Municipal Stormwater Management Plan

Florence Township
Burlington County NJ

October 2021
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INTRODUCTION

This Municipal Stormwater Management Plan (MSWMP) provides strategies for Florence Township to address stormwater-related impacts. The creation of this plan is required by N.J.A.C. 7:14A-25 Municipal Stormwater Regulations. The contents and format are consistent with the requirements of N.J.A.C. 7:8 Municipal Stormwater Management Rules. The plan provides the options and strategies available to improve the management of stormwater throughout Florence Township. The plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major development, defined as projects that disturb one or more acres of land. The standards and practices provided within are intended to minimize the adverse impact of stormwater runoff on water quality and quantity and the loss of groundwater recharge that provides base flow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

A “build-out” analysis has been included in this plan based upon existing zoning and land available for development. This plan also addresses the review and update of the Florence Township Master Plan, existing ordinances, and other related planning documents to allow for project designs that include low impact development techniques and green infrastructure standards. Finally, a mitigation plan will identify the required strategies to offset the impact created by granting a waiver, variance, or exemption of the design and performance standards as set by this plan. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

GOALS

The goals of this MSWMP are to:

- Reduce flood damage, including damage to life and property;
- Minimize, to the extent practical, any increase in stormwater runoff from any new development;
- Reduce soil erosion from any development or construction project;
- Assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- Maintain groundwater recharge;
- Prevent, to the greatest extent feasible, an increase in nonpoint pollution;
- The maintenance of surface waters to ensure their biological and stormwater management functions, including the restoration, enhancement, and maintenance of their chemical, physical, and biological integrity, in order to protect public health and safeguard aquatic life;
the preservation of their scenic and ecological values; and the enhancement of their domestic, municipal, recreational, industrial, and other uses.

- Maintain the integrity of stream channels for their biological functions as well as for drainage;
- Protect public safety through the proper design and operation of stormwater basins.

To achieve these goals, this plan outlines specific stormwater design and performance standards for new development. Additionally, the plan proposes stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies 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.

**STORMWATER DISCUSSION**

Water moves continuously through the hydrologic or water cycle (see Figure 3). Water evaporates from water bodies and the earth's surface and transpires from vegetation into the atmosphere (these components of the water cycle are jointly referred to as evapotranspiration). Water vapor in the atmosphere condenses to form clouds which produce precipitation that falls to the earth's surface. A small percentage of this precipitation falls over the land and runs off into streams and lakes flowing to the oceans.

*Figure 3: The Hydrologic Cycle*

*Source: United States Geological Survey*
However, most of the precipitation that falls on land surfaces infiltrates into the ground (see Figure 4), where it either recharges shallow groundwater table aquifers and discharges to streams and springs, sustaining their base flow, or seeps into deeper confined aquifers, where it is stored for long periods and discharges regionally (see Figure 5). Human activities and development of the land can interfere with the natural water cycle, and in doing so, impact a watershed in many ways.

**Figure 4: Infiltration & Recharge**
*Source: Ohio State University – Soil Infiltration*

**Figure 5: Deep Groundwater Discharge**
*Source: Spokane Aquifer Joint Board*
Development can remove beneficial vegetation; replacing it with lawns or impervious cover, thus reducing evapotranspiration and infiltration. Clearing and grading removes depressions that store rainfall and encourage infiltration. Construction activities can also compact the soil and diminish infiltration, resulting in increased volumes and rates of stormwater runoff.

Conversely, increased impervious areas that are connected to each other through gutters, channels, and storm sewers transport runoff more quickly than natural areas. Shortening runoff travel time increases the rainfall-runoff response in the watershed, causing flow in downstream waterways to reach peak rates faster and water levels to increase above natural conditions. These conditions aggravate downstream flooding and erosion and increase the quantity of sediment in stream flow and deposited in stream channels. Impervious areas and storm sewers reduce the potential for surface vegetation to filter and remove pollutants from runoff.

Increased impervious area from land development can also decrease infiltration (Figure 6), and in turn, reduce stream base flow and groundwater recharge. Reductions in stream base flow can dry up habitat in stream channels and adjacent wetlands, and in so doing, adversely impact the health of important biological communities that reside in or depend upon these stream channels and wetlands. Increased impervious area can also increase peak stream flow, channel erosion, and sedimentation and thus can destroy aquatic habitat.

Land development can result in the addition and accumulation of pollutants on the land surface. Runoff and infiltration can mobilize and transport these pollutants to groundwater and streams. Surfaces and cleared areas within a development can receive a variety of pollutants from the atmosphere and from runoff over land surfaces that mobilizes fertilizers, animal wastes, and leakage and corrosion from vehicles. The pollutants may include suspended and dissolved solids containing metals, nutrients and other inorganic compounds; hydrocarbons, pesticides, herbicides and other
organic compounds; and pathogens—all of which can become mobilized by precipitation falling on the land.

Land development can also adversely affect water quality and stream biota in subtle ways. Runoff stored in detention or retention basins can become heated, raising the temperature of the downstream waterway and adversely affecting cold water aquatic species, such as trout, and by providing conditions that support unwanted aquatic species. Additionally, development may remove trees along streams or cause stream bank instability that undermines nearby trees. These trees are valuable because they provide shade that maintains cooler water temperatures and increased dissolved oxygen levels during critical summer periods. Trees also help stabilize stream banks, preventing bank erosion, and their leaf litter provides habitat and food for aquatic communities.

BACKGROUND

Florence Township encompasses 10.17 square miles in the northeastern part of Burlington County, New Jersey. The predominant land use throughout the Township is agricultural. The existing land use map is depicted in Figure C-5. The various zoning districts found in the Township and the current zoning map is shown in Figure C-8.

The majority of undeveloped areas that exist in Florence Township are located in the lower third of the Township. Figure C-7 identifies the topography as depicted on the USGS 7.5 Minute Quadrangle Maps.

Population & Housing

According to the 2020 Census, Florence Township has 12,812 residents. The population rose by a total of 703 residents between 2010 and 2020. Population increases have slowed in Florence Township over the past 10 years, but the Township continues to grow. Burlington County continues to grow as well by 2.9% in the past 10 years.

By the year 2050, the Delaware Valley Regional Planning Commission (DVRPC) anticipates that Florence Township will see continued growth to 13,445. This would result in an increase between 2015-2050 of 6.3%.

Based on 2015-2019 American Community Survey data, Florence Township is estimated to have 5,363 housing units with 3,873 of the units being owner occupied.

Land Development & Use

The DVRPC’s most recent 2010 data shows land use cover within Florence Township as dominated by wooded properties with agricultural being the second most common land use.

In 2020, NJDEP GeoWeb shows a significant increase in residential properties throughout the township. See Figure C-5 for land use and land cover.
SURFACE WATER QUALITY

Within Florence Township their area total of two (2) watersheds; the Assiscunk Creek Watershed and the Crafts Creek Watershed.

**Table 1.1 – Florence Township Watersheds (HUC-11)**

<table>
<thead>
<tr>
<th>Watershed ID</th>
<th>Watershed Management Area</th>
<th>Watershed Name</th>
<th>Area (Sq. Miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20EA</td>
<td>20</td>
<td>Crafts Creek</td>
<td>28.9 (18,496 AC.)</td>
</tr>
<tr>
<td>20FA</td>
<td>20</td>
<td>Assiscunk Creek</td>
<td>45.9 (29,376 AC.)</td>
</tr>
</tbody>
</table>

The NJDEP requires that municipalities evaluate the impacts of their small municipal separate storm sewer systems (small MS4s) on surface waters at the HUC14 sub-watershed level (these watershed and sub-watershed divisions were developed by the United States Geological Survey (USGS) using a coding system called Hydrological Unit Codes, or HUCs).

Figure C-4 shows the HUC14s located partially or entirely within the municipal boundaries of Florence Township. The names of the HUC14s are shown in Table 1.2.

**New Jersey Surface Water Quality Standards**

The Federal Clean Water Act requires that states maintain surface water quality in high quality waters and restore water quality in impaired waters. Surface Water Quality Standards (SWQS) have been developed by the NJDEP (and Delaware River Basin Commission (DRBC) for the Delaware River) to accomplish this goal. These standards establish “designated uses” to be achieved for surface water bodies and specify the water quality criteria necessary to achieve these uses.

Designated uses established by the NJDEP for New Jersey water bodies include potable water supply (drinking water use), propagation of fish and wildlife (aquatic life use), recreation in and on the water (primary and secondary contact), agricultural and industrial supplies, and navigation. The NJDEP has established stream classifications and antidegradation designations for all of the state’s surface water bodies. New Jersey’s Water Quality and Monitoring Standards homepage can be found at the following link:

[http://www.state.nj.us/dep/wmm/](http://www.state.nj.us/dep/wmm/)

The Surface Water Quality Standards can be found in N.J.A.C. 7:9B at these links:

[http://www.state.nj.us/dep/wmm/sgwqt/swqsdocs.html](http://www.state.nj.us/dep/wmm/sgwqt/swqsdocs.html)
[http://www.state.nj.us/dep/wmm/sgwqt/sgwqt.html](http://www.state.nj.us/dep/wmm/sgwqt/sgwqt.html)

In addition, because the Delaware River is an interstate water body, the Delaware River Basin Commission (DRBC) has established interstate zones, designated uses for each zone, and water
quality standards to achieve the designated uses along the entire length of the river. Burlington County adjoins the very lowest end of Zone 2 and the upper most portion of Zone 3. The DRBC’s 2020 Delaware River and Bay Integrated List Water Quality Assessment Report, which contains the water quality standards for each zone.

### Table 1.2 – Florence Township Sub- Watersheds (HUC-14)

<table>
<thead>
<tr>
<th>Watershed (HUC 11)</th>
<th>HUC 14 Sub-Watersheds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
</tr>
<tr>
<td>Assiscunk Creek</td>
<td>02040201100050</td>
</tr>
<tr>
<td></td>
<td>02040201100060</td>
</tr>
<tr>
<td>Crafts Creek</td>
<td>02040201090040</td>
</tr>
<tr>
<td></td>
<td>02040201090020</td>
</tr>
<tr>
<td></td>
<td>02040201090030</td>
</tr>
</tbody>
</table>

### Surface Water Classifications

The surface waters in the Assiscunk Creek and Crafts Creek Watershed are classified FW2-NT.

The designated uses for surface water classification FW2-NT (non-trout fresh surface waters not designated as FW1 or PL) as described by the N.J.A.C. 7:9B-1.12(c) are:

1. Maintenance, migration and propagation of the natural and established biota;
2. Primary and secondary contact recreation;
3. Industrial and agricultural water supply;
4. Public potable water supply after conventional filtration treatment (a series of processes including filtration, flocculation, coagulation, and sedimentation, resulting in substantial particulate removal but no consistent removal of chemical constituents) and disinfection; and
5. Any other reasonable uses.

The designated uses for surface water classification FW2-NT are to meet the statewide surface water criteria as stated in N.J.A.C. 7:9B-1.14. The fresh water portions or where the salinity is below or equal to 3.5 ppt at mean high tide, are classified as FW2-NT and take on the designate uses as described above.
Surface Water Quality Data

The New Jersey Department of Environmental Protection (NJDEP) has established an Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways. There are over 800 AMNET sites throughout the state of New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macroinvertebrate community dynamics.

Conventional Water Quality Data

The NJDEP utilizes conventional surface water quality data from a number of sources to bi-annually evaluate the impairment of surface water bodies. These water quality data include the federal Storage and Retrieval repository (STORET) data and other Existing Sources.

Impaired Waterways

For the purpose of evaluating surface water quality in this watershed, the NJDEP Integrated List (Sublists 1-5) were abridged and sorted to provide the locations of impaired waters within these watersheds and these are listed in Table 1.3(a) and 1.3(b) below. The impairments include but are not limited to: phosphorus, mercury, PCB's, pH, E. coli, fecal coliform, etc. These impairments are ranked in severity (low, medium, or high) and total maximum daily loads (TMDLs) are formed from the recommendations of this impairment listing.

Below is a list of the impaired waterways as listed within the 2014 New Jersey Integrated Report for the Assiscunk Creek Watershed:

Table 1.3(a) – Assiscunk Creek Impaired Waterways

<table>
<thead>
<tr>
<th>No.</th>
<th>Location</th>
<th>Parameter</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Assiscunk Creek (Neck Road to Jacksonville Road)</td>
<td>Arsenic</td>
<td>Low</td>
</tr>
<tr>
<td>2</td>
<td>Assiscunk Creek (Neck Road to Jacksonville Road)</td>
<td>E. Coli</td>
<td>Medium</td>
</tr>
<tr>
<td>3</td>
<td>Assiscunk Creek (Neck Road to Jacksonville Road)</td>
<td>Polychlorinated Biphenyls (PCBs) in Fish Tissue</td>
<td>Low</td>
</tr>
<tr>
<td>4</td>
<td>Assiscunk Creek (below Neck Road)</td>
<td>E. Coli</td>
<td>Medium</td>
</tr>
<tr>
<td>5</td>
<td>Assiscunk Creek (below Neck Road)</td>
<td>Polychlorinated Biphenyls (PCBs) in Fish Tissue</td>
<td>Low</td>
</tr>
</tbody>
</table>
Table 1.3(b) – Crafts Creek Impaired Waterways

<table>
<thead>
<tr>
<th>No.</th>
<th>Location</th>
<th>Parameter</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Crafts Creek (below Route 206)</td>
<td>Arsenic</td>
<td>Low</td>
</tr>
<tr>
<td>2</td>
<td>Crafts Creek (below Route 206)</td>
<td>E. Coli</td>
<td>Medium</td>
</tr>
<tr>
<td>3</td>
<td>Crafts Creek (below Route 206)</td>
<td>Polychlorinated Biphenyls (PCBs) in Fish Tissue</td>
<td>Low</td>
</tr>
<tr>
<td>4</td>
<td>LDRV tributaries (Bustleton Creek Area)</td>
<td>Mercury in Fish Tissue</td>
<td>Low</td>
</tr>
<tr>
<td>5</td>
<td>LDRV tributaries (Bustleton Creek Area)</td>
<td>Polychlorinated Biphenyls (PCBs) in Fish Tissue</td>
<td>Low</td>
</tr>
</tbody>
</table>

Total Maximum Daily Loads (TMDLs)

The NJDEP Bureau of Stormwater Permitting has provided an online search tool to review the approved TMDLs for a specific municipality. Using this tool, we have listed below the approved TMDLs applicable to the noted HUC 14 watershed areas.

1. Assiscunk TMDLs
   a. Total Maximum Daily Loads for Polychlorinated Biphenyls (PCBs) for Zones 2-5 of the Tidal Delaware River
      i. Applicable HUC 14: Assiscunk Creek (Neck Road to Jacksonville Road) (2003)

2. Crafts Creek TMDLs
   a. Total Maximum Daily Load for Mercury Impairments Based on Concentration in Fish Tissue Caused Mainly by Air Deposition to Address 122 HUC 14’s Statewide
      i. Applicable HUC 14: LDRV Tributaries (Assiscunk to Blacks Creek) (Assiscunk to Blacks Creek) (2010)

   b. Total Maximum Daily Loads for Polychlorinated Biphenyls (PCBs) for Zones 2-5 of the Tidal Delaware River
      i. Applicable HUC 14: Crafts Creek (below Route 206) (2003)

   c. Total Maximum Daily Loads for Polychlorinated Biphenyls (PCBs) for Zones 2-5 of the Tidal Delaware River
      i. Applicable HUC 14: LDRV Tributaries (Bustleton Creek area) (2003)

   d. Total Maximum Daily Loads for Polychlorinated Biphenyls (PCBs) for Zones 2-5 of the Tidal Delaware River
      i. Applicable HUC 14: LDRV Tributaries (Crystal Creek area) (2003)
The TMDLs noted above are the result of mechanical and industrial processes that have caused impairments from air depositions into the waterbodies. PCBs are formed as a result of man-made processes. These compounds generally are found within electrical equipment such as transformers and capacitors, paint, printing inks, pesticides, hydraulic fluids and lubricants. PCBs are hydrophobic in nature and can be concentrated in the tissue of fish and other aquatic life.

Mercury is a very persistent contaminant that tends to bio-accumulate and persist for long periods of time within the environment. The contaminant tends to be deposited through the air from burning coal and volcanic activity. Mercury can be deposited in the soil and waterways through improper disposal of mercury containing equipment. A TMDL has been formed to reduce mercury concentrations within the environment. The State of New Jersey has had successes eliminating mercury pollution within the State through the implementation of a Mercury Task Force which has recommend and received approval for a mercury air emission reduction from municipal solid waste incinerator facilities.

**Category 1 Waterways**

The Township of Florence does not contain any Category 1 Waterways according to the NJDEP GeoWeb.

**Hydrogeology**

The eastern portion of the Assiscunk Creek Watershed (to approximately Old York Road) is underlain by the Potomac Raritan Magothy aquifer system, which is unconfined at the surface and can provide more than 500 GPM.

Moving to the east away from the Delaware River, the Crafts Creek Watershed contains the Merchantville-Woodbury confining unit. This is a confined aquifer that will produce a yield of less than 25 GPM.

In these watersheds within the Township of Florence, these aquifers are susceptible to contamination from development, stormwater runoff, and the quality of the groundwater recharge. Confined aquifers are much more susceptible to contamination.

**Soils**

Soils within the Assiscunk and Crafts watersheds are varied in nature. Along Crafts Creek leading to the Delaware River are clay and sandy silt loams. These soils are moderately to poorly drained soils. Traveling inland toward the New Jersey Turnpike, a shift in the soil type is noted with the introduction of more well drained and urban soils.

**Critical Habitats**

The NJDEP Division of Fish and Wildlife Endangered Nongame Species Program developed a Geographic Information System (GIS) called the *Landscape Project*, which is described as a “pro-active, ecosystem-level approach to the long-term protection of imperiled and priority species and their important habitats in New Jersey.” Version 2 of the Landscape project is now available.
interactively on the web and for download. According to the NJDEP's Metadata, “Version 2 was created by intersecting imperiled and priority species data with NJDEP 1995/97 Land Use/Land Cover update. The resulting data layer identifies, delineates and ranks (based on the conservation status of species present) habitat statewide. Each patch is coded for the number of sightings of priority, state threatened, state endangered and federally listed species present. The data is designed to be used for state and local planning, open space acquisition and land-use regulation.”

The NJDEP Division of Fish and Wildlife describes the Landscape Project and the importance of preserving natural habitat as follows:

New Jersey is the most densely populated state in the nation. One of the consequences of this distinction is the extreme pressure that is placed on our natural resources. As the population grows, we continue to lose or impact the remaining natural areas of the state. As more and more habitat is lost, people are beginning to appreciate the benefits and necessity of maintaining land in its natural state.

For example, we know that wetlands are critical for recharging aquifers, lessening the damage from flooding and naturally breaking down contaminants in the environment. Forests and grasslands protect the quality of our drinking water, help purify the air we breathe and provide important areas for outdoor recreation. Collectively, these habitats are of critical importance to the diverse assemblage of wildlife found in New Jersey, including more than 70 species classified as threatened or endangered.

Many imperiled species require large contiguous tracts of habitat for survival. The consequence of the rapid spread of suburban sprawl is the loss and fragmentation of important wildlife habitat and the isolation and degradation of the smaller habitat patches that remain. Small patches of fields, forests and wetlands interspersed with development provide habitat for common species that do well living near humans, but do not provide the necessary habitat for most of our imperiled wildlife. We need to protect large, contiguous blocks of forest, grassland and wetlands to assure the survival of imperiled species over the long-term.

In addition to providing habitat for the conservation of imperiled species, protecting critical wildlife areas will result in more open space for outdoor recreation. Recent surveys by the U.S. Fish and Wildlife Service show that more than 60% of Americans participate in some form of wildlife-related recreation. Open spaces provide places where people can escape the confines of urban and suburban living.

Most critical habitats are supported in part or in total by the surrounding surface and ground water resources, and they are consequently impacted by development, non-point source pollution and stormwater runoff. Critical Habitats mapped by the NJDEP's Landscape Project within the Assiscunk and Crafts Creek Watershed are shown within Figure C-2. The Critical Habitats within this watershed may include Grassland, Forest, Forested Wetland, Emerging Wetland, Beach, Bald Eagle Foraging, Urban Peregrine Falcon Nesting, and Wood Turtle habitats that should, to the extent practical, be conserved and protected from the adverse impacts caused by uncontrolled development and stormwater runoff.
BUILD OUT ANALYSIS AND POLLUTANT LOADING PROJECTIONS

In 2010, the Delaware Valley Regional Planning Commission (DVRPC) completed a land use analysis for Florence Township. At the time of the study, only 10.2% of lands were considered vacant while the majority of the land within the Township was designated as agricultural or wooded use. Figure 2 below shows a breakdown of the land use types as recorded in 2010 within the Township.

**Figure 7 – 2010 Florence Township Land Use**

![Florence Township 2010 Land Use by Acres](image)

Source: Delaware Valley Regional Planning Commission

In 2013, the DVRPC published their population forecasts for 2010-2040. It is anticipated that Florence Township will gain 1,500-4,000 people by the year 2040.

In 2015, an update land use evaluation was conducted by the DVRPC. Figure 2.1 below shows a breakdown of the land use types and the change in percentages.

**Table 2 – 2015 Florence Township Land Use**

<table>
<thead>
<tr>
<th>Land Use Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>19.4</td>
</tr>
<tr>
<td>Industrial</td>
<td>5.0</td>
</tr>
<tr>
<td>Transportation</td>
<td>9.5</td>
</tr>
<tr>
<td>Utility</td>
<td>3.3</td>
</tr>
</tbody>
</table>
Table C-1 contains a full build out and pollutant loading analysis by land cover for the Township of Florence.

### 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/quantity and loss of groundwater recharge in receiving water bodies. This has been implemented by adoption of the NJDEP Model Stormwater Ordinance (Appendix B), as amended for use and enforcement within the Township of Florence.

The design and performance standards include the language for maintenance of stormwater management measures consistent with the stormwater management rules in 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). The Municipal Stormwater Management Plan was submitted to the county for review and approval on April 22, 2021.

During construction, Township inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed and approved.

### PLAN CONSISTENCY

The Township is not within a Regional Stormwater Management Planning Area. If one is developed in the future, Florence Township will revise this MSWMP to be consistent.

Total Maximum Daily Loads (TMDLs) have been developed for the Delaware River. Florence Township is situated within Zone 2 of the Delaware River Estuary which the EPA has restricted the amount of PCBs discharged into the river. The Township has received authorization from NJDEP’s Bureau of Nonpoint Pollution Control, to discharge municipal stormwater to the Delaware River.
under the New Jersey Pollutant Discharge Elimination System (NJPDES) Tier A Municipal Stormwater General Permit NJ0141852 (Tier A Permit). The final permit numbered NJG0149551 became effective 04/01/2004. If this permit is amended in the future, Florence Township will revise this MSWMP to be consistent.

This MSWMP is consistent with Residential Site Improvement Standards (RSIS) in N.J.A.C. 5:21. The municipality will use the most current RSIS in the stormwater management review of plans submitted for approval. This MSWMP will be consistent with any future updates to the RSIS.

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 measure and report any inconsistencies to the Burlington County Soil Conservation District.

NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES

The NJDEP’s new Stormwater Management Rules include the specific provisions that must be addressed in a municipal stormwater management plan (N.J.A.C. 7:8-4.2(c)). One of these requirements is that the plan include an evaluation of the extent to which the master plan (including the land use element), official map, and development regulations (including zoning ordinances) implement the principles of the Stormwater Management Rules relating to Green Infrastructure (GI) stormwater management strategies (N.J.A.C. 7:8-5.3(b)). The NJDEP recently adopted amendments to the current Stormwater Management Rules (N.J.A.C. 7:8) which included the removal of the non-structural strategies and the replacement with the GI Standards. An updated Stormwater Ordinance was approved on February 3rd, 2021 to reflect the amendments to The New Jersey Stormwater Management Rules (N.J.A.C. 7:8) adopted on March 2nd, 2020.

New stormwater management techniques have been developed to mimic natural hydrologic conditions and encourage infiltration and vegetation rather than structural stormwater management methods. These techniques are referred to by the NJDEP as GI Standards. GI Techniques are designed to attenuate runoff from smaller drainage areas throughout the site area in an attempt to infiltrate stormwater to be treated by vegetation or by soils or to be stored for reuse. The link to the NJDEP website to download the BMP Manual is:

http://www.njstormwater.org/bmp_manual2.htm

The NJDEP BMP Manual encourages the uses of nonstructural low impact development-BMPs, however, the requirement to utilize these BMP’s has been removed from N.J.A.C 7:8-5.2. These BMP’s include such practices as minimizing site disturbance, preserving important site features, reducing and disconnecting impervious cover, flattening slopes, utilizing native vegetation, minimizing turf grass lawns and maintaining natural drainage features.

While it may be possible at some sites to satisfy all stormwater management requirements through nonstructural LID-BMPs, these strategies are meant to be used in conjunction with the GI Standards as set forth in N.J.A.C-5.3. In an effort to break up large point discharges, the GI employs small scale structural BMP’s such as dry wells, manufactured treatment devices (MTD’s), pervious paving systems,
bio-retention, infiltration, and sand filters. These systems are permitted to be used in conjunction with larger scale structural strategies to attenuate larger storm events. The combination of the GI strategies and the structural BMP's are required to satisfy the requirements for stormwater runoff quality, quantity, and groundwater recharge.

Because GI BMP's rely on nonstructural or relatively small structural BMPs distributed throughout a land development site, ownership and maintenance may be similarly distributed to an array of property owners. Each GI BMP requires the use of a deed notice to be recorded in the county clerk's office to prevent any alteration or removal of the BMP.

The NJDEP believes that effective, state-wide use of such practices can best be achieved through modifications to municipal master plans and land use ordinances to include LID goals, GI BMP's and to provide for the use of specific LID-BMPs. The Stormwater Management Rules require municipalities to review their master plans and ordinances in order to incorporate LID non-structural techniques and GI BMP's to the maximum extent practicable.

The NJDEP Stormwater Management Rules (N.J.A.C. 7:8) require, in Section 5.2(a) that Major Development (disturbing one acre or more or increasing impervious surface by 1/4 acre) incorporate green infrastructure strategies in accordance with N.J.A.C. 7:8-5.3. Nonstructural development strategies and GI are to be given preference over structural BMPs. Where it is not possible to fully comply with the Stormwater Management Rules through nonstructural LIDs and GI, structural LID-BMPs are to be used in conjunction with standard structural BMPs to meet the Rules' requirements.

N.J.A.C. 7:8-5.2 requires that an Applicant seeking approval for a major development that is unable to meet strict compliance with green infrastructure, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements may obtain a waiver for certain conditions including:

- Enlargement of an existing public roadway
- Construction or enlargement of a public pedestrian access

Additional requirements under N.J.A.C 7:8-5.2(e) are to be met in conjunction with the activities noted above.

**Green Infrastructure Standards**

The NJDEP has amended the Stormwater Management Rule (N.J.A.C. 7:8) to require the use of Green Infrastructure (GI) BMP's to the greatest extent possible to meet the stormwater quality, stormwater quantity, and groundwater recharge requirements.

Stormwater practices prior to the development of the GI BMP's allowed for the discharge of surface water runoff into a large infiltration basin or detention basin. This created a point discharge area and ultimately led to a large volume of stormwater being discharged into a waterway without proper treatment.

The GI Standards were developed to be paired with the Low Impact Development (LID – Non-Structural Strategies) techniques to reduce the impact of stormwater from site development. The design techniques to be utilized include:
• Preserving stream buffer areas
• Minimizing the number of trees cut down during construction
• Minimizing the areas on site where heavy equipment is used
• Using the soils and vegetation that are beneficial on site
• Using GI practices that treat stormwater runoff through soil and vegetation

The NJDEP has approved a total of ten (10) GI BMP’s to address groundwater recharge, stormwater runoff quantity, and stormwater quality. The following systems have been approved for use to meet the requirements of N.J.A.C. 7:8-5.2:

• Cisterns
• Dry Wells
• Grass Swales
• Green Roof
• Manufactured Treatment Device
• Pervious Paving System
• Small Scale Bioretention Basin
• Small Scale Infiltration Basin
• Small Scale Sand Filter
• Vegetative Filter Strip

To satisfy the requirements of N.J.A.C 7:8 for water quality and groundwater recharge, the GI BMP’s must have a contributory drainage area of no greater than 2.5 acres in most cases. In certain cases when compliance with these standards is not possible, a design waiver or variance can be requested.

Nonstructural LID-BMPs

The NJDEP’s Stormwater rule’s design and performance standards encourage the maximum possible use of the nine nonstructural strategies.

1. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.
2. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.
3. Maximize the protection of natural drainage features and vegetation.
4. Minimize the decrease in the pre-construction time of concentration.
5. Minimize land disturbance including clearing and grading.
7. Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.
8. Provide vegetated open-channel conveyance systems discharge into and through stable vegetated areas.
The nonstructural LID-BMPs have been grouped by the NJDEP into four general categories:

I. Vegetation and Landscaping – reduces runoff volumes and peaks through infiltration, surface storage, and evapotranspiration, provides pervious surface for groundwater recharge and removes pollutants from stormwater. Key techniques include:

   A. Preservation of Natural Areas – preserve areas with significant hydrologic functions including forested areas, riparian corridors and soils/geology with high recharge potential.
   B. Native Ground Cover – reduce the use of turf grass and preserve areas that naturally minimize runoff.
   C. Vegetative Filters and Buffers – provide native ground cover and grass areas to filter stormwater runoff from pervious areas and to provide locations for runoff to infiltrate.

II. Minimizing Land Disturbance – reduces runoff volume and pollutant loads and maintains existing recharge rates and other hydrologic functions. Key techniques include:

   A. Planning and design to fit the development to the terrain, limiting clearing and grading.
   B. Evaluating site conditions and constraints including soil types, geology, topography, slopes, drainage areas, wetlands, and floodplains to maintain high recharge areas and provide runoff storage areas.
   C. Utilizing construction techniques that limit disturbance and soil compaction.
   D. Restricting the future expansion of buildings and other improvements that will adversely affect runoff volumes and rates or recharge rates.

III. Impervious Area Management – reduces water quality impacts, runoff volume and peak rates, runoff velocity, erosion and flooding. Key techniques include:

   A. Streets – use minimum acceptable pavement widths and incorporate pervious vegetated medians and islands with curb cuts for runoff access.
   B. Sidewalks – use pervious pavement with infiltration storage beneath and disconnect from the street drainage system.
   C. Parking and Driveways – use pervious pavement wherever practical and reduce parking space requirements by sharing requirements in mixed uses and by reducing parking space lengths by allowing for overhang into pervious areas.
   D. Pervious Paving Materials – Use pervious materials in parking spaces, driveways, access roadways and sidewalks, including pavers, porous pavement and gravel.
   E. Unconnected Impervious Areas – Disconnect impervious areas and runoff form the site’s drainage system allowing the sheet flow to cross pervious areas through curb cuts or by eliminating curbing and using shoulders and swales.
F. **Vegetated Roofs** – install lightweight vegetative planting beds on new or existing roofs.

IV. **Time of Concentration Modification** – minimize reductions to the time of concentration caused by changes in hydrologic characteristics in order to minimize the peak runoff rate. Key techniques include:

A. **Surface Roughness Changes** – increase surface roughness through the use of land cover and decrease the amount of connected smooth surfaces in order to increase runoff travel time throughout the drainage area.

B. **Slope Reduction** – reduce slopes in graded areas and/or provide terraces and reduced slope channels to increase runoff travel length and time.

C. **Vegetated Conveyance** – use vegetated channels and swales to increase roughness and runoff travel time and to provide opportunities for runoff treatment and infiltration.

In order to assure to the maximum extent possible, the use of Nonstructural LIDs in new major development, the NJDEP prepared a Nonstructural Strategies Evaluation Worksheet, and this worksheet is included in Appendix D.

**Structural LID-BMPs**

In addition to these nonstructural LID-BMPs and the Gi BMP’s, structural stormwater management measures can be LID-BMPs. These structural BMPs become LID-BMPs by storing, infiltrating, and/or treating runoff close to the source of the stormwater. Unlike standard structural BMPs that are located along a site’s drainage system, structural LID-BMPs are normally dispersed throughout a development and more closely mimic the hydrology. LID-BMPs are typically standard structural BMPs, but their location, closer to the runoff source, allows them to be smaller in size. Standard structural BMPs that can be implemented at a LID scale include: drywells, infiltration systems, bioretention basins, and both surface and subsurface detention basins; downsized, to address stormwater close to its source as LIDs.

There are a number of structural stormwater BMPs that may be used to address the groundwater recharge and stormwater quality and quantity requirements of the NJDEP Stormwater Management Rules in N.J.A.C. 7:8. The structural BMPs include the following techniques (see also *New Jersey Stormwater Best Management Practices Manual*, February 2004, which includes the planning, design, construction, and maintenance guidelines for these structural BMPs):

1. Bioretention Systems
2. Constructed Stormwater Wetlands
3. Dry Wells
4. Extended Detention Basins
5. Infiltration Basins
6. Manufactured Treatment Devices
Other BMPs that possess similar levels of effectiveness, efficiency, and endurance may also be utilized, provided that such levels can be demonstrated.

Florence Township will review the Master Plan and local land use ordinances and incorporate structural stormwater management strategies (LID and standard structural stormwater BMPs) to the extent practicable and in accordance with sound planning, science, engineering and construction principles, as they apply to its unique environment.

The Florence Township Stormwater Control Ordinance contains the following sections to be utilized in conjunction with N.J.A.C 7:8.

- Section 91-75.3 General Design and Performance Standards for Stormwater Management Measures
- Section 91-75.5 Stormwater Management Requirements for Major Development, to include Maintenance Plan, Nonstructural Stormwater Management Strategies, Erosion Control, Groundwater Recharge and Runoff Quality and Quantity Standards
- Section 91-75.5 Methods of Calculation of Stormwater Runoff and Groundwater Recharge
- Section 91-75.6 Standards for Structural Stormwater Management Measures
- Section 91-75.7 Sources for Technical Guidance
- Section 91-75.8 Safety Standards for Stormwater Management Basins
- Section 91-75.9 Requirements for Site Development Stormwater Plan, to include a Topographic Base Map, an Environmental Site Analysis, a Project Description and Site Plans, and Land Use Planning and Source Control Plan, a Stormwater Management Facilities Map, comprehensive hydrologic and hydraulic design calculations, a Soils Report, and a Maintenance and Repair Plan.

**MITIGATION PLANS**

A mitigation plan is required to grant a variance or exemption form design and performance standards of the Florence Township's MSWMP. The mitigation requirements offer a hierarchy of options that clearly offset the effect on the three elements of the MSWMP; groundwater recharge, stormwater quantity control, and/or stormwater quality control that was created by granting the variance or exemption. Florence Township requires applicants that are seeking a variance or exemption from the design and performance standards of the MSWMP to refer to the current list of mitigation projects that would qualify as candidates to be included in the applicant's proposed mitigation plan.

Annually, the Township Engineer in conjunction with the Township Environmental Commission shall develop and/or amend a list if mitigation projects throughout the Township that may be used by applicants seeking a variance or exemption from the design and performance standards set by the
Township MSWMP. The mitigation list is intended to provide the desired hierarchy of projects for the element of the MSWMP that the variance or exemption was granted. The current list of mitigation projects will be kept on file at the Township Municipal Building and will be made available upon request.

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 of the Township's MSWMP.

If a suitable site cannot be located within the same drainage area the mitigation project may provide mitigation that is not equivalent to the impacts for which the variance or exemption is sought but will address the same issue. For example, if a variance or exemption is given because the 80 percent TSS requirement may not be met, the selected project may address water quality impacts due to a fecal impairment.

The township may allow a developer to provide funding or partial funding to the Township for an environmental enhancement project that has been identified in the Florence Township's List of Mitigation Projects, 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 project, 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.
Figure C-1: Aerial Map
Figure C-2: NJDEP Landscape Project
Figure C-3: Groundwater Recharge Map
Figure C-4: HUC-14 Watershed Map
Figure C-5- Land Use/ Land Cover Map
Figure C-6: Streams Map
Figure C-7: USGS Map
Figure C-8: Zoning Map
## Table C-1: Build Out Analysis

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Notes: *Urban Land Use from Figure  
**Major right of Ways, Major Utility Easements, Municipal, Quasi-Municipal, Parks, Schools, Waterbodies, & Wetlands from Figure  
***Agricultural, Barren Land, & Forest from Figure  
TP = Total Phosphorus Load  
TN = Total Nitrogen Load  
TSS = Total Suspended Solids Load
Table C-2: Pollutant Loads by Land Cover

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