. This impairment is further acknowledged by the placement of major segment of the the Black Creek, Waywanda Creek and Pochuck Creek, on a list of impaired waters due to elevated pathogens..



### Stormwater Discussion

Land development can dramatically alter the hydrologic cycle of a site and, ultimately, an entire watershed (see Figure 1 on page 5). 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, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport, or travel time, quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new, and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious surfaces can also decrease opportunities for infiltration which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

Figure 2. Groundwater Recharge in the Hydrologic Cycle



Source: New Jersey Geological Survey Report GSR-32.

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

Land development can also cause increased pollutant loading in stormwater runoff which can adversely affect water quality and stream biota in more subtle ways. For example, stormwater falling on impervious surfaces, or stored in detention or retention basins, can become heated and raise the temperature of the downstream waterway, adversely affecting cold water fish species, like trout. 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.

### Stormwater Locations and Conditions Assessment

To ensure a comprehensive and coordinated approach to stormwater management throughout the Highlands Region, the Highlands Council requires municipalities to conduct an assessment of existing stormwater structure locations. This process is being completed in conjunction with the development of this plan.

### Water Quality

In the State of New Jersey, the Bureau of Environmental Analysis, Restoration and Standards (BEARS) is responsible for conducting and coordinating water quality assessments for all waters of State of New Jersey including data collected by non-departmental entities (example regional and local governmental agencies and volunteer monitoring organizations), and determining the causes and sources of water quality impairment.

BEARS is also responsible for determining the pollutant reductions needed for restoration of water quality, through the development and implementation of Total Maximum Daily Loads (TMDLs) or watershed restoration plans. “Water Quality Impairment” means that waters do not fully support the designated uses established for those waters by the New Jersey Surface Water Quality Standards at N.J.A.C. 7:9B.

Designated uses include Aquatic Life (general), Aquatic Life (trout), Primary Contact Recreation, Secondary Contact Recreation, Drinking Water Supply, Agricultural Water Supply, Industrial Water Supply, Shellfish Harvest, and Fish Consumption. The Integrated List lists the attainment of HUC14s of designated uses based on six categories as follows:

Sublist 1: The designated use is assessed and attained, AND all other designated uses in the assessment unit are assessed and attained. (Note: The fish consumption use is not used for this determination based on USEPA guidance).

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Sublist 2: The designated use is assessed and attained, BUT one or more designated uses in the assessment unit are not attained and/or are insufficient information to make a determination.

Sublist 3: Insufficient or no data are available to determine if the designated use is attained.

Sublist 4: The designated use is not attained or is threatened; however, development of a TMDL is not required for one of the following reasons:

- a. A TMDL has been completed for the pollutant causing non-attainment.
- b. Other enforceable pollution control requirements are reasonably expected to result in the conformance with the applicable water quality standard(s) in the near future and the designated use will be attained.
- c. Non-attainment is caused by something other than a pollutant (e.g. “pollution”), such as natural conditions.

Sublist 5: The designated use is not attained. The waterbody is impaired or threatened for the designated use by a pollutant(s) and requires a TMDL.

Vernon Township has Eight (8) HUC14s that are listed on the Impaired Water List table depicted below. The table clarifies which HUC14s have impairments.

*Table 1. Impaired Subwatersheds in Vernon Township*

HUC14s in the Municipality	TMDL(s)	Designated Use Support Status								Parameters Not Attained
		Drinking Water	Primary Recreation	Aquatic Life	Trout Support	Industrial	Agricultural	Fish Consumption	Secondary Recreation	
<b>02020007010030</b> <i>Franklin Pond Creek</i>	Fecal Coliform	3	3	3	3	3	3	3	3	
<b>02020007010050</b> <i>Hardistoville Tributaries</i>		3	3	3	3	3	3	3	3	
<b>02020007010070</b> <i>Walkill River (Martins Rd to Hamburg SW Bdy)</i>	Fecal Coliform, Arsenic	5	4A	5	N/A	2	5	3	3	Mercury, Phosphorus, Total Dissolved Solids, Mercury
<b>02020007020070</b> <i>Papakating Creek (below Pelletstown)</i>	Fecal Coliform, Phosphorus, Arsenic	5	4A	5	N/A	2	2	3	3	Nitrate
<b>02020007030010</b> <i>Walkill River (41d13m30s to Martins Road)</i>	Fecal Coliform, Arsenic	3	3	5	N/A	2	2	3	3	Pollutant Unknown
<b>02020007030030</b> <i>Walkill River (Owens gage to 41d13m30s)</i>	Fecal Coliform, Arsenic	4A	4A	5	N/A	2	2	3	3	Phosphorus
<b>02020007030040</b> <i>Walkill River (stateline to Owens gage)</i>	Fecal Coliform, Arsenic	4A	4A	5	5	2	2	3	3	Phosphorus
<b>02020007040010</b> <i>Black Creek (above/incl Great Gorge Resort tributary)</i>	Phosphorus	2	3	4A	5	2	2	3	3	Temperature
<b>02020007040020</b> <i>Black Creek (below Great Gorge Resort tributary)</i>	Fecal Coliform, Phosphorus	2	4A	5	5	2	2	3	3	Dissolved Oxygen

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HUC14s in the Municipality	TMDL(s)	Designated Use Support Status								Parameters Not Attained
		Drinking Water	Primary Recreation	Aquatic Life	Trout Support	Industrial	Agricultural	Fish Consumption	Secondary Recreation	
<b>02020007040030</b> <i>Pochuck Creek/Glenwood Lk &amp; northern tributary</i>	Fecal Coliform, Phosphorus	3	4A	3	3	3	3	3	3	
<b>02020007040040</b> <i>Highland Lake/Wawayanda Lake</i>		3	3	3	3	3	3	3	3	
<b>02020007040050</b> <i>Wawayanda Creek &amp; tributaries</i>	Fecal Coliform, Phosphorus	2	4A	4A	5	2	2	3	3	Temperature
<b>02020007040060</b> <i>Long House Creek/Upper Greenwood Lake</i>		3	3	3	N/A	3	3	3	3	
<b>02030103050010</b> <i>Pequannock River (above Stockholm/Vernon Rd)</i>	Temperature	3	3	4A	4A	3	3	3	3	
<b>02030103050020</b> <i>Pacock Brook</i>		3	3	3	3	3	3	3	3	
<b>02030103050040</b> <i>Clinton Reservoir/Mossmans Brook</i>		3	3	2	2	3	3	3	3	

Source: Highlands Environmental Resource Inventory for Vernon Township (2012)

Multiple subwatersheds in the Township, identified in Table 2, were reported to have phosphorus and fecal coliform present. According to the NJDEP, phosphorus is a naturally-occurring, essential nutrient for plants and algae, but it can be considered a pollutant when it stimulates excessive plant and algae growth. The NJDEP also notes that nonpoint and stormwater point sources are the primary contributors to fecal coliform loads and can include storm-driven loads transporting fecal coliform from sources such as geese, farms, and domestic pets to the receiving water.

Further, the SWQS (Surface Water Quality Standards) identifies the following surface waters located within Vernon Township (See Appendix A, Waterways).

Table 2. Surface Waters – Source NJDEP GIS Data

Name	Category
Black Creek	FW2-TP C1
Canistear Reservoir	FW2-TM C1 FW2-NT C1
Hamburg Creek	FW2-TM C1
Livingston Ponds Brook	FW2-TP C1
Mud Pond Tributaries	FW2-TP C1 FW2-NT C1
Pacack Brook	FW2-NT C1
Parker Lake	FW2-NT C1
Pochuck Creek	FW2-NT C1
Sawmill Pond Brook	FW2-NT C1
Spring Brook	FW2-NT C1
Wallkill River	FW2-NT C1
Wawayanda Creek	FW2-NT C1 FW2 TM C1
Wildwood Lake	FW2-NT C1



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The category definitions are as follows:

FW2 means the general surface water classification applied to those fresh waters that are not designated as FW1 or Pinelands Waters.

NT = Non-Trout Waters

TM = Trout Maintenance

TP = Trout Production

C1 = Category One waters. These waters are designated in the tables in N.J.A.C. 7:9B-1.15(c) through (j), for purposes of implementing the antidegradation policies set forth at N.J.A.C. 7:9B-1.5(d), for exceptional recreational significance, exception water supply significance, and ecological integrity (habitat, water quality and biological functions). Category One waters are protected from any measurable change in existing water quality.

### Groundwater Recharge

Groundwater recharge does not occur uniformly in all areas of the Highlands Region. Recharge varies by soil, precipitation, land cover, and other factors. Some land areas will provide more recharge than others, and the best of these have been mapped by the Highlands Council as Prime Ground Water Recharge Areas. Prime Ground Water Recharge Areas are defined as the areas in each subwatershed that have the highest recharge rates and, in total, provide 40 percent of total recharge for that subwatershed (see Appendix A: Prime Ground Water Recharge Areas Map). Protection of these lands and the quality and quantity of recharge from them has a high priority in the Regional Master Plan. The technical basis and additional background information on Prime Ground Water Recharge Areas can be found in the Highlands Council's Water Resource Assessment Technical Report.

### Net Water Availability

The Regional Master Plan incorporates Net Water Availability as a capacity threshold on water uses resulting from future development. Where Net Water Availability is positive, it is assumed there is water available beyond the existing demand. Where net water availability is negative, the subwatershed is deemed a Current Deficit Area, meaning existing uses are exceeding sustainable supplies. In addition, maintenance of stream flows within any HUC14 subwatersheds upstream of a Current Deficit Area is necessary without further impairing the ecological health of the stream or reducing the safe yields of water supplies. These areas are classified as Existing Constrained Areas and will be managed to ensure that the downstream deficit is not exacerbated. Table 3, below, shows a summary of these calculations for each of the 10 subwatersheds in Vernon Township. Appendix A shows the locations of these subwatersheds.

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Table 3. Net Water Availability

HUC14	Subwatershed Name	Net Water
02020007010030	Franklin Pond Creek	-0.049
02020007010050	Hardistonville Tributaries	-0.228
02020007010070	Walkill River (Martins Rd to Hamburg SW Bdy)	-0.720
02020007020070	Papakating Creek (below Pelletstown)	0.000
02020007030010	Walkill River (41d13m30s to Martins Road)	-0.040
02020007030030	Walkill River (Owens gage to 41d13m30s)	-0.004
02020007030040	Walkill River (stateline to Owens gage)	-0.002
02020007040010	Black Creek (above/incl Great Gorge Resort tributary)	-0.497
02020007040020	Black Creek (below Great Gorge Resort tributary)	-0.176
02020007040030	Pochuck Creek/Glenwood Lk & northern tributary	-0.006
02020007040040	Highland Lake/Wawayanda Lake	-0.003
02020007040050	Wawayanda Creek & tributaries	0.006
02020007040060	Long House Creek/Upper Greenwood Lake	0.009
02030103050010	Pequannock River (above Stockholm/Vernon Rd)	0.001
02030103050020	Pacock Brook	0.005
02030103050040	Clinton Reservoir/Mossmans Brook	0.026

## Harmful Algae Blooms

The purpose of the New Jersey Cyanobacterial Harmful Algal Bloom (HAB)\* Response Strategy (Response Strategy) is to provide a unified statewide approach to respond to cyanobacterial HABs in freshwater recreational waters and sources of drinking water, and to protect the public from risks associated with exposure to cyanobacteria and related toxins. Although the primary focus of the Response Strategy is the protection of human health, it provides some information and recommendations regarding exposure and prevention of potential impacts to domestic animals (pets), livestock, and wildlife, as well.

Cyanobacteria are a type of bacteria capable of photosynthesis. Although they are not true algae, they were often referred to as “blue-green algae” in the past. Cyanobacteria can discolor the waters and frequently impart off-tastes and odors to the water in which they grow. Some species can produce toxins (known as cyanotoxins) that can be harmful to the health of humans and animals. Although problems related to cyanobacteria most often occur in freshwaters (lakes and streams), cyanobacteria can also be found in coastal waters. A cyanobacterial Harmful Algal Bloom (HAB) is the name given to the excessive growth, or “bloom” of cyanobacteria, some of which can produce one or more types of potentially harmful toxins (cyanotoxins). The DEP defines a HAB as a density of identified cyanobacterial cells of 20,000 cells/ml or higher. HABs often occur under suitable environmental conditions of light, temperature, nutrient enrichment, and calm water. These blooms can result in a thick coating or mat on the surface of a waterbody, frequently in summer or fall, but blooms can occur year-round.

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Cyanobacterial blooms may vary in species composition, residence time, the cyanotoxins they produce, and the associated risk to human health, pets, livestock, and wildlife. The distribution and concentration of blooms may be affected by weather and lake conditions such as rain, wind, and currents. Distributions of HABs can be waterbody wide, or localized near the shoreline, shallows, or areas affected by flows or the influx of nutrients. Cyanobacteria may maintain a position at a particular depth or may be found throughout the water column where light penetrates (e.g. Planktothrix, Cylindospermopsis). Some cyanobacteria may migrate vertically to different locations in the photic zone (where light penetrates) throughout the day. Surface accumulations (scum) may develop when cyanobacteria float to the surface during calm, sunny weather, and may dissipate within hours as conditions change. Entire cyanobacteria populations may accumulate at 1 or 2 cm below the water surface. Surface accumulations of cyanobacteria may concentrate further when blown by wind to leeward areas like bays, inlets, or near-shore areas (with the direction of the wind). Dense accumulations may extend from the surface to depths of more than one meter.

Exposures to cyanobacteria and cyanotoxins during recreational activities may potentially occur through oral ingestion (swallowing), skin absorption, and inhalation. Oral exposure may occur from accidental or deliberate ingestion of water. Dermal exposure occurs by direct contact of exposed parts of the body during recreational activity in water containing cyanobacteria. Inhalation may occur through the inhalation of contaminated aerosols while recreating. However, such inhalation exposure is much lower than ingestion exposure that can occur from immersion during recreational activities, such as swimming.

Adverse health effects from recreational exposure to cyanobacterial cells and cyanotoxins can range from a mild skin rash to serious illness. Acute illnesses caused by exposure to cyanotoxins have been reported, and exposure to very high levels of toxins is potentially fatal.

## Design and Performance Standards

The Township has adopted the design and performance standards for stormwater management measures, as presented in N.J.A.C. 7:8-5, to minimize the adverse impact of stormwater runoff on water quality and water quantity, and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the stormwater management rules at N.J.A.C. 7:8-5.8 Maintenance Requirements, and language for safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins.

In order for the above-referenced ordinance to be consistent with the Highlands Regional Master Plan, the following will be adopted:

### I. STORMWATER ORDINANCE AMENDMENTS

#### SECTION 2: DEFINITIONS (NEW AND AMENDED) (Article XII, § 330-206 through 211.6)

**Carbonate Rock Area** means an area where rock consisting chiefly of calcium and magnesium carbonates, such as limestone and dolomite, has been identified.

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**Current Deficit Area** means any United States Geological Survey 14-digit Hydrologic Unit Code subwatershed area that is identified in the Highlands Regional Master Plan as having negative Net Water Availability, meaning that existing consumptive and depletive water uses exceed the capacity of the ground water supply to sustain.

**Empowerment Neighborhoods** shall mean neighborhoods designated by the Urban Coordinating Council “in consultation and conjunction with” the New Jersey Redevelopment Authority pursuant to N.J.S.A 55:19-69.

**Exempt Development** shall mean any development that creates an increase of less than 1,000 square feet of impervious area and disturbs less than 2,500 square feet of land. Further, an exempt development shall not meet the definition of “minor development.”

**Green Infrastructure** shall mean a stormwater management measure that manages stormwater close to its source by:

- (1) Treating stormwater runoff through infiltration into subsoil;
- (2) Treating stormwater runoff through filtration by vegetation or soil; or
- (3) Storing stormwater runoff for reuse.

**Highlands Open Waters** shall mean all springs, wetlands, intermittent and ephemeral streams, perennial streams and bodies of surface water, whether natural or artificial, located wholly or partially within the boundaries of the Highlands Region, but shall not mean swimming pools.

**Impervious Surface-Highlands Preservation Area** shall mean any structure, surface, or improvement that reduces or prevents absorption of stormwater into land, and includes porous paving, paver blocks, gravel, crushed stone, decks, patios, elevated structures, and other similar structures, surfaces, or improvements. To be considered an impervious surface, the structure, surface or improvement must have the effect of reducing or preventing stormwater absorption.

**Major Development** shall mean any individual “development,” as well as multiple developments that individually or collectively result in:

- (1) The disturbance of one or more acres of land since February 2, 2004;
- (2) The creation of one-quarter acre or more of “regulated impervious surface” since February 2, 2004;
- (3) The creation of one-quarter acre or more of “regulated motor vehicle surface” since March 2, 2021; or
- (4) A combination of 2 and 3 above that totals an area of one-quarter acre or more. The same surface shall not be counted twice when determining if the combination area equals one quarter acre or more.

Major development includes all developments that are part of a common plan of development or sale (for example, phased residential development) that collectively or individually meet any one or more of conditions (1), (2), (3), or (4) above. Projects undertaken by any government agency that otherwise meet the definition of “major development” but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., are also considered “major development”.



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**Minor Development** shall mean any development that results in the creation of an increase of 500 square feet or more of impervious area or one that disturbs more than 2,500 square feet of land area. Further, a minor development shall not meet the definition of "major development".

**Maximum Extent Practicable** means designing stormwater management systems so that all reasonable opportunities for using non-structural stormwater practices are exhausted and a structural BMP is implemented only where absolutely necessary.

**Mitigation** means an action by an applicant providing compensation or offset actions for onsite stormwater management requirements where the applicant has demonstrated the inability or impracticality of strict compliance with the stormwater management requirements set forth in N.J.A.C. 7:8, in an adopted regional stormwater management plan, or in this local ordinance, and has received a waiver from strict compliance from the municipality. Mitigation shall include the implementation of the approved mitigation plan within the same drainage area where the subject project is proposed, or a contribution of funding toward a municipal stormwater control project, or provision for equivalent treatment at an alternate location, or any other equivalent water quality benefit as approved by the municipality.

**Non-Exempt Project** shall mean any project not eligible for an exemption from the Highlands Water Protection and Planning Act Rules, pursuant to N.J.A.C. 7:38-2.3.

**Preservation Area** shall mean lands within the Highlands Region that are located in that portion designated by the Highlands Act as the "Preservation Area" (see metes and bounds description at N.J.S.A. 13:20-7b).

**Prime Groundwater Recharge Area** shall mean lands with the best groundwater recharge rates within a HUC14 subwatershed as indicated by GSR-32 analysis, that provide the top forty percent (40%) of the total recharge volume for the subwatershed.

**Redevelopment** means land-disturbing activity that results in the creation, addition, or replacement of impervious surface area on an already developed or disturbed site. Redevelopment includes, but is not limited to: the expansion of a building footprint, addition or replacement of a structure, replacement of impervious surface area that is not part of a routine maintenance activity, and land disturbing activities related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety.

**Regional Master Plan** shall mean the Highlands regional master plan or any revision thereof adopted by the Highlands Water Protection and Planning Council pursuant to N.J.S.A. C.13:20-8.

**State Development And Redevelopment Plan Metropolitan Planning Area (Pa1)** shall mean 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.

**Tidal Flood Hazard Area** shall mean a flood hazard area in which the flood elevation resulting from the two-, 10-, or 100-year storm, as applicable, is governed by tidal flooding from the Atlantic

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Ocean. Flooding in a tidal flood hazard area may be contributed to, or influenced by, stormwater runoff from inland areas, but the depth of flooding generated by the tidal rise and fall of the Atlantic Ocean is greater than flooding from any fluvial sources. In some situations, depending upon the extent of the storm surge from a particular storm event, a flood hazard area may be tidal in the 100-year storm, but fluvial in more frequent storm events.

**Urban Coordinating Council Empowerment Neighborhood** shall mean a neighborhood given priority access to State resources through the New Jersey Redevelopment Authority.

**Urban Enterprise Zones** shall mean 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** shall mean the 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.

### SECTION 4: STORMWATER MANAGEMENT REQUIREMENTS FOR MAJOR DEVELOPMENT

#### P: GROUNDWATER RECHARGE AND RUNOFF STANDARDS

#### SUBSECTION (2): THE DESIGN ENGINEER SHALL, USING ASSUMPTIONS AND FACTORS FOR STORMWATER RUNOFF AND GROUNDWATER RECHARGE CALCULATIONS:

(New Section) [iii] Non-Exempt Projects located in the Preservation Area and in a Current Deficit Area: Where the project is located in the Preservation Area and in a Current Deficit Area as identified in the Net Water Availability Map in Appendix A, the project shall demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures provide for enhanced recharge standards set forth in (5) below.

(New Section) (iv) Non-Exempt Projects located in the Preservation Area and in a Prime Ground Water Recharge Area: Where the project is located in the Preservation Area and in a Prime Ground Water Recharge Area as identified in the Net Water Availability Map in Appendix A, the following standards shall apply:

(New Section) (a.) Where disturbance is permitted in accordance with this subsection, it shall be limited to no greater than 15% of the Prime Ground Water Recharge Area on the site and shall preferentially be sited on that portion of Prime Ground Water Recharge Area that has the lowest groundwater recharge rates.

(New Section) (b.) Where disturbance to the Prime Ground Water Recharge Area is permitted, the project shall demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures provide for enhanced recharge standards set forth in (5.) below.

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(4)(iii) Carbonate Rock Areas in the Preservation Area. Where surficial or subsurface karst features have been identified and recharge facilities cannot be designed in a manner that would eliminate the concentrated subsurface release of stormwater. (Note: the mere presence of carbonate bedrock does not constitute a karst feature)

(New Section) (5) Enhanced Recharge Standards: Non-Exempt Projects that are subject to the enhanced recharge requirements by P.2.iii. or P.2.iv above, shall apply the following standards, either:

(5)(i) Recharge 125 percent of the percentage of the average annual preconstruction groundwater recharge volume for the site; or

(5)(ii) In addition to complying with the recharge requirements of section IV.P, retain on-site with no discharge, the Stormwater Quality Design Volume (SWQDv), defined as the runoff from the 1.25-inch, 2-hour rainfall event. Where meeting the recharge requirement will not result in retention of the full SWQDv, the major development shall retain any additional volume to meet the requirements of this section through additional infiltration, or through evapotranspiration or capture and on-site re-use of rainfall.

(New Section) (6) Mitigation Required for Non-Exempt Projects in the Preservation Area: In lieu of on-site recharge, the applicant shall be responsible for providing mitigation of the groundwater recharge volume in the required amount. The applicant should provide mitigation within the following areas, in order of priority:

(i) the same development site where feasible;

(ii) the same HUC14 subwatershed, or

(iii) an interrelated HUC14 subwatershed where no feasible option exists in the same HUC14 subwatershed. If none of the above options are feasible or achievable, then the applicant shall comply with the mitigation requirements set forth in 7.

(New Section) (7) Mitigation Required for Non-Exempt Projects in the Preservation Area: A waiver from strict compliance with the requirements of the Municipal Stormwater ordinance shall be approved by the municipality only in those cases where an applicant has demonstrated the inability to strictly comply with any standard of the municipal stormwater ordinance. A waiver from strict compliance for such projects can only be obtained if the applicant agrees to undertake a suitable mitigation measure identified in the mitigation section of the municipality's Stormwater Management Plan. In such cases, the applicant must submit a mitigation plan detailing how the project's failure to strictly comply will be compensated. In cases where a waiver is granted, an applicant should provide mitigation, if possible and/or practical, within the same drainage area within which the subject project is proposed, or contribute funding toward a municipal stormwater control project, or provide for equivalent treatment at an alternate location, or provide for another equivalent water quality benefit, in lieu of implementing the required stormwater control measures on their specific site.

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### Plan Consistency

#### Residential Site Plan Improvement Standards

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

#### Regional Stormwater Management Plans

Because the municipality is not located within an adopted Regional Stormwater Management Planning Area, conformance to a regional stormwater management plan (RSWMP) is not required. Any RSWMPs proposed in the future will require an update to this Municipal Stormwater Management Plan as appropriate in order for conformance to take place.

#### Total Maximum Daily Loads (TMDL's)

TMDLs represent the assimilative or carrying capacity of the receiving water taking into consideration point and nonpoint sources of pollution, natural background, and surface water withdrawals. A TMDL is developed as a mechanism for identifying all the contributors to surface water quality impacts and setting goals for load reductions for specific pollutants as necessary to meet surface water quality standards. TMDLs are required, under Section 303(d) of the federal Clean Water Act, to be developed for water bodies that cannot meet surface water quality standards after the implementation of technology-based effluent limitations. TMDLs may also be established to help maintain or improve water quality in waters that are not impaired.

A TMDL establishes Waste Load Allocations and Load Allocations for point and nonpoint sources, respectively. Regulations concerning TMDLs are contained in EPA's Water Quality Planning and Management Regulations (40 CFR 130). "A TMDL is established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality." (40 CFR 130.7(c)).

Where TMDLs are required to address documented surface water quality impairment, allocations are made to the varying sources contributing to the water quality problem in order to reduce the total pollutant load received by the waterbody. Load reduction goals established through TMDLs are achieved through the issuance of waste load allocations for point source discharges and load allocations for nonpoint source discharges. Since nonpoint source pollution, by definition, does not come from discrete, identifiable sources, load allocations would consist of the identification of categories of nonpoint sources that contribute to the parameters of concern. The load allocation would also include specific load reduction measures for those categories of sources, to be implemented through best management practices (BMPs), including local ordinances for stormwater management and nonpoint source pollution control, headwaters protection practices, or other mechanisms for addressing the priority issues of concern.



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A TMDL is considered "proposed" when NJDEP publishes the TMDL Report as a proposed Water Quality Management Plan Amendment in the New Jersey Register (NJR) for public review and comment. A TMDL is considered to be "established" when NJDEP finalizes the TMDL Report after considering comments received during the public comment period for the proposed plan amendment and formally submits it to EPA Region 2 for thirty (30)-day review and approval. The TMDL is considered "approved" when the NJDEP-established TMDL is approved by EPA Region 2. The TMDL is considered to be "adopted" when the EPA-approved TMDL is adopted by NJDEP as a water quality management plan amendment and the adoption notice is published in the NJR.

Three TMDL's have been developed for the Walkkill River, One TMDL has been developed for Franklin Pond Creek, One TMDL has been developed for the Papakating Creek, Two TMDL's have been developed for Black Creek, One TMDL has been developed for the Pochuck Creek, One TMDL has been developed for the Waywanda Creek, and One for the Pequannock River. However, there are no TMDLs for The Clinton Reservoir, Pacock Brook, Highland Lake, or Hardistonville tributaries that pass through the Township. If any RSWMPs or additional TMDLs are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent.

### New Jersey Soil Erosion and Sediment Control Standards

The Township's Stormwater Management Ordinance requires 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.

### Highlands Regional Master Plan

This plan has been updated to be consistent with the Highlands Regional Master Plan. This plan recommends updates to the municipal stormwater ordinance, if necessary, to maintain consistency between this plan, the Highlands Regional Master Plan and the Stormwater Control Ordinance.

## **Nonstructural Management Strategies**

In February 2021, the Township adopted an updated Stormwater Management Ordinance to incorporate non-structural strategies including green infrastructure and best management practices including low impact development strategies. The Design and Performance Standards specific to the Highlands Region, beginning on page 15 of this report, will be added to the 2021 ordinance which was adopted as follows:

### **§ 330-206 Scope and purpose.**

A. Policy statement. Flood control, groundwater recharge, and pollutant reduction shall be achieved through the use of stormwater management measures, including green infrastructure best management practices (GI BMPs) and nonstructural stormwater management strategies. GI BMPs and low-impact development (LID) should be utilized to meet the goal of maintaining natural hydrology to reduce stormwater runoff volume, reduce erosion, encourage infiltration and groundwater recharge, and reduce pollution. GI BMPs and LID 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. The purpose of this article is to establish minimum stormwater management requirements and controls for "major development," as defined below in § 330-207.

C. Applicability.

(1) This article shall be applicable to the following major developments:

(a) Nonresidential 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 article shall also be applicable to all major developments undertaken by Vernon Township.

D. Compatibility with other permit and ordinance requirements. Development approvals issued pursuant to this article are to be considered an integral part of development approvals 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 article. 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 article is not intended to interfere with, abrogate, or annul any other ordinances, rule or regulation, statute, or other provision of law except that, where any provision of this article 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.

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### § 330-207 Definitions.

For the purpose of this article, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this article clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directory. 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.

**COMMUNITY BASIN** An infiltration system, sand filter designed to infiltrate, standard constructed wetland, or wet pond, established in accordance with N.J.A.C. 7:8-4.2(c)14, that is designed and constructed in accordance with the New Jersey Stormwater Best Management Practices Manual, or an alternate design, approved in accordance with N.J.A.C. 7:8-5.2(g), for an infiltration system, sand filter designed to infiltrate, standard constructed wetland, or wet pond and that complies with the requirements of this article.

**COMPACTION** The increase in soil bulk density.

**CONTRIBUTORY DRAINAGE AREA** The area from which stormwater runoff drains to a stormwater management measure, not including the area of the stormwater management measure itself.

**CORE** A pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

**COUNTY REVIEW AGENCY** An agency designated by the Sussex County Board of County Commissioners to review municipal stormwater management plans and implementing ordinance(s). The county review agency may either be:

A. A county planning agency; or

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

**DEPARTMENT** The Department of Environmental Protection.

**DESIGN ENGINEER** 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.

**DESIGNATED CENTER** A State Development and Redevelopment Plan Center as designated by the State Planning Commission such as urban, regional, town, village, or hamlet.

**DEVELOPMENT** 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

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excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, for which permission is required under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq. In the case of development of agricultural land, "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.

**DISTURBANCE** The placement or reconstruction of impervious surface or motor vehicle surface, or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation. Milling and repaving is not considered disturbance for the purposes of this definition.

**DRAINAGE AREA** 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 CONSTRAINED AREA** The following areas where the physical alteration of the land is in some way restricted, either through regulation, easement, deed restriction or ownership such as: wetlands, floodplains, threatened and endangered species sites or designated habitats, and parks and preserves. Habitats of endangered or threatened species are identified using the Department's Landscape Project as approved by the Department's Endangered and Nongame Species Program.

**ENVIRONMENTALLY CRITICAL AREA** An area or feature which is of significant environmental value, including but not limited to: stream corridors, natural heritage priority sites, habitats of endangered or threatened species, large areas of contiguous open space or upland forest, steep slopes, and well head protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the Department's Landscape Project as approved by the Department's Endangered and Nongame Species Program.

**EROSION** The detachment and movement of soil or rock fragments by water, wind, ice, or gravity.

**GREEN INFRASTRUCTURE** A stormwater management measure that manages stormwater close to its source by:

- A. Treating stormwater runoff through infiltration into subsoil;
- B. Treating stormwater runoff through filtration by vegetation or soil; or
- C. Storing stormwater runoff for reuse.

**HUC 14 or HYDROLOGIC UNIT CODE 14** An area within which water drains to a particular receiving surface water body, also known as a subwatershed, which is identified by a 14-digit hydrologic unit boundary designation, delineated within New Jersey by the United States Geological Survey.

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**IMPERVIOUS SURFACE** A surface that has been covered with a layer of material so that it is highly resistant to infiltration by water.

**INFILTRATION** The process by which water seeps into the soil from precipitation.

**LEAD PLANNING AGENCY** One or more public entities having stormwater management planning authority designated by the regional stormwater management planning committee pursuant to N.J.A.C. 7:8-3.2, that serves as the primary representative of the committee.

**MAJOR DEVELOPMENT** An individual "development," as well as multiple developments that individually or collectively result in the disturbance of one or more acres of land since February 2, 2004. Major development includes all developments that are part of a common plan of development or sale (for example, phased residential development) that collectively or individually result in the disturbance of one or more acres of land since February 2, 2004. Projects undertaken by any government agency that otherwise meet the definition of "major development" but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., are also considered "major development."

**MOTOR VEHICLE** Land vehicles propelled other than by muscular power, such as automobiles, motorcycles, autocycles, and low speed vehicles. For the purposes of this definition, "motor vehicle" does not include farm equipment, snowmobiles, all-terrain vehicles, motorized wheelchairs, go-carts, gas buggies, golf carts, ski-slope grooming machines, or vehicles that run only on rails or tracks.

**MOTOR VEHICLE SURFACE** Any pervious or impervious surface that is intended to be used by "motor vehicles" and/or aircraft, and is directly exposed to precipitation including, but not limited to, driveways, parking areas, parking garages, roads, racetracks, and runways.

**MUNICIPALITY** Any city, borough, town, township, or village.

**NEW JERSEY STORMWATER BEST MANAGEMENT PRACTICES (BMP) MANUAL or BMP MANUAL**

The manual maintained by the Department providing, in part, design specifications, removal rates, calculation methods, and soil testing procedures approved by the Department as being capable of contributing to the achievement of the stormwater management standards specified in this article. The BMP Manual is periodically amended by the Department as necessary to provide design specifications on additional best management practices and new information on already included practices reflecting the best available current information regarding the particular practice and the Department's determination as to the ability of that best management practice to contribute to compliance with the standards contained in this article. Alternative stormwater management measures, removal rates, or calculation methods may be utilized, subject to any limitations specified in this article, provided the design engineer demonstrates to the municipality, in accordance with § 330-209F of this article and N.J.A.C. 7:8-5.2(g), that the proposed measure and its design will contribute to achievement of the design and performance standards established by this article.



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**NODE** An area designated by the State Planning Commission concentrating facilities and activities which are not organized in a compact form.

**NUTRIENT** A chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

**PERSON** Any individual, corporation, company, partnership, firm, association, political subdivision of this state and any state, interstate or federal agency.

**POLLUTANT** 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** The amount of water from precipitation that infiltrates into the ground and is not evapotranspired.

**REGULATED IMPERVIOUS SURFACE** Any of the following, alone or in combination:

A. A net increase of impervious surface;

B. The total area of impervious surface collected by a new stormwater conveyance system (for the purpose of this definition, a "new stormwater conveyance system" is a stormwater conveyance system that is constructed where one did not exist immediately prior to its construction or an existing system for which a new discharge location is created);

C. The total area of impervious surface proposed to be newly collected by an existing stormwater conveyance system; and/or

D. The total area of impervious surface collected by an existing stormwater conveyance system where the capacity of that conveyance system is increased.

**REGULATED MOTOR VEHICLE SURFACE** Any of the following, alone or in combination:

A. The total area of motor vehicle surface that is currently receiving water;

B. A net increase in motor vehicle surface; and/or quality treatment either by vegetation or soil, by an existing stormwater management measure, or by treatment at a wastewater treatment plant, where the water quality treatment will be modified or removed.

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**SEDIMENT** 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** The lot or lots upon which a major development is to occur or has occurred.

**SOIL** All unconsolidated mineral and organic material of any origin.

**STATE PLAN POLICY MAP** 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** 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 MANAGEMENT BMP** An excavation or embankment and related areas designed to retain stormwater runoff. A stormwater management BMP may either be normally dry (that is, a detention basin or infiltration system), retain water in a permanent pool (a retention basin), or be planted mainly with wetland vegetation (most constructed stormwater wetlands).

**STORMWATER MANAGEMENT MEASURE** Any 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.

### STORMWATER MANAGEMENT PLANNING AGENCY

A public body authorized by legislation to prepare stormwater management plans.

### STORMWATER MANAGEMENT PLANNING AREA

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

**STORMWATER RUNOFF** Water flow on the surface of the ground or in storm sewers, resulting from precipitation.

**WATER CONTROL STRUCTURE** A structure within, or adjacent to, a water, which intentionally or coincidentally alters the hydraulic capacity, the flood elevation resulting from the two-, ten-, or 100-year storm, flood hazard area limit, and/or floodway limit of the water. Examples of a water control structure may include a bridge, culvert, dam, embankment, ford (if above grade), retaining wall, and weir.

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**WATERS OF THE STATE** The ocean and its estuaries, all springs, streams, wetlands, and bodies of surface or groundwater, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

**WETLANDS or WETLAND** 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.

### **§ 330-208 Design and performance standards for stormwater management measures.**

A. Stormwater management measures for major development shall be designed to provide erosion control, groundwater recharge, stormwater runoff quantity control, and stormwater runoff quality treatment as follows:

(1) The minimum standards for erosion control are those established under the Soil and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules at N.J.A.C. 2:90.

(2) The minimum standards for groundwater recharge, stormwater quality, and stormwater runoff quantity shall be met by incorporating green infrastructure.

B. The standards in this article 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.

### **§ 330-209 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 § 330-211.5.

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 quality, and stormwater runoff quantity requirements of §§ 330-209.2, 330-209.3, and 330-209.4:

(1) The construction of an underground utility line provided that the disturbed areas are revegetated upon completion;

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(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 green infrastructure, groundwater recharge, stormwater runoff quality, and stormwater runoff quantity requirements of §§ 330-209.1, 330-209.2, 330-209.3, and 330-209.4 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 stormwater management measures, the option selected complies with the requirements of §§ 330-209.1, 330-209.2, 330-209.3, and 330-209.4 to the maximum extent practicable;

(3) The applicant demonstrates that, in order to meet the requirements of §§ 330-209.1, 330-209.2, 330-209.3, and 330-209.4, 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 Subsection D(3) above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of §§ 330-209.1, 330-209.2, 330-209.3, and 330-209.4 that were not achievable on site.

E. Tables 1 through 3 below summarize the ability of stormwater best management practices identified and described in the New Jersey Stormwater Best Management Practices Manual to satisfy the green infrastructure, groundwater recharge, stormwater runoff quality and stormwater runoff quantity standards specified in §§ 330-209.1, 330-209.2, 330-209.3, and 330-209.4. When designed in accordance with the most current version of the New Jersey Stormwater Best Management Practices Manual, the stormwater management measures found at N.J.A.C. 7:8-5.2(f) Tables 5-1, 5-2 and 5-3 and listed below in Tables 1, 2 and 3 are presumed to be capable of providing stormwater controls for the design and performance standards as outlined in the tables below. Upon amendments of the New Jersey Stormwater Best Management Practices to reflect additions or deletions of BMPs meeting these standards, or changes in the presumed performance of BMPs designed in accordance with the New Jersey Stormwater BMP Manual, the Department shall publish in the New Jersey Registers a notice of administrative change revising the applicable table. The most current version of the BMP Manual can be found on the Department's website at: [https://njstormwater.org/bmp\\_manual2.htm](https://njstormwater.org/bmp_manual2.htm).

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F. Where the BMP tables in the NJ Stormwater Management Rule are different due to updates or amendments with the tables in this article the BMP Tables in the Stormwater Management rule at N.J.A.C. 7:8-5.2(f) shall take precedence.

Table 1				
Green Infrastructure BMPs for Groundwater Recharge, Stormwater Runoff Quality, and/or Stormwater Runoff Quantity				
Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Minimum Separation from Seasonal High Water Table (feet)
Cistern	0	Yes	No	—
Dry well(a)	0	No	Yes	2
Grass swale	50 or less	No	No	2(e) 1(f)
Green roof	0	Yes	No	—
Manufactured treatment device(a)(g)	50 or 80	No	No	Dependent upon the device
Pervious paving system(a)	80	Yes	Yes(b) No(c)	2(b) 1(c)
Small-scale bioretention basin(a)	80 or 90	Yes	Yes(b) No(c)	2(b) 1(c)
Small-scale infiltration basin(a)	80	Yes	Yes	2
Small-scale sand filter	80	Yes	Yes	2
Vegetative filter strip	60-80	No	No	—

Table 2				
Green Infrastructure BMPs for Stormwater Runoff Quantity (or for Groundwater Recharge and/or Stormwater Runoff Quality with a Waiver or Variance from N.J.A.C. 7:8-5.3)				
Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Minimum Separation from Seasonal High Water Table (feet)
Bioretention system	80 or 90	Yes	Yes(b) No(c)	2(b) 1(c)
Infiltration basin	80	Yes	Yes	2
Sand filter(b)	80	Yes	Yes	2



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Table 1

Green Infrastructure BMPs for Groundwater Recharge, Stormwater Runoff Quality, and/or Stormwater Runoff Quantity

Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Minimum Separation from Seasonal High Water Table (feet)
Standard constructed wetland	90	Yes	No	N/A
Wet pond(d)	50-90	Yes	No	N/A

Table 3

BMPs for Groundwater Recharge, Stormwater Runoff Quality, and/or Stormwater Runoff Quantity only with a Waiver or Variance from N.J.A.C. 7:8-5.3

Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Minimum Separation from Seasonal High Water Table (feet)
Blue roof	0	Yes	No	N/A
Extended detention basin	40-60	Yes	No	1
Manufactured treatment device(h)	50 or 80	No	No	Dependent upon the device
Sand filter(c)	80	Yes	No	1
Subsurface gravel wetland	90	No	No	1
Wet pond	50-90	Yes	No	N/A

Notes to Tables 1, 2, and 3:

- (a) Subject to the applicable contributory drainage area limitation specified at § 330-209.1A;
- (b) Designed to infiltrate into the subsoil;
- (c) Designed with underdrains;
- (d) Designed to maintain at least a ten-foot-wide area of native vegetation along at least 50% of the shoreline and to include a stormwater runoff retention component designed to capture stormwater runoff for beneficial reuse, such as irrigation;
- (e) Designed with a slope of less than 2%;
- (f) Designed with a slope of equal to or greater than 2%;
- (g) Manufactured treatment devices that meet the definition of "green infrastructure" at § 330-207;

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Table 3

BMPs for Groundwater Recharge, Stormwater Runoff Quality, and/or Stormwater Runoff Quantity only with a Waiver or Variance from N.J.A.C. 7:8-5.3

Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Minimum Separation from Seasonal High Water Table (feet)
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(h)	Manufactured treatment devices that do not meet the definition of "green infrastructure" at § 330-207.			
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G. An alternative stormwater management measure, alternative removal rate, and/or alternative method to calculate the removal rate may be used if the design engineer demonstrates the capability of the proposed alternative stormwater management measure and/or the validity of the alternative rate or method to the municipality. A copy of any approved alternative stormwater management measure, alternative removal rate, and/or alternative method to calculate the removal rate shall be provided to the Department in accordance with § 330-209B. Alternative stormwater management measures may be used to satisfy the requirements at § 330-209.1 only if the measures meet the definition of "green infrastructure" at § 330-207. Alternative stormwater management measures that function in a similar manner to a BMP listed at § 330-209.1A are subject to the contributory drainage area limitation specified at § 330-209.1A for that similarly functioning BMP. Alternative stormwater management measures approved in accordance with this subsection that do not function in a similar manner to any BMP listed at Section § 330-209.1A shall have a contributory drainage area less than or equal to 2.5 acres, except for alternative stormwater management measures that function similarly to cisterns, grass swales, green roofs, standard constructed wetlands, vegetative filter strips, and wet ponds, which are not subject to a contributory drainage area limitation. Alternative measures that function similarly to standard constructed wetlands or wet ponds shall not be used for compliance with the stormwater runoff quality standard unless a variance in accordance with N.J.A.C. 7:8-4.6 or a waiver from strict compliance in accordance with § 330-209D is granted from § 330-209.1.

H. Whenever the stormwater management design includes one or more BMPs that will infiltrate stormwater into subsoil, 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 or other subsurface structures within the zone of influence of the groundwater mound, or interference with the proper functioning of the stormwater management measure itself.

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I. Design standards for stormwater management measures are as follows:

(1) Stormwater management measures shall be designed to take into account the existing site conditions, including, but not limited to, environmentally critical areas; wetlands; floodprone 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) Stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure, as appropriate, and shall have parallel bars with one-inch spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than one-third the width of the diameter of the orifice or one-third the width of the weir, with a minimum spacing between bars of one inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of § 330-211.3B;

(3) 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) Stormwater management BMPs shall be designed to meet the minimum safety standards for stormwater management BMPs at § 330-211.3; and

(5) The size of the orifice at the intake to the outlet from the stormwater management BMP shall be a minimum of 2 1/2 inches in diameter.

J. Manufactured treatment devices may be used to meet the requirements of this subsection, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department. Manufactured treatment devices that do not meet the definition of green infrastructure at § 330-207 may be used only under the circumstances described at § 330-209.1C.

K. Any application for a new agricultural development that meets the definition of major development at § 330-207 shall be submitted to the Soil Conservation District for review and approval in accordance with the requirements at §§ 330-209.1, 330-209.2, 330-209.3, and 330-209.4 and any applicable Soil Conservation District guidelines for stormwater runoff quantity and erosion control. For purposes of this subsection, "agricultural development" means land uses normally associated with the production of food, fiber, and livestock for sale. Such uses do not include the development of land for the processing or sale of food and the manufacture of agriculturally related products.

L. If there is more than one drainage area, the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards at §§ 330-209.2, 330-209.3, and 330-209.4 shall be met in each drainage area, unless the runoff from the drainage areas converge onsite and no adverse environmental

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impact would occur as a result of compliance with any one or more of the individual standards being determined utilizing a weighted average of the results achieved for that individual standard across the affected drainage areas.

M. Any stormwater management measure authorized under the municipal stormwater management plan or ordinance shall be reflected in a deed notice recorded in the Sussex County Clerk's office. A form of deed notice shall be submitted to the municipality for approval prior to filing. The deed notice shall contain a description of the stormwater management measure(s) used to meet the green infrastructure, groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards at §§ 330-209.1, 330-209.2, 330-209.3, and 330-209.4 and shall identify the location of the stormwater management measure(s) in NAD 1983 State Plane New Jersey FIPS 2900 US Feet or Latitude and Longitude in decimal degrees. The deed notice shall also reference the maintenance plan required to be recorded upon the deed pursuant to § 330-211.5B(5). Prior to the commencement of construction, proof that the above-required deed notice has been filed shall be submitted to the municipality. Proof that the required information has been recorded on the deed shall be in the form of either a copy of the complete recorded document or a receipt from the clerk or other proof of recordation provided by the recording office. However, if the initial proof provided to the municipality is not a copy of the complete recorded document, a copy of the complete recorded document shall be provided to the municipality within 180 calendar days of the authorization granted by the municipality.

N. A stormwater management measure approved under the municipal stormwater management plan or ordinance may be altered or replaced with the approval of the municipality, if the municipality determines that the proposed alteration or replacement meets the design and performance standards pursuant to §§ 330-209, 330-209.1, 330-209.2, 330-209.3, and 330-209.4 of this article and provides the same level of stormwater management as the previously approved stormwater management measure that is being altered or replaced. If an alteration or replacement is approved, a revised deed notice shall be submitted to the municipality for approval and subsequently recorded with the Sussex County Clerk's Office and shall contain a description and location of the stormwater management measure, as well as reference to the maintenance plan, in accordance with Subsection M above. Prior to the commencement of construction, proof that the above-required deed notice has been filed shall be submitted to the municipality in accordance with Subsection M above.

### § 330-209.1 Green infrastructure standards.

This section specifies the types of green infrastructure BMPs that may be used to satisfy the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards.

A. To satisfy the groundwater recharge and stormwater runoff quality standards at §§ 330-209.2 and 330-209.3, the design engineer shall utilize green infrastructure BMPs identified in Table 1 at § 330-209F and/or an alternative stormwater management measure approved in accordance with § 330-209G. The following green infrastructure BMPs are subject to the following maximum contributory drainage area limitations:

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Best Management Practice	Maximum Contributory Drainage Area
Dry well	1 acre
Manufactured treatment device	2.5 acres
Pervious pavement systems	Area of additional inflow cannot exceed three times the area occupied by the BMP
Small-scale bioretention systems	2.5 acres
Small-scale infiltration basin	2.5 acres
Small-scale sand filter	2.5 acres

B. To satisfy the stormwater runoff quantity standards at § 330-209.4, the design engineer shall utilize BMPs from Table 1 or from Table 2 and/or an alternative stormwater management measure approved in accordance with § 330-209G.

C. If a variance in accordance with N.J.A.C. 7:8-4.6 or a waiver from strict compliance in accordance with § 330-209D is granted from the requirements of this section, then BMPs from Table 1, 2, or 3, and/or an alternative stormwater management measure approved in accordance with § 330-209G may be used to meet the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards at §§ 330-209.2, 330-209.3, and 330-209.4.

D. For separate or combined storm sewer improvement projects, such as sewer separation, undertaken by a government agency or public utility (for example, a sewerage company), the requirements of this subsection shall only apply to areas owned in fee simple by the government agency or utility, and areas within a right-of-way or easement held or controlled by the government agency or utility; the entity shall not be required to obtain additional property or property rights to fully satisfy the requirements of this subsection. Regardless of the amount of area of a separate or combined storm sewer improvement project subject to the green infrastructure requirements of this subsection, each project shall fully comply with the applicable groundwater recharge, stormwater runoff quality control, and stormwater runoff quantity standards at § 330-209.2, 330-209.3, and 330-209.4, unless the project is granted a waiver from strict compliance in accordance with § 330-209D.

### **§ 330-209.2 Groundwater recharge standards.**

This section contains the minimum design and performance standards for groundwater recharge as follows:

A. The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at § 330-210, either:

(1) Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100% of the average annual pre-construction groundwater recharge volume for the site; or



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

B. This groundwater recharge requirement does not apply to projects within the "urban redevelopment area," or to projects subject to Subsection C below.

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

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

(2) Industrial stormwater exposed to source material. "Source material" means any material(s) or machinery, located at an industrial facility, that is directly or indirectly related to process, manufacturing or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to, raw materials; intermediate products; final products; waste materials; by-products; industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.

### **§ 330-209.3 Stormwater runoff quality standards.**

This section contains the minimum design and performance standards to control stormwater runoff quality impacts of major development. Stormwater runoff quality standards are applicable when the major development results in an increase of 1/4 acre or more of regulated motor vehicle surface.

A. Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality design storm as follows:

(1) 80% TSS removal of the anticipated load, expressed as an annual average shall be achieved for the stormwater runoff from the net increase of motor vehicle surface.

(2) If the surface is considered regulated motor vehicle surface because the water quality treatment for an area of motor vehicle surface that is currently receiving water quality treatment either by vegetation or soil, by an existing stormwater management measure, or by treatment at a wastewater treatment plant is to be modified or removed, the project shall maintain or increase the existing TSS removal of the anticipated load expressed as an annual average.

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B. The requirement to reduce TSS does not apply to any stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the New Jersey Pollutant Discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A, or in a discharge specifically exempt under a NJPDES permit from this requirement. Every major development, including any that discharge into a combined sewer system, shall comply with Subsection A above, unless the major development is itself subject to a NJPDES permit with a numeric effluent limitation for TSS or the NJPDES permit to which the major development is subject exempts the development from a numeric effluent limitation for TSS.

C. 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 4, below. The calculation of the volume of runoff may take into account the implementation of stormwater management measures.

Table 4 - Water Quality Design Storm Distribution

Time (minutes)	Cumulative Rainfall (inches)	Time (minutes)	Cumulative Rainfall (inches)	Time (minutes)	Cumulative Rainfall (inches)
1	0.00166	41	0.1728	81	1.0906
2	0.00332	42	0.1796	82	1.0972
3	0.00498	43	0.1864	83	1.1038
4	0.00664	44	0.1932	84	1.1104
5	0.00830	45	0.2000	85	1.1170
6	0.00996	46	0.2117	86	1.1236
7	0.01162	47	0.2233	87	1.1302
8	0.01328	48	0.2350	88	1.1368
9	0.01494	49	0.2466	89	1.1434
10	0.01660	50	0.2583	90	1.1500
11	0.01828	51	0.2783	91	1.1550
12	0.01996	52	0.2983	92	1.1600
13	0.02164	53	0.3183	93	1.1650
14	0.02332	54	0.3383	94	1.1700
15	0.02500	55	0.3583	95	1.1750
16	0.03000	56	0.4116	96	1.1800
17	0.03500	57	0.4650	97	1.1850

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Table 4 - Water Quality Design Storm Distribution

Time (minutes)	Cumulative Rainfall (inches)	Time (minutes)	Cumulative Rainfall (inches)	Time (minutes)	Cumulative Rainfall (inches)
18	0.04000	58	0.5183	98	1.1900
19	0.04500	59	0.5717	99	1.1950
20	0.05000	60	0.6250	100	1.2000
21	0.05500	61	0.6783	101	1.2050
22	0.06000	62	0.7317	102	1.2100
23	0.06500	63	0.7850	103	1.2150
24	0.07000	64	0.8384	104	1.2200
25	0.07500	65	0.8917	105	1.2250
26	0.08000	66	0.9117	106	1.2267
27	0.08500	67	0.9317	107	1.2284
28	0.09000	68	0.9517	108	1.2300
29	0.09500	69	0.9717	109	1.2317
30	0.10000	70	0.9917	110	1.2334
31	0.10660	71	1.0034	111	1.2351
32	0.11320	72	1.0150	112	1.2367
33	0.11980	73	1.0267	113	1.2384
34	0.12640	74	1.0383	114	1.2400
35	0.13300	75	1.0500	115	1.2417
36	0.13960	76	1.0568	116	1.2434
37	0.14620	77	1.0636	117	1.2450
38	0.15280	78	1.0704	118	1.2467
39	0.15940	79	1.0772	119	1.2483
40	0.16600	80	1.0840	120	1.2500

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D. If more than one BMP in series is necessary to achieve the required 80% 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.

A = the TSS Percent Removal Rate applicable to the first BMP.

B = the TSS Percent Removal Rate applicable to the second BMP.

E. Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include green infrastructure BMPs that optimize nutrient removal while still achieving the performance standards in §§ 330-209.2, 330-209.3, and 330-209.4.

F. 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.

G. The Flood Hazard Area Control Act Rules at N.J.A.C. 7:13-4.1(c)1 establish 300-foot riparian zones along Category One waters, as designated in the Surface Water Quality Standards at N.J.A.C. 7:9B, and certain upstream tributaries to Category One waters. A person shall not undertake a major development that is located within or discharges into a 300-foot riparian zone without prior authorization from the Department under N.J.A.C. 7:13.

H. Pursuant to the Flood Hazard Area Control Act Rules at N.J.A.C. 7:13-11.2(j)3.i, runoff from the water quality design storm that is discharged within a 300-foot riparian zone shall be treated in accordance with this subsection to reduce the post-construction load of total suspended solids by 95% of the anticipated load from the developed site, expressed as an annual average.

I. This stormwater runoff quality standards do not apply to the construction of one individual single-family dwelling, provided that it is not part of a larger development or subdivision that has received preliminary or final site plan approval prior to December 3, 2018, and that the motor vehicle surfaces are made of permeable material(s) such as gravel, dirt, and/or shells.

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### § 330-209.4 Stormwater runoff quantity standards.

This section contains the minimum design and performance standards to control stormwater runoff quantity impacts of major development.

A. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at § 330-210, complete one of the following:

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

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

(3) Design stormwater management measures so that the post-construction peak runoff rates for the two-, ten- and 100-year storm events are 50%, 75% and 80%, 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; or

(4) In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with Subsection A(1), (2), and (3) above is required unless the design engineer demonstrates through hydrologic and hydraulic analysis that the increased volume, change in timing, or increased rate of the stormwater runoff, or any combination of the three will not result in additional flood damage below the point of discharge of the major development. No analysis is required if the stormwater is discharged directly into any ocean, bay, inlet, or the reach of any watercourse between its confluence with an ocean, bay, or inlet and downstream of the first water control structure.

B. The stormwater runoff quantity standards shall be applied at the site's boundary to each abutting lot, roadway, watercourse, or receiving storm sewer system.

### § 330-210 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 Chapters 7, 9, 10, 15 and 16 Part 630, Hydrology National Engineering Handbook, incorporated herein by reference as amended and



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supplemented. This methodology is additionally described in Technical Release 55 - Urban Hydrology for Small Watersheds (TR-55), dated June 1986, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the Natural Resources Conservation Service website at: [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb1044171.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044171.pdf) or at United States Department of Agriculture Natural Resources Conservation Service, 220 Davision Avenue, Somerset, New Jersey 08873; or

(b) The Rational Method for peak flow and the Modified Rational Method for hydrograph computations. The rational and modified rational methods are described in "Appendix A-9 Modified Rational Method" in the Standards for Soil Erosion and Sediment Control in New Jersey, January 2014. This document is available from the State Soil Conservation Committee or any of the Soil Conservation Districts listed at N.J.A.C. 2:90-1.3(a)3. The location, address, and telephone number for each Soil Conservation District is available from the State Soil Conservation Committee, PO Box 330, Trenton, New Jersey 08625. The document is also available at: <http://www.nj.gov/agriculture/divisions/anr/pdf/2014NJSoilErosionControlStandardsComplete.pdf>.

(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 (1)(a) above and the Rational and Modified Rational Methods at (1)(b) above. 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 has existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations. In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is pasture, lawn, or park), with good cover (if the land use type is woods), or with good hydrologic condition and conservation treatment (if the land use type is cultivation).

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

(4) In computing stormwater runoff from 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 or other methods may be employed.

# STORMWATER MANAGEMENT PLAN

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(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: The New Jersey Geological Survey Report GSR-32, A Method for Evaluating Groundwater-Recharge Areas in New Jersey, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual; at the New Jersey Geological Survey website at: <https://www.nj.gov/dep/njgs/pricelst/gsreport/gsr32.pdf> or at New Jersey Geological and Water Survey, 29 Article Parkway, PO Box 420 Mail Code 29-01, Trenton, New Jersey 08625-0420.

### **§ 330-211.1 Sources for technical guidance.**

A. Technical guidance for stormwater management measures can be found in the documents listed below, which are available to download from the Department's website at: [http://www.nj.gov/dep/stormwater/bmp\\_manual2.htm](http://www.nj.gov/dep/stormwater/bmp_manual2.htm).

(1) Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended and supplemented. Information is provided on stormwater management measures such as, but not limited to, those listed in Tables 1, 2, and 3.

(2) Additional maintenance guidance is available on the Department's website at: [https://www.njstormwater.org/maintenance\\_guidance.htm](https://www.njstormwater.org/maintenance_guidance.htm).

B. Submissions required for review by the Department should be mailed to: The Division of Water Quality, New Jersey Department of Environmental Protection, Mail Code 401-02B, PO Box 420, Trenton, New Jersey 08625-0420.

### **§ 330-211.2 Solids and floatable materials control standards.**

A. Site design features identified under § 330-209F, or alternative designs in accordance with § 330-209G, to prevent discharge of trash and debris from drainage systems shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this subsection, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see Subsection A(2) below.

(1) Design engineers shall use one 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:

# STORMWATER MANAGEMENT PLAN

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(a) 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; or

(b) A different grate, if each individual clear space in that grate has an area of no more than seven square inches, or is no greater than 0.5 inch 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 system floors used to collect stormwater from the surface into a storm drain or surface water body.

(c) For curb-opening inlets, including curb-opening inlets in combination inlets, 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 square inches, or be no greater than two inches across the smallest dimension.

(2) The standard in Subsection A(1) above does not apply:

(a) Where each individual clear space in the curb opening in existing curb-opening inlet does not have an area of more than nine square inches;

(b) Where the municipality agrees that the standards would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets;

(c) Where flows from the water quality design storm as specified in N.J.A.C. 7:8 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:

[1] A rectangular space  $4 \frac{5}{8}$  (4.625) inches long and  $1 \frac{1}{2}$  (1.5) inches wide (this option does not apply for outfall netting facilities); or

[2] A bar screen having a bar spacing of 0.5 inch.

Note that these exemptions do not authorize any infringement of requirements in the Residential Site Improvement Standards for bicycle safe grates in new residential development (N.J.A.C. 5:21-4.18(b)2 and 7.4(b)1).

(d) Where flows are conveyed through a trash rack that has parallel bars with one-inch spacing between the bars, to the elevation of the water quality design storm as specified in N.J.A.C. 7:8; or

# STORMWATER MANAGEMENT PLAN

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(e) 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.

### **§ 330-211.3 Safety standards for stormwater management basins.**

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

A. The provisions of this section are not intended to preempt more stringent municipal or county safety requirements for new or existing stormwater management BMPs. Municipal and county stormwater management plans and ordinances may, pursuant to their authority, require existing stormwater management BMPs to be retrofitted to meet one or more of the safety standards in Subsection B(1), (2), and (3) below for trash racks, overflow grates, and escape provisions at outlet structures.

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 BMP to ensure proper functioning of the BMP 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; and
- (d) The trash rack shall be constructed of rigid, durable, and corrosion-resistant material and designed to withstand a perpendicular live loading of 300 pounds per square foot.

(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; and
- (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 pounds per square foot.

(3) Stormwater management BMPs shall include escape provisions as follows:

# STORMWATER MANAGEMENT PLAN

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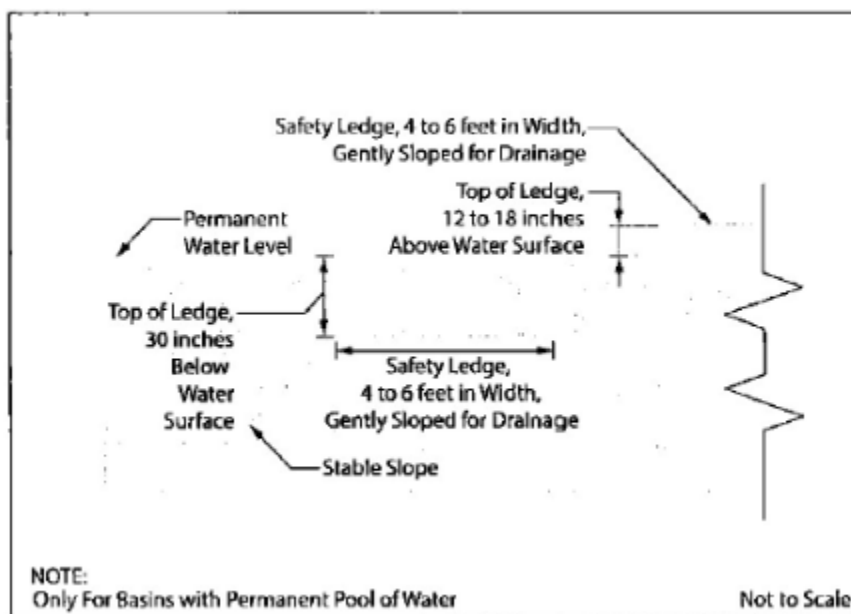
(a) If a stormwater management BMP has an outlet structure, escape provisions shall be incorporated in or on the structure. Escape provisions include the installation of permanent ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management BMPs. With the prior approval of the municipality pursuant to § 330-211.3B, a freestanding outlet structure may be exempted from this requirement;

(b) Safety ledges shall be constructed on the slopes of all new stormwater management BMPs having a permanent pool of water deeper than 2 1/2 feet. Safety ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall be located approximately 2 1/2 feet below the permanent water surface, and the second step shall be located one to 1 1/2 above the permanent water surface. See Subsection D below for an illustration of safety ledges in a stormwater management BMP; and

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

C. Variance or exemption from safety standard. A variance or exemption from the safety standards for stormwater management BMPs may be granted only upon a written finding by the municipality that the variance or exemption will not constitute a threat to public safety.

D. Safety ledge illustration. Elevation View - Basin Safety Ledge Configuration.



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### § 330-211.4 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 article, the applicant shall submit all of the required components of the checklist for the site development stormwater plan at Subsection C below as part of the submission of the application for approval.

(2) The applicant shall demonstrate that the project meets the standards set forth in this article.

(3) The applicant shall submit 22 copies of the materials listed in the checklist for site development stormwater plans in accordance with Subsection C below.

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

#### C. Submission of site development stormwater plan. 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 one inch equals 200 feet or greater, showing two-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 floodplains 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 man-made 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 surroundings should be submitted. 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 plans. 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 will occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high groundwater elevations. A written description of the site plan and justification for proposed changes in natural conditions shall also be provided.

# STORMWATER MANAGEMENT PLAN

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(4) Land use planning and source control plan. This plan shall provide a demonstration of how the goals and standards of §§ 330-209, 330-209.1, 330-209.2, 330-209.3, 330-209.4 and 330-210 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 disturbed, 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 predevelopment and post-development conditions for the design storms specified in §§ 330-209, 330-209.1, 330-209.2, 330-209.3, and 330-209.4 of this article.

(b) When the proposed stormwater management control measures depend on the hydrologic properties of soils or require certain separation from the seasonal high water table, then a soils report shall be submitted. The soils report shall be based on on-site 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 § 330-211.5.

(8) Waiver from submission requirements. The municipal official or board reviewing an application under this article may, in consultation with the municipality's review engineer, waive submission of any of the requirements in Subsection C(1) through (6) above 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.



# STORMWATER MANAGEMENT PLAN

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### § 330-211.5 Maintenance and repair.

A. Applicability. Projects subject to review as in § 330-206C of this article shall comply with the requirements of Subsections B and C below.

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). The plan shall contain information on BMP location, design, ownership, maintenance tasks and frequencies, and other details as specified in Chapter 8 of the NJ BMP Manual, as well as the tasks specific to the type of BMP, as described in the applicable chapter containing design specifics.

(3) If the maintenance plan identifies a person other than the property owner (for example, a developer, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's or entity's agreement to assume this responsibility, or of the owner's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.

(4) 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. The individual property owner may be assigned incidental tasks, such as weeding of a green infrastructure BMP, provided the individual agrees to assume these tasks; however, the individual cannot be legally responsible for all of the maintenance required.

(5) If the party responsible for maintenance identified under Subsection B(3) above is not a public agency, the maintenance plan and any future revisions based on Subsection 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.

(6) Preventative and corrective maintenance shall be performed to maintain the functional parameters (storage volume, infiltration rates, inflow/outflow capacity, etc.) of the stormwater management measure, including, but not limited to, 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.

(7) The party responsible for maintenance identified under Subsection B(3) above shall perform all of the following requirements:

# STORMWATER MANAGEMENT PLAN

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(a) 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;

(b) Evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed; and

(c) 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 Subsection B(6) and (7) above.

(8) The requirements of Subsection B(3) and (4) above do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency, subject to all applicable municipal stormwater general permit conditions, as issued by the Department. [https://www.nistormwater.org/maintenance\\_guidance.htm](https://www.nistormwater.org/maintenance_guidance.htm).

(9) 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 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. Nonpayment of such bill may result in a lien on the property.

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.

§ 330-211.6 Penalties.

Any person(s) who erects, constructs, alters, repairs, converts, maintains, or uses any building, structure or land in violation of this article shall be subject to the penalties and fines as provided for in Chapter 1, § 1-19, Violations and Penalties

# STORMWATER MANAGEMENT PLAN

## Vernon Township

### Land Use / Buildout Analysis

The 2009 Vernon Township Municipal Build-Out Report, prepared by the State of New Jersey Highlands Water Protection and Planning Council, evaluated land-based capacity, utility capacity, and resourced based capacity. The report states that Vernon Township has 850 acres (1.32 square miles) of potential developable land, including both vacant and redevelopable land. According to stormwater regulations, municipalities under one square miles of developable land are exempt from preparing a detailed build-out analysis. However, the 2009 Highlands Build-Out Report identified the following build-out results:

#### Municipal Build-Out Results with Resource and Utility Constraints

Residential units – Sewered	1
Septic System Yield	322
Total Residential Units	323
Non-Residential Jobs – Sewered	109

### Stormwater Mitigation Plan

In accordance with N.J.A.C. 7:8-4.6, a municipality may grant a variance or exemption from the design and performance standards for stormwater management measures provided the municipal Stormwater Management Plan includes a Stormwater Mitigation Plan in accordance with N.J.A.C. 7:8-4.2(c)11. The mitigation plan identifies measures required to offset any potential impact created by granting the variance or exemption.

This mitigation plan is provided for a proposed development that is granted a variance or exemption from the stormwater management design and performance standards. Presented is a hierarchy of options. The applicant is required to choose one of the projects listed in item 1 below. If there are no available projects under item 1, then as an alternative the applicant may propose a mitigation project that meets the requirement of item 1 below as the first option. If the applicant is unable to identify a suitable project that meets the requirement of Item 1, as determined by the Township of Vernon, the applicant must propose a project that meets the requirements of either item 2 or item 3 below. The Township of Vernon prior to implementation must approve all mitigation projects proposed by an applicant.

### Mitigation Project Criteria

1. The mitigation project must be implemented in the same drainage area as the proposed development. The project must provide additional groundwater recharge benefits, or protection from stormwater runoff quality and quantity from previously developed property that does not currently meet the design and performance standards outlined in the Municipal Stormwater Management Plan. The developer must ensure the long-term maintenance of the project, including the maintenance requirements under Chapter 8 and 9 of the NJDEP Stormwater BMP Manual.

# STORMWATER MANAGEMENT PLAN

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2. The applicant can select one of the following projects listed to compensate for the deficit from the performance standards resulting from the proposed project. More detailed information on the projects can be obtained from the Township Engineer.
3. The municipality may allow a developer to provide funding or partial funding to the municipality for an environmental enhancement project that has been identified in a Municipal Stormwater Management Plan, or towards the development of a Regional Stormwater Management Plan. The funding must be equal to or greater than the cost to implement the mitigation outlined above, including costs associated with purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure.

### General Types of Mitigation Projects

#### Repair Roadside Swales

Roadside swale repairs within the same HUC14 may be presented to the Township Engineer for review and approval. Swale repair may include:

- a. Bioswales.
- b. Redesign of side slopes.
- c. Slope stability.
- d. Channel stabilization (rip rap).

#### Stormwater Basin Retrofit

Stormwater basin retrofit projects within the same HUC14 may be presented to the Township Engineer for review and approval. Basin retrofit projects may include:

- a. Outlet structure modifications.
- b. Regrading and planting.
- c. Elimination of low flow channels.
- d. Installation of in-line or end-of-pipe Best Management Practices (BMP) as approved by NJDEP.

#### Stream and Stream Bank Stabilization

Stream and stream bank stabilization projects may be presented for review and approval by the Township Engineer. Stabilization projects will be reviewed for the following benefits:

- a. Stabilization of eroded stream banks where public or private property or structures are threatened.
- b. Reduce sediment deposition in lakes, ponds and other low velocity areas.
- c. Improved water quality.

#### Stormwater Outfall Restoration

Projects identified for stormwater outfall repair/retrofits are prioritized by proximity to lakes or Category 1 streams and need for repair. Mitigation of existing outfalls within the same HUC14 is under the guidance and prioritization of the Township Engineer. Outfalls with substandard apron protection can lead to siltation and sedimentation of adjacent water bodies. Therefore, outfalls within close proximity to lake or stream estimated drainage areas are prioritized for repair/retrofit.

# STORMWATER MANAGEMENT PLAN

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Outfall retrofits to control sedimentation revolve around reducing velocity of discharged water. This is most commonly accomplished through the installation of properly sized rip-rap. Areas for rip-rap around outfalls are typically between 10-20 square feet. Additional non-structural stormwater techniques around outfalls include regenerative step pool storm conveyance. This technique creates a series of pools to collect stormwater and allow time for sediment to dissipate before continuing down the channel to the eventual receiving waterbody. This technique is recommended if adequate space allows for the construction of a regenerative step pool storm conveyance.

Other restoration options at the discretion of the Township Engineer are:

- a. Replacement of conduit outlet protection with evidence of scour/erosion.
  - b. Replacement with installation of drop manhole to set outfall structure at invert of stream channel with outlet protection.
4. If a suitable site cannot be located in the same drainage area as the proposed development, the mitigation project may provide mitigation that is not equivalent to the impacts for which the variance or exemption is sought, but that addresses the same issue.
  5. The Township may allow a developer to provide funding or partial funding for an environmental enhancement project. The funding must be equal to or greater than the cost to implement the mitigation outlined above, including costs associated with purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure.

### Lake Management Plans

Lakes in the Highlands Region began to see intense development near their shorelines around the 1950s, which directly led to stormwater issues that negatively affect the lakes. The Highlands Council notes, in its guidelines for Lake Management Plans, that during this time common practices were collecting, concentrating, and discharging stormwater into the lake. Sediments, nutrients, and other pollutants were not filtered out. Also, during this time, septic systems were often undersized considering the seasonal, rather than the permanent, use of the homes.

The Highlands Council asserts that the key to successful maintenance of ecological integrity is long-term management of causes and impacts of the lake's gradual increase in phosphorus, nitrogen, and other plant nutrients in aging lakes. Lake management plans are intended to correct problems within a lake and protect it from further degradation while acknowledging that development around lakes is ongoing.

The Township of Vernon has nearly 4,000 acres of land zoned for lake communities. The Private Lake Communities (PLC) are single-family residential areas surrounding private lakes that have a 10,000-square-foot minimum lot size. The Private Lake Leasehold Communities (PLLC) are pre-existing communities where land is leased for residential development surrounding a private lake.

# STORMWATER MANAGEMENT PLAN

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There have been recorded issues with algae blooms which have been recorded within the private lakes and communities. For most ponds and lakes, the focus of the watershed management strategies contained in the lake management plan will involve the control and management of stormwater runoff. The Township is currently working with the Highlands Council to develop lake management plans for many of the lakes within the Township to improve water quality around the Township's lakes.

**Appendix A: Maps**

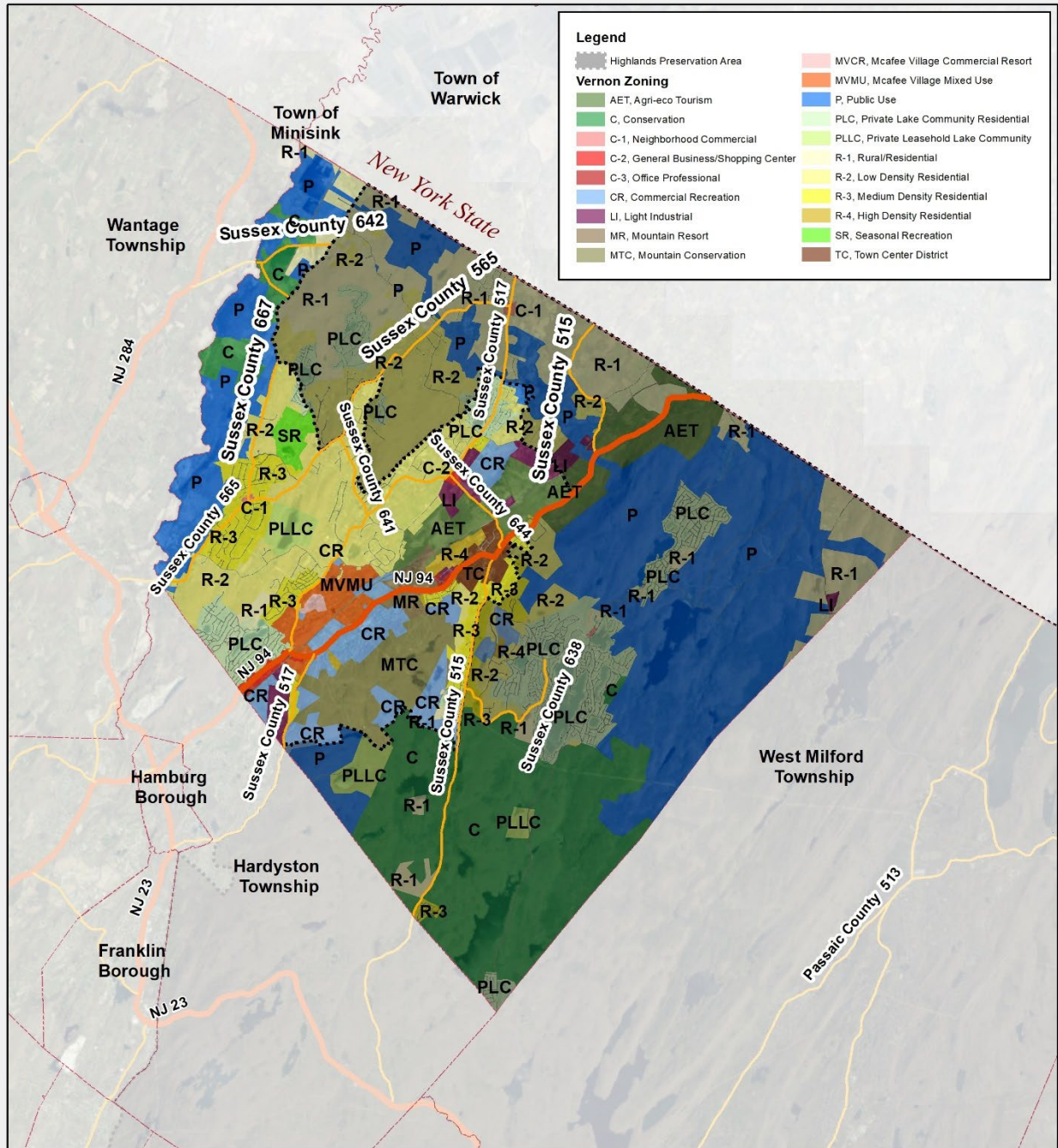


# STORMWATER MANAGEMENT PLAN

## Vernon Township

### Vernon Zoning Map

Township of Vernon, Sussex County, New Jersey



Sources: New Jersey Office of Information Technology, 2022  
 New Jersey Highlands Council, 2022  
 New Jersey Department of Transportation, 2022

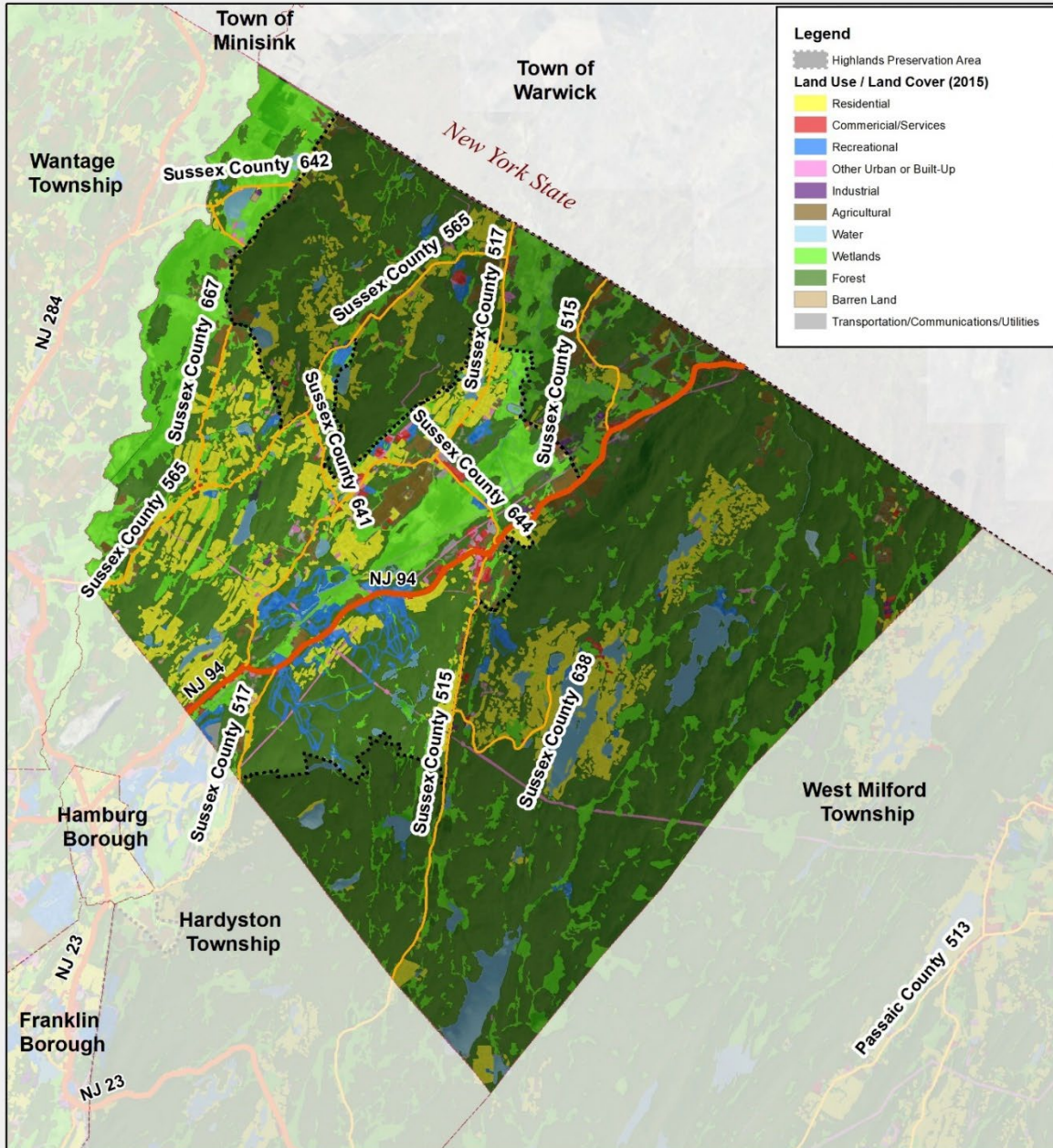


# STORMWATER MANAGEMENT PLAN

## Vernon Township

### Vernon Land Use / Land Cover Map

Township of Vernon, Sussex County, New Jersey



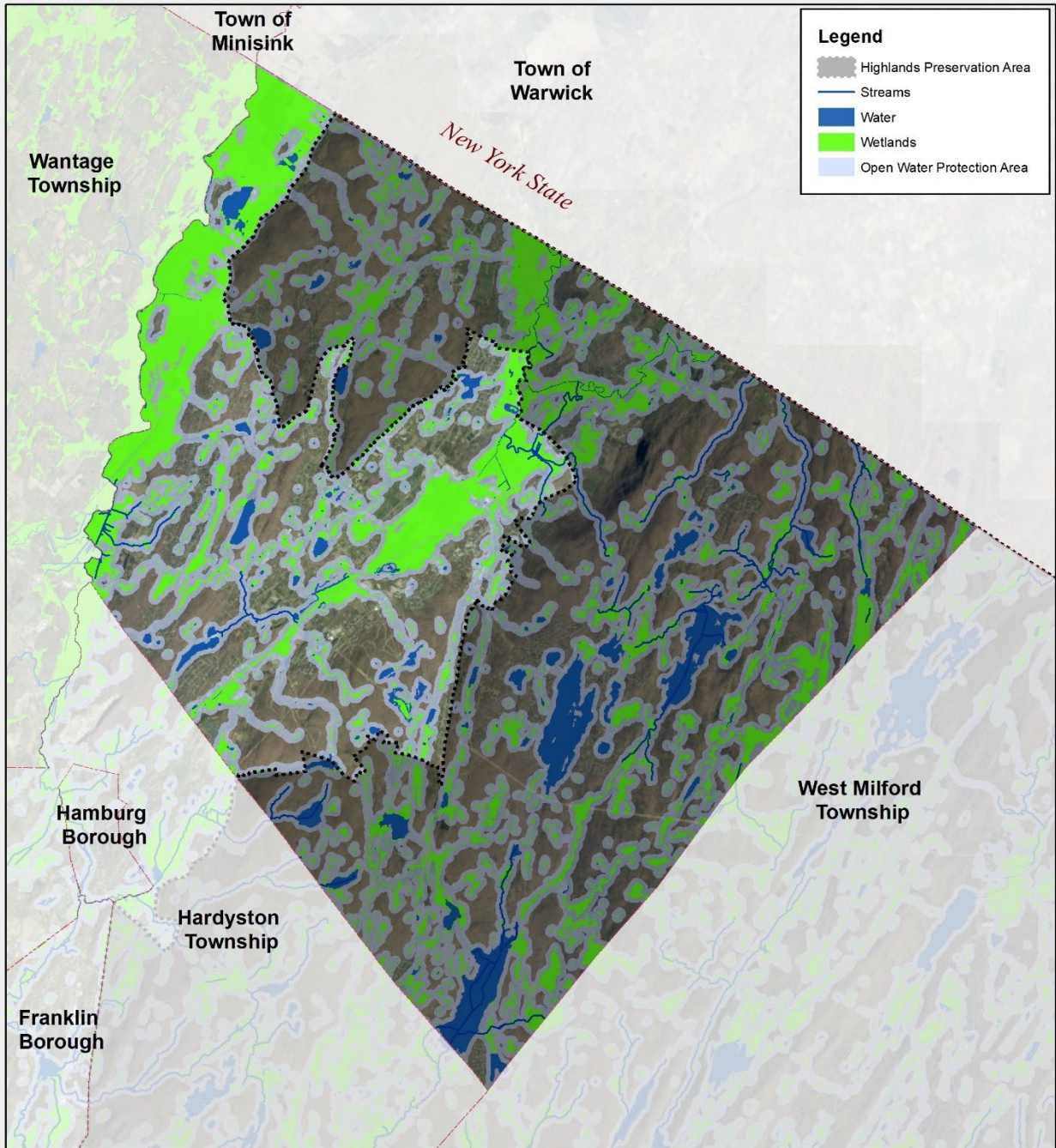
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 New Jersey Highlands Council, 2022  
 New Jersey Department of Transportation, 2022





# Highlands Open Waters Map

Township of Vernon, Sussex County, New Jersey



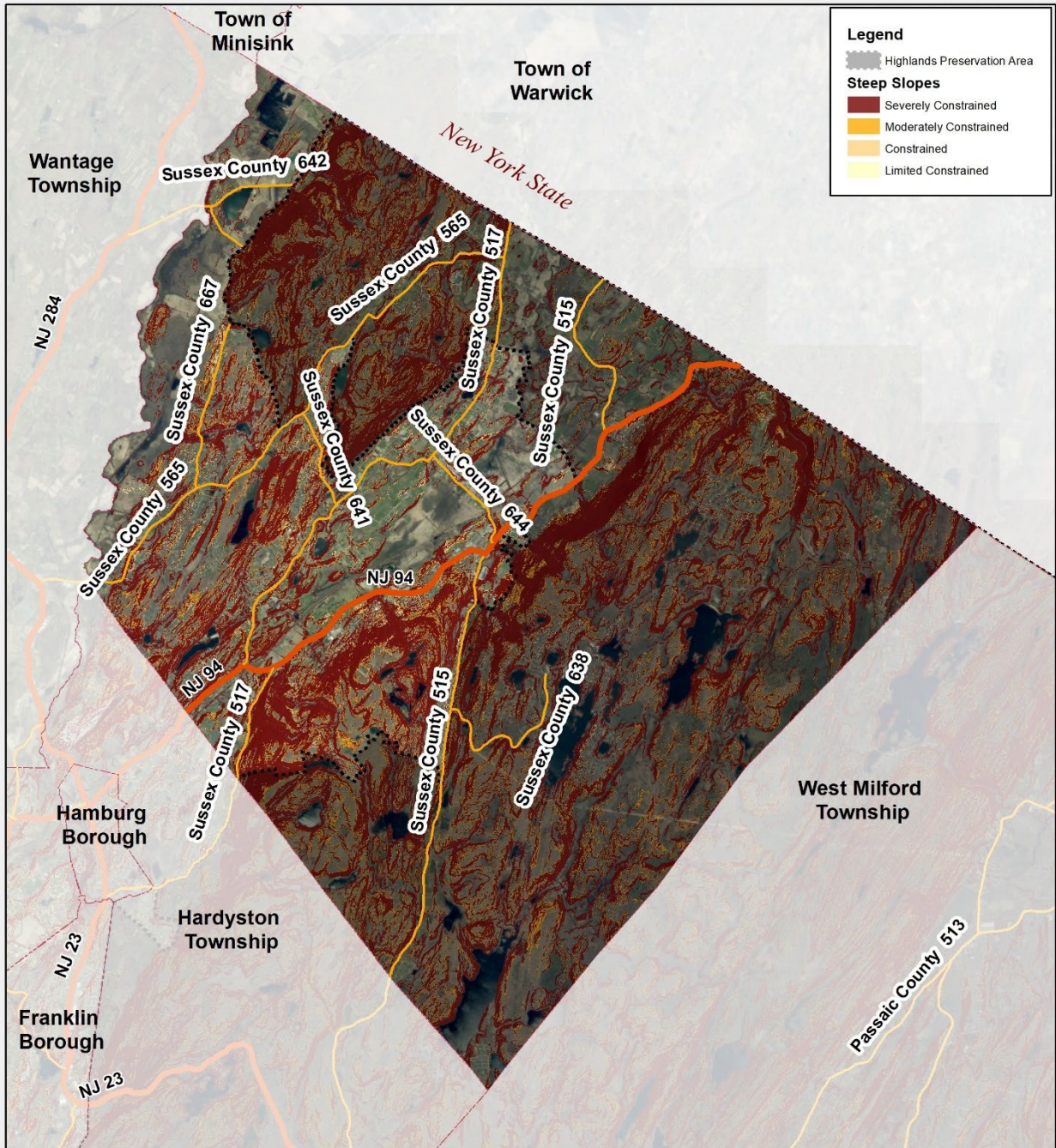
Sources: New Jersey Office of Information Technology, 2022  
New Jersey Highlands Council, 2022  
New Jersey Department of Transportation, 2022





# Vernon Steep Slopes Map

Township of Vernon, Sussex County, New Jersey



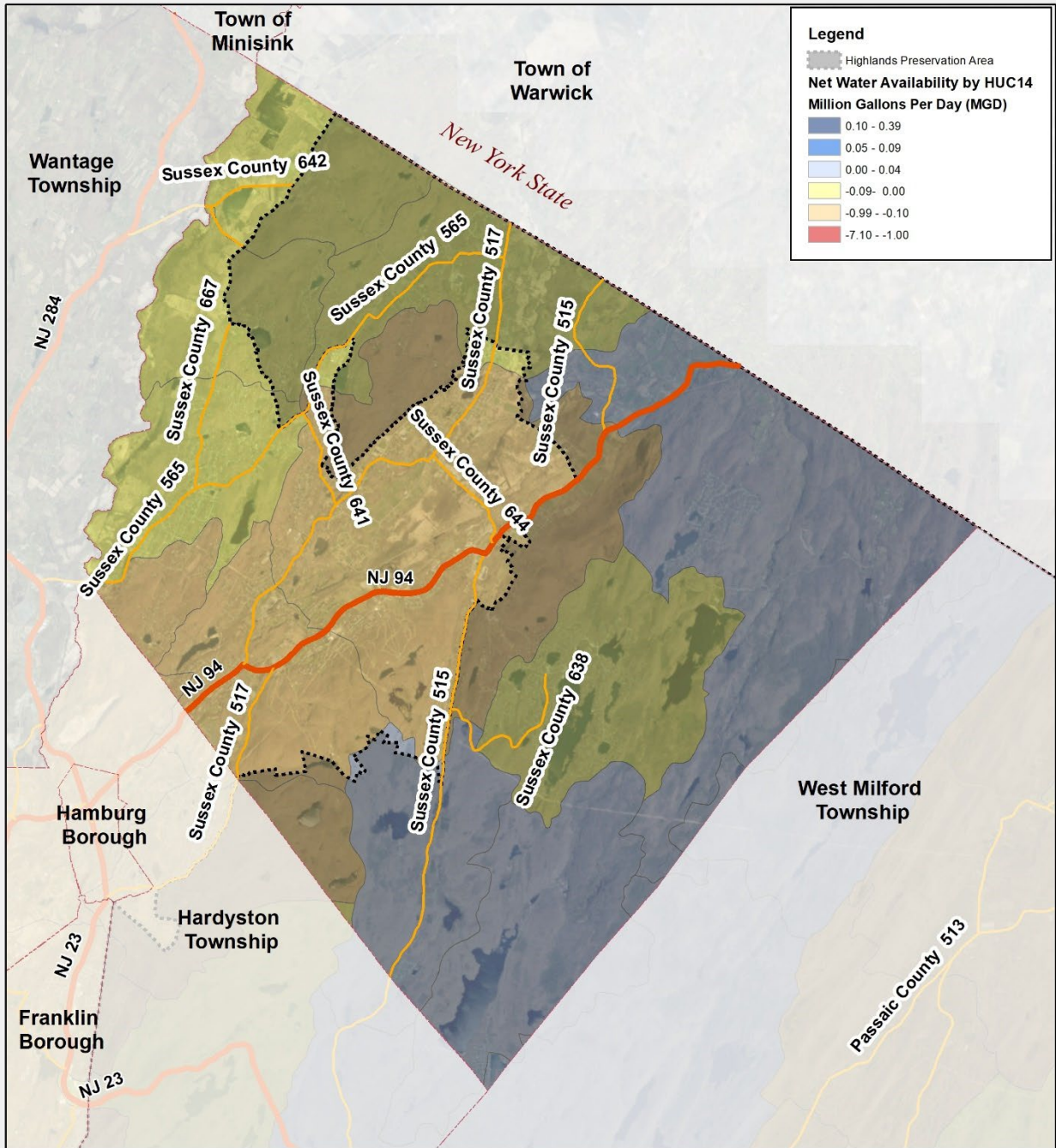
Sources: New Jersey Office of Information Technology, 2022  
New Jersey Highlands Council, 2022  
New Jersey Department of Transportation, 2022





# Vernon Net Water Availability Map

Township of Vernon, Sussex County, New Jersey



**Legend**

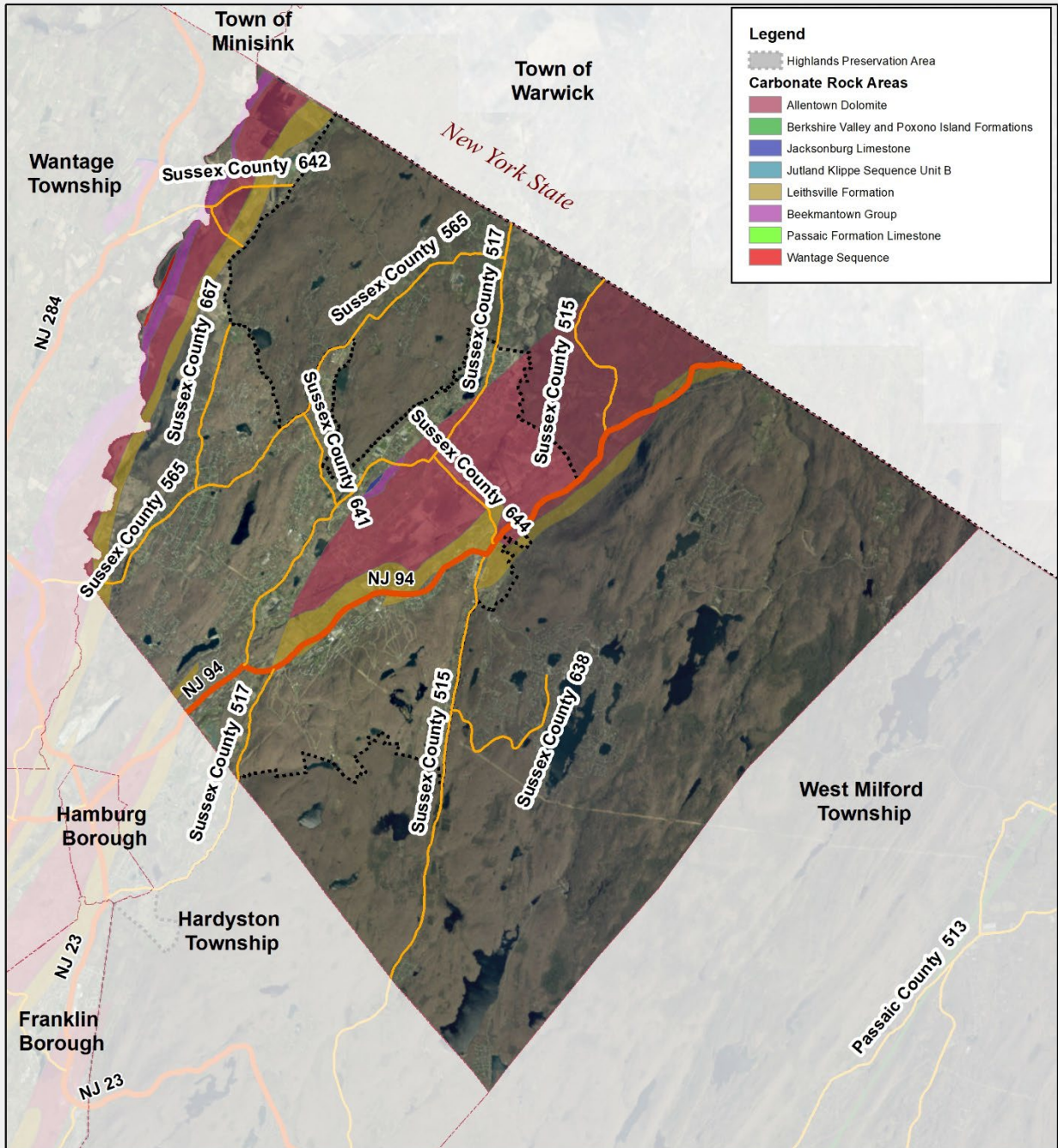
- Highlands Preservation Area
- Net Water Availability by HUC14**
- Million Gallons Per Day (MGD)**
- 0.10 - 0.39
- 0.05 - 0.09
- 0.00 - 0.04
- 0.09 - 0.00
- 0.99 - -0.10
- 7.10 - -1.00

Sources: New Jersey Office of Information Technology, 2022  
 New Jersey Highlands Council, 2022  
 New Jersey Department of Transportation, 2022



# Vernon Carbonate Rock Area Map

Township of Vernon, Sussex County, New Jersey



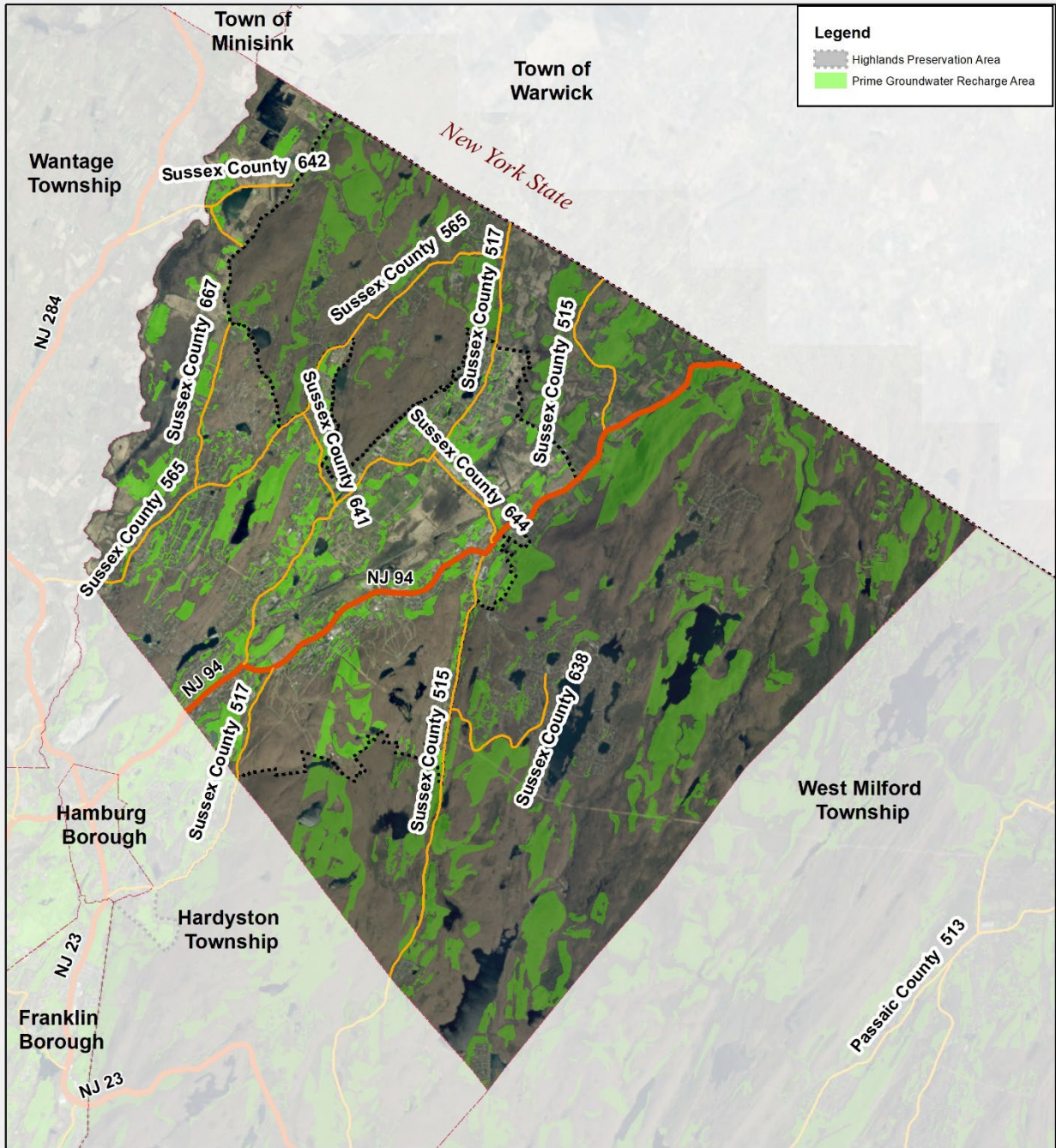
Sources: New Jersey Office of Information Technology, 2022  
 New Jersey Highlands Council, 2022  
 New Jersey Department of Transportation, 2022





# Vernon Prime Groundwater Recharge Area Map

Township of Vernon, Sussex County, New Jersey



Sources: New Jersey Office of Information Technology, 2022  
New Jersey Highlands Council, 2022  
New Jersey Department of Transportation, 2022



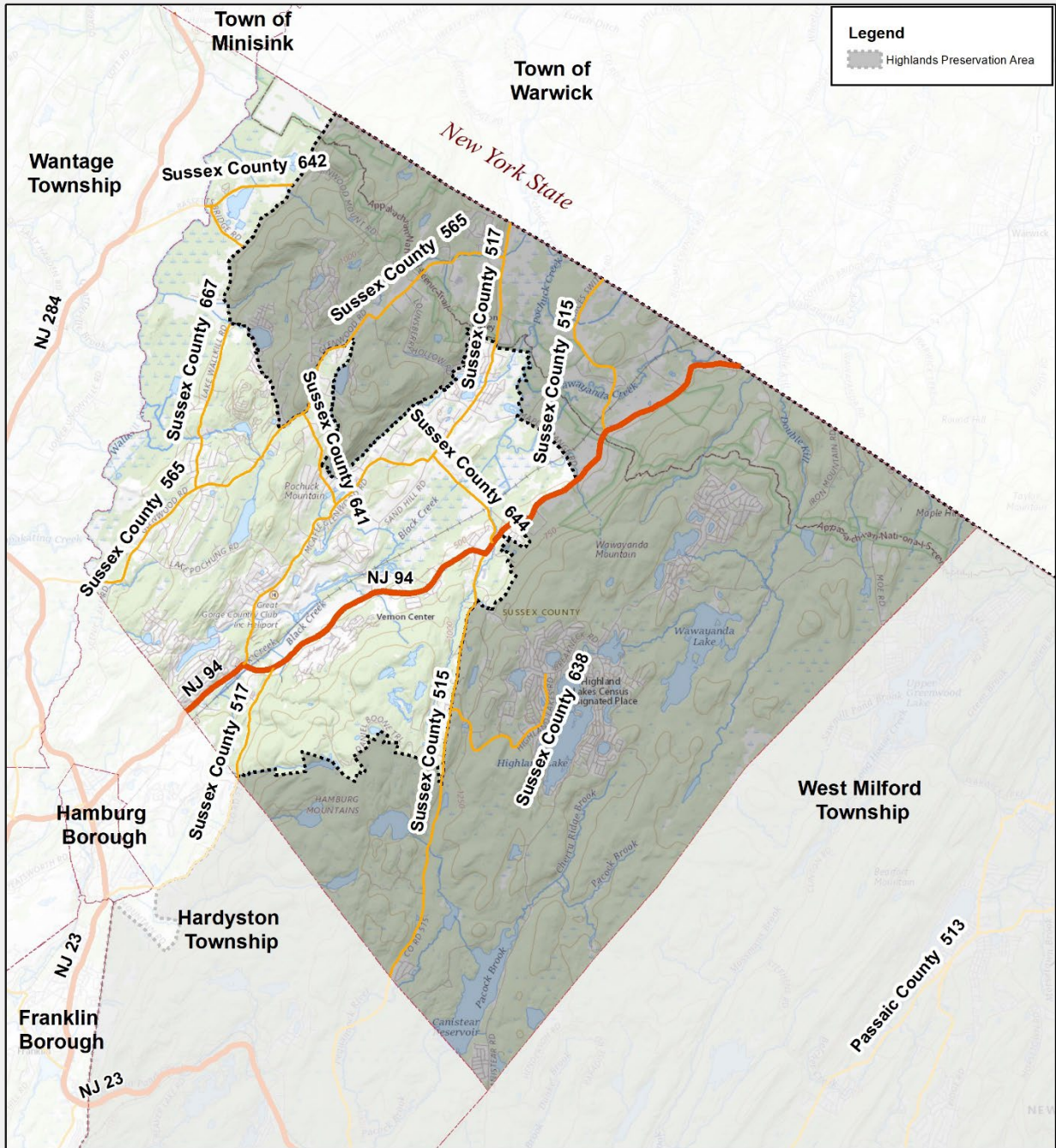


# STORMWATER MANAGEMENT PLAN

## Vernon Township

### U.S.G.S. Quadrangles Map

Township of Vernon, Sussex County, New Jersey



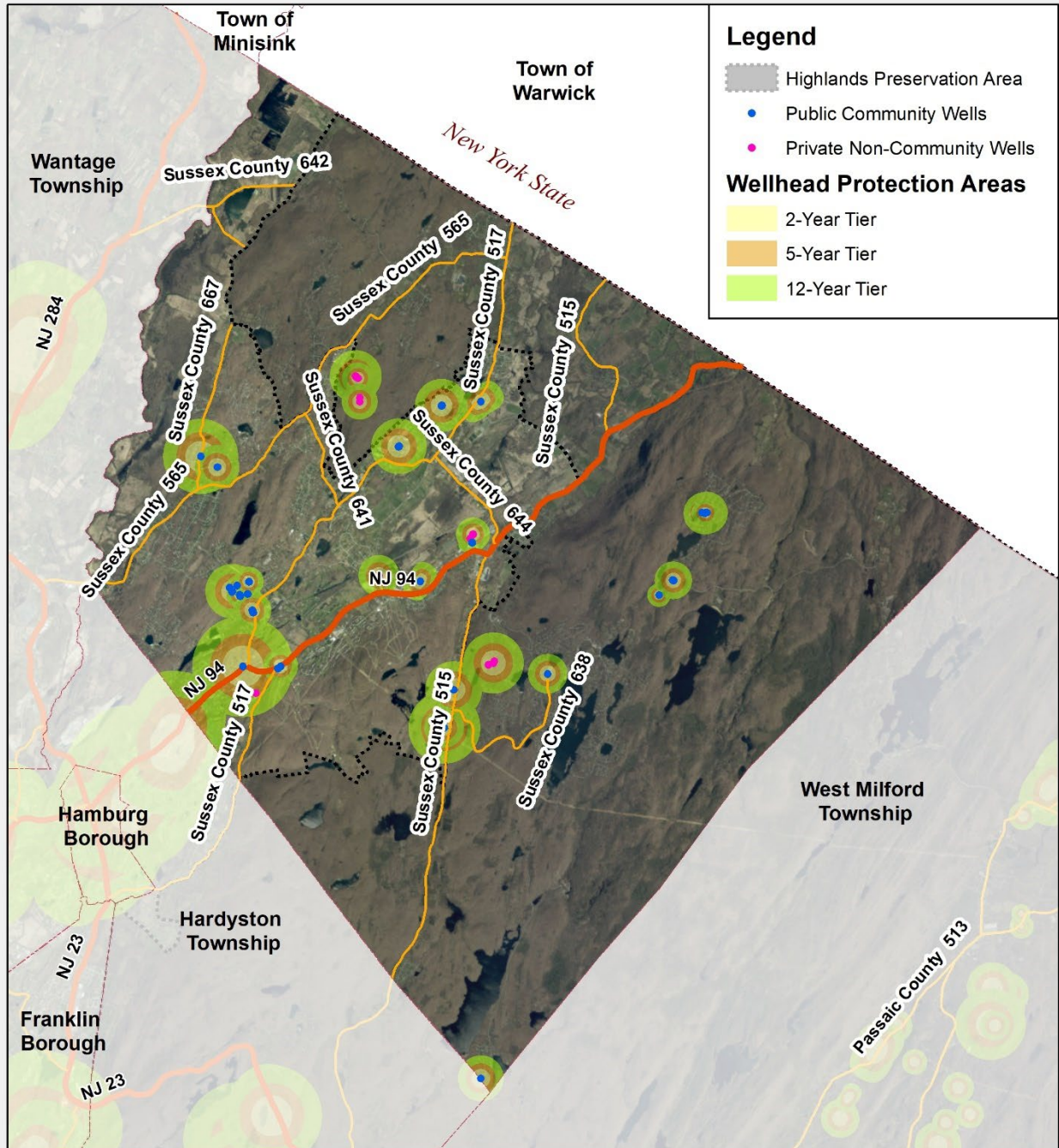
Sources: New Jersey Office of Information Technology, 2022  
New Jersey Highlands Council, 2022  
New Jersey Department of Transportation, 2022





# Wellhead Protection Areas Map

Township of Vernon, Sussex County, New Jersey



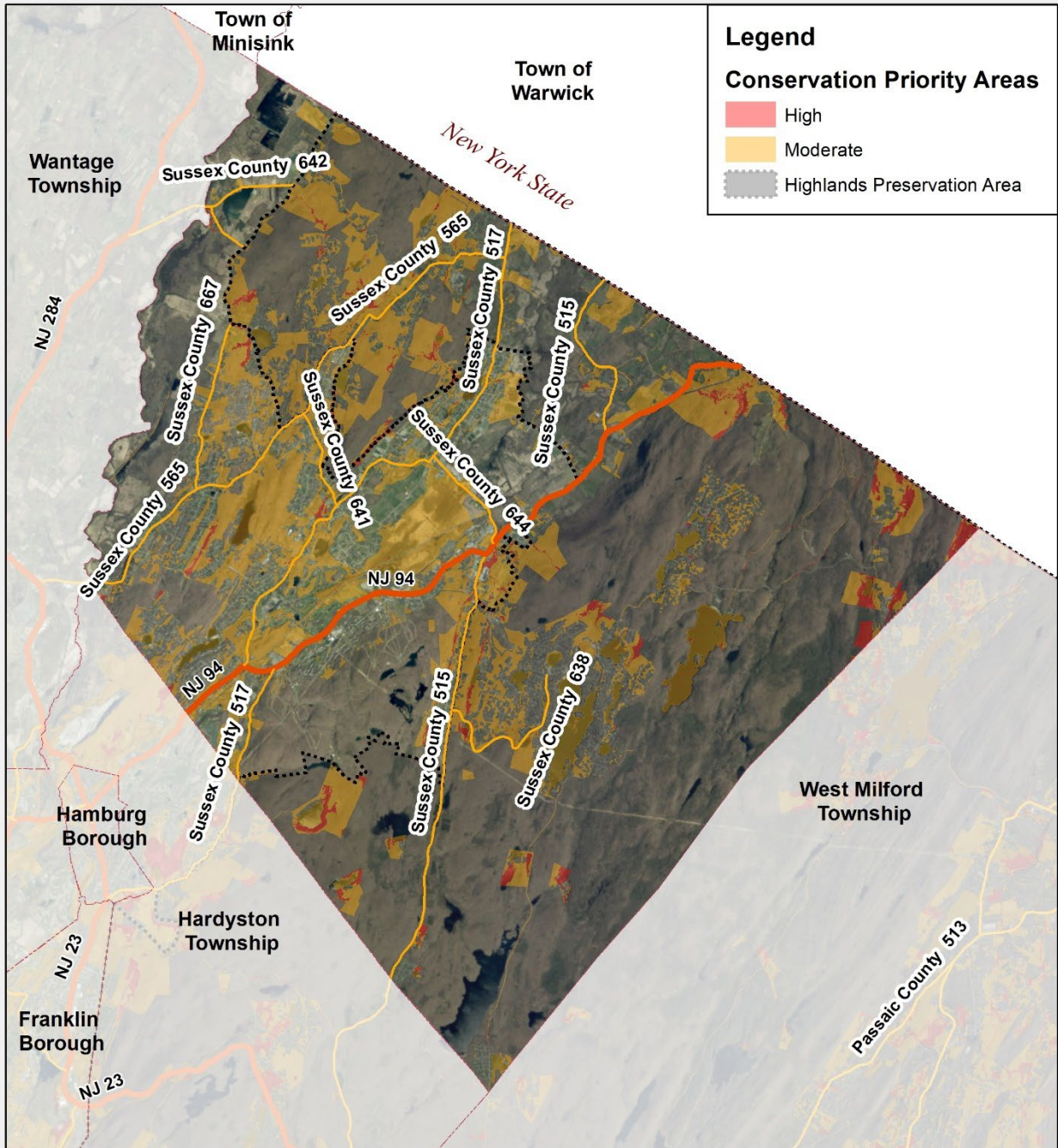
Sources: New Jersey Office of Information Technology, 2022  
New Jersey Highlands Council, 2022  
New Jersey Department of Transportation, 2022





# Highlands Conservation Priority Areas Map

Township of Vernon, Sussex County, New Jersey

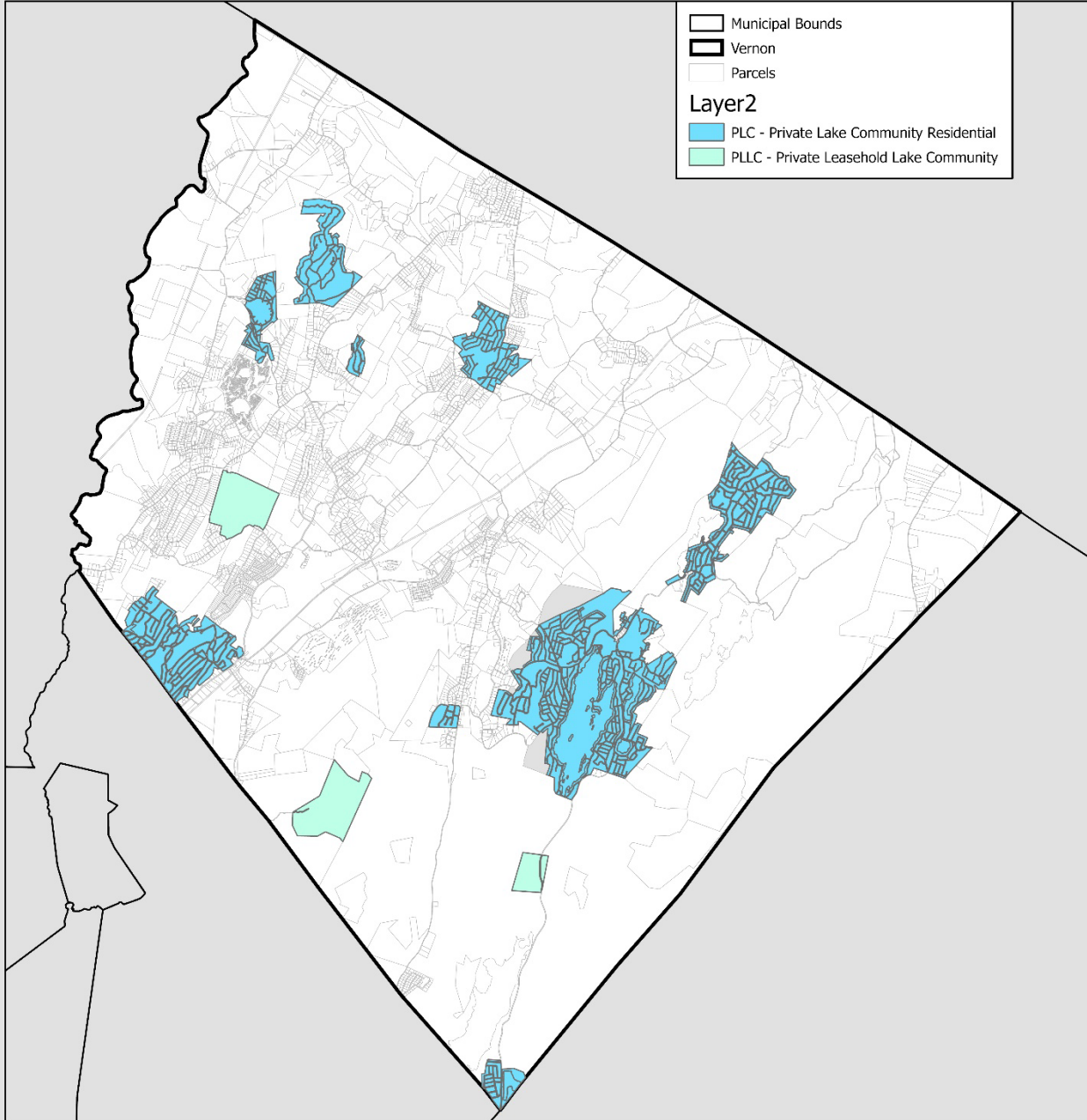


Sources: New Jersey Office of Information Technology, 2022  
New Jersey Highlands Council, 2022  
New Jersey Department of Transportation, 2022

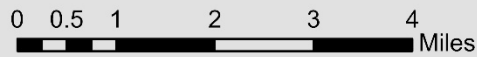


# Lake Community Zones

Township of Vernon, Sussex County, New Jersey



Source:  
New Jersey Office of Information Technology

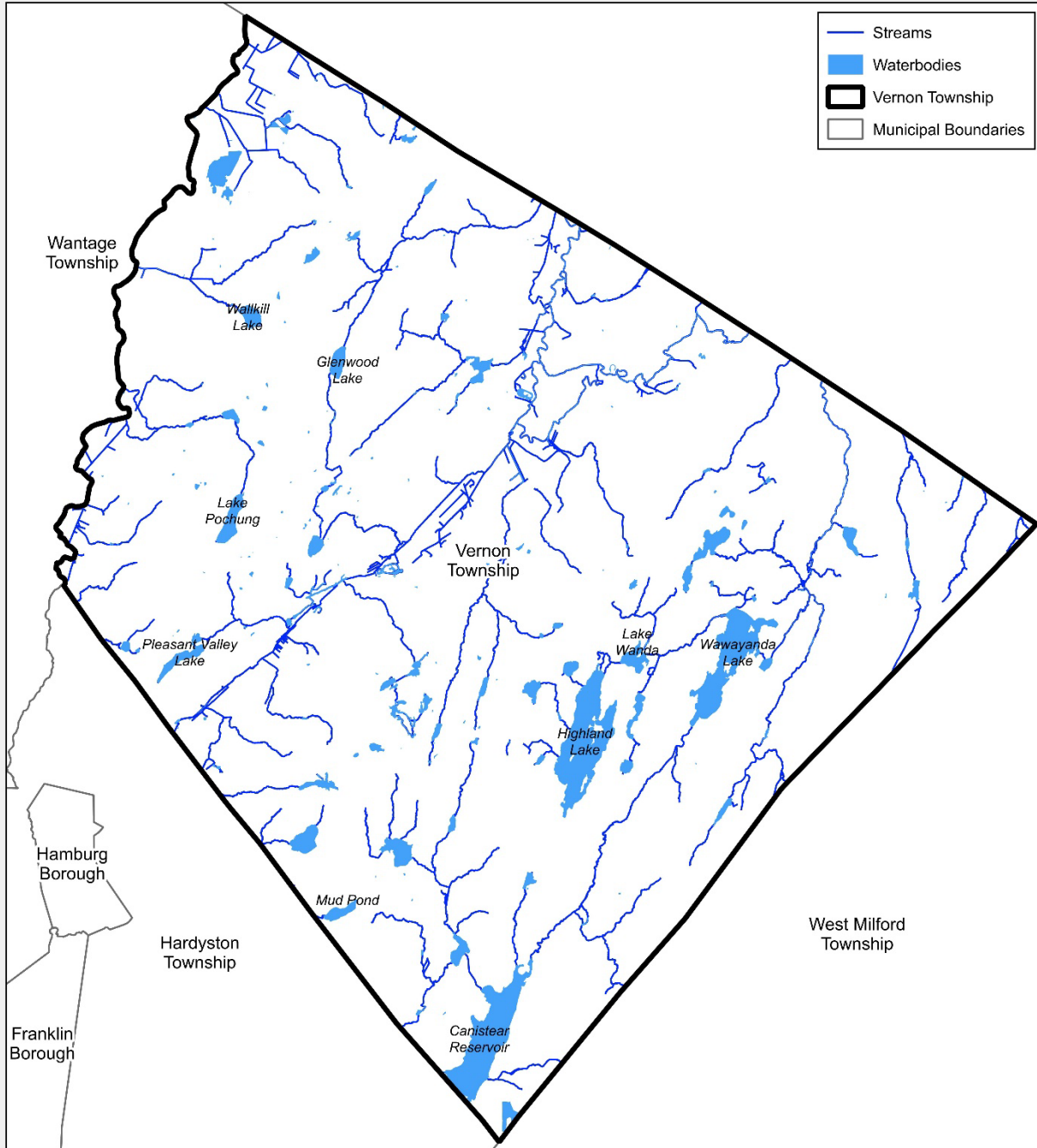


# STORMWATER MANAGEMENT PLAN

## Vernon Township

### Waterways

Township of Vernon, Sussex County, New Jersey



Sources:  
New Jersey Office of Information Technology, 2022  
New Jersey DEP, OGIS, 2022



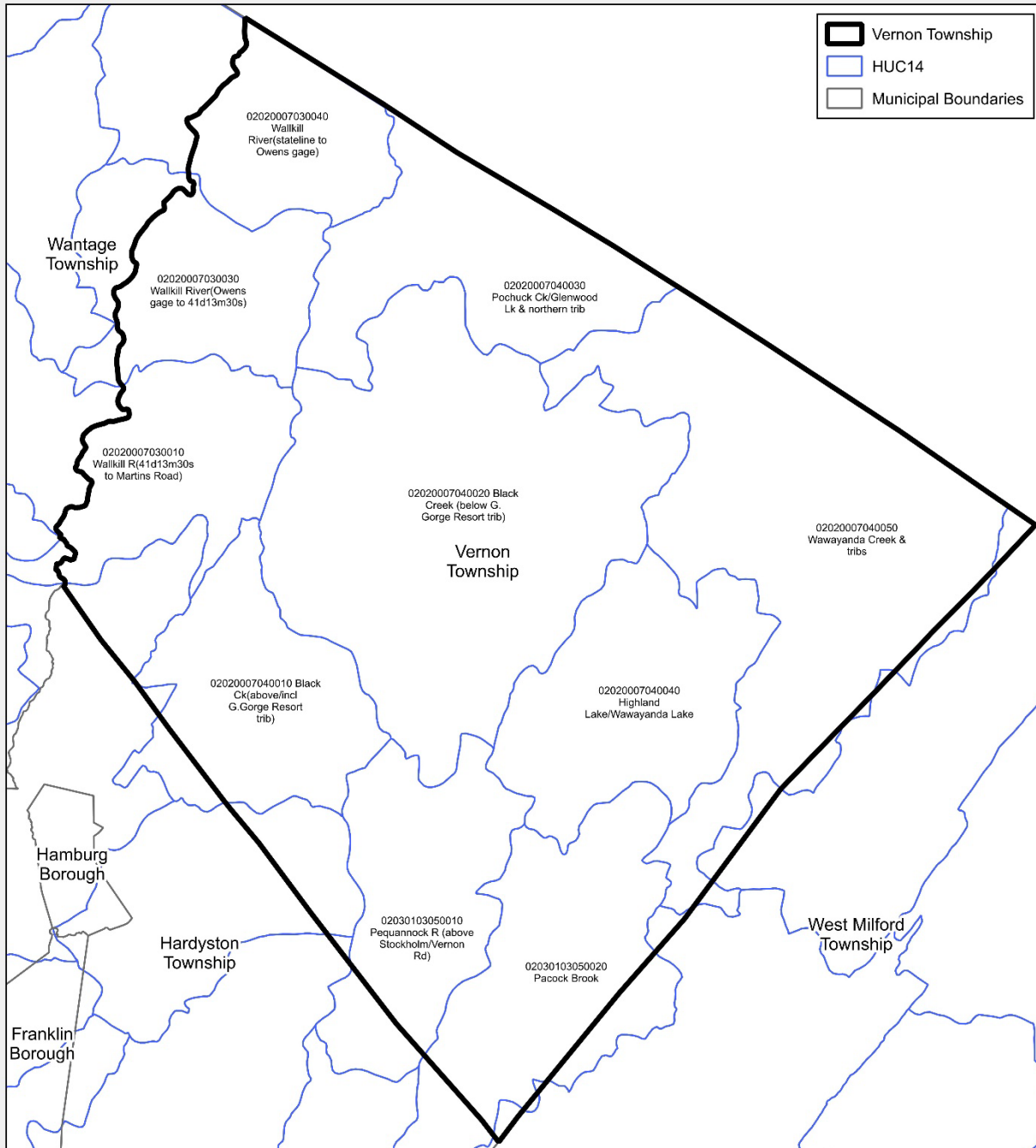


# STORMWATER MANAGEMENT PLAN

## Vernon Township

### HUC14 Subwatersheds

Township of Vernon, Sussex County, New Jersey



Sources:  
New Jersey Office of Information Technology, 2022  
New Jersey DEP, OGIS, 2022

