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Stormwater Management Plan

For

**Township of Shrewsbury
Monmouth County, New Jersey**

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SHT-001

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Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Township of Shrewsbury (“the Township”) to address stormwater related impacts. The creation of this plan is required by N.J.A.C. 7:14A-25 Municipal Stormwater Regulations. This plan contains all of the required elements described in N.J.A.C. 7:8 Stormwater Management Rules. 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 acre of land. These standards are intended to minimize the adverse impacts of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides baseflow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

This plan also addresses the review and update of existing ordinances and other planning documents to allow for project designs that include low impact development techniques. In addition, the plan includes a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

MSWMP 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 source pollution;
- Maintain the integrity of stream channels for their biological functions, as well as for drainage;
- Minimize pollutants in stormwater from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values and to enhance the domestic, municipal, recreational, industrial, and other uses of water; and
- 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. 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.

Stormwater Discussion

Land development can dramatically alter the hydrologic cycle (see Figure 1) of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. 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 under 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 area can also decrease opportunities for infiltration, which in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy the habitat of some species,

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.

In addition to increased pollutant loading, land development can adversely affect water quality and stream biota in more subtle ways. For example, stormwater falling on impervious surfaces or stored in detention or retention basins can become heated and raise the temperature of the downstream waterway, adversely affecting cold water fish species such as 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.

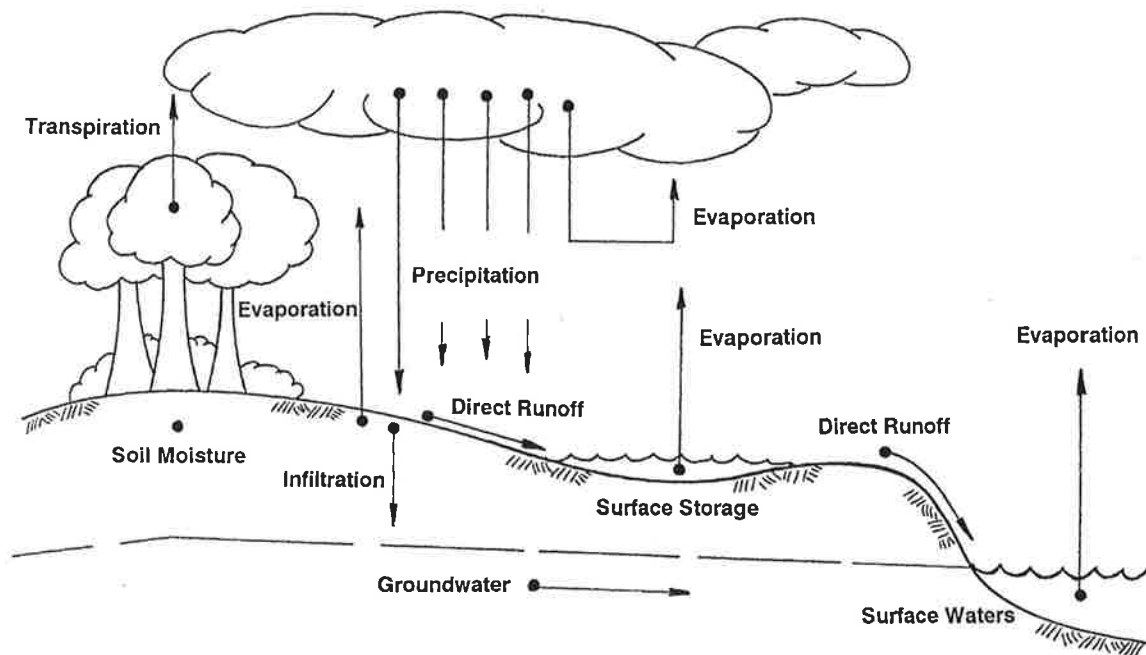


Figure 1 – Hydrologic Cycle

Background

The Township of Shrewsbury encompasses 0.1 square miles in central east portion of Monmouth County, New Jersey. The Township is almost entirely a residential community with no areas of development remaining. Streams and rivers within the Township are shown in Figure 2 and the topography of the Township is shown in Figure 3.

According to the 2000 census, the Township has 1,098 residents. The population has not increased since the 1990 census.

The Township is situated in the Atlantic Coast Water Shed just south of the North Branch of Parkers Creek, which drains into the Shrewsbury River. The municipality is located in Monmouth Coastal Watershed Management Area (WMA) 12. The Township is within one (1) Hydrologic Unit Code (HUC) areas (02030104080020). This HUC14 area is shown in Figure 4.

The New Jersey Department of Environmental Protection (NJDEP) has established an Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways and aquatic life, known as the DEP Sublist 5. There are over 800 AMNET sites throughout New Jersey. These sites are sampled for benthic macroinvertebrates fecal coliform and phosphorus by the 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.

Based on the AMNET data, the waterbodies bordering the Township are moderately impaired. The closest AMNET site is located just west of the Township in the Shrewsbury River Estuary.

In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on the streams in the state. These data show that the instream total coliform and dissolved oxygen of the Shrewsbury River Estuary frequently fails to meet the state's criteria. This means that the river is an impaired waterway and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) requirement for these pollutants.

A TMDL is the amount of a pollutant that can be accepted by a waterbody without causing an exceedance of water quality standards or interfering with the ability to use a waterbody for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant, such as stormwater and wastewater discharges, which require an NJPDES permit to discharge, and nonpoint source pollution, which includes stormwater runoff from agricultural areas and residential areas, along with a margin of safety. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan is developed to identify how the various sources will be reduced to the designated allocations. Implementation strategies may include improved stormwater treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems, and implementing other BMP's.

The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)), also known as the "Integrated List", is required by the Federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDL's are needed. The Shrewsbury River Estuary and Parker's Creek (aquatic life) is listed on the 2004 proposed Sublist 5 (March 1, 2004) and is non-attaining for total coliform.

The Township is almost fully developed and the existing land use/ land cover, based on 1995/1997 aerial photography, is shown in Figure 6. The existing zoning is shown in Figure 7. A current aerial photo based on the NJDEP 2002 data is shown in Figure 8. The vast majority of land is urban land with little chance for groundwater recharge. The Township is entirely within the State Plan Designation PA1 Metropolitan Planning Area where infiltration requirements are not applicable. However, groundwater recharge rates for native soils in this area are generally between 1 and 19 inches annually. The average annual groundwater recharge rates are shown graphically in Figure 9.

According to the NJDEP, "A Well Head Protection Area (WHPA) in New Jersey is a map area calculated around a Public Community Water Supply (PCWS) well in New Jersey that delineates the horizontal extent of ground water captured by a well pumping at

a specific rate over a two-, five-, and twelve-year period of time for unconfined wells. ... The confined wells have a fifty foot radius delineated around each well serving as the well head protection area to be controlled by the water purveyor in accordance with Safe Drinking Water Regulations (see NJAC 7:10-11.7(b)1).”

WHPA delineations are conducted in response to the Safe Drinking Water Act Amendments of 1986 and 1996 as part of the Source Water Area Protection Program (SWAP). The delineations are the first step in defining the sources of water to a public supply well. Within these areas, potential contamination will be assessed and appropriate monitoring will be undertaken as subsequent phases of the NJDEP SWAP

As shown in Figure 10, the Township is not in a tier 3 well head protection area and there are no other well head protection areas in the Township.

In addition to the rivers and streams that run through and along the Township, there are a number of wetland areas. These wetland areas, shown in Figure 11, provide flood storage, nonpoint pollutant removal and habitat for flora and fauna.

Design and Performance Standards

The Township will adopt the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The 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. The ordinances will be submitted to the County for review and approval within 12 month of the adoption date of the Stormwater Management Rules.

Plan Consistency

The Township is not within a Regional Stormwater Management Planning Area and no TMDL's have been developed for waters within the Township; therefore this plan does not need to be consistent with any regional stormwater management plans (RSWMPs) nor any TMDL's. There is currently a RSWMP being prepared for Parker's Creek and upon completion this Municipal Stormwater Management Plan will be updated to be consistent with the plan and associated TMDL's.

The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. The Township will utilize the most current update of the RSIS in the stormwater review of residential areas. This Municipal Stormwater Management Plan will be updated to be consistent with any future updates of 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 measures and report any inconsistencies to the local Soil Conservation District. All pertinent design calculations for stormwater management facilities should adhere to the new design rainfall depths for Monmouth County as revised by the Natural Resources Conservation Service as of September 2004 accordingly:

NRCS 24 Hour Design Storm Rainfall Depths

as Revised September 2004

Storm Period	1 Year		2 Year		5 Year		10 Year		25 Year		50 Year		100 Year	
	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New
Monmouth County	2.8	2.9	3.4	3.4	4.4	4.4	5.3	5.2	6.0	6.6	6.5	7.7	7.5	8.9

The Stormwater Management Ordinance shall be consistent with and requires all new development and redevelopment plans to comply with the Monmouth County Growth Management Guide's objective to Water Resources as follows:

1. Encourage the protection and conservation of all water resources.
2. Encourage the protection of potable water resources.
3. Encourage the preservation and improvement of coastal water resources.
4. Promote preservation and improvement of surface water quality.
5. Encourage the preservation and improvement of groundwater quality and quantity.
6. Promote and protection of water-oriented wildlife habitat.
7. Promote the preservation, restoration and enhancement of wetlands and stream corridors in order to protect the adjacent water bodies, such as streams, rivers, lakes, bays and oceans.

Nonstructural Stormwater Management Strategies

The Township has reviewed the current master plan and land use ordinances. The appropriate sections of each document will reference the Municipal Stormwater Management Plan. Each development application will be reviewed on a case-by-case basis for implementation and consistency with the Non-Structural Stormwater Management Strategies regulations. The applicant's engineer and the applicable reviewing board will implement Nonstructural Stormwater Management Strategies that are conducive to the type and intensity of the proposed development. Said Nonstructural Stormwater Management Strategies will include, but not limited to the following:

- The protection of areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.

- Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces
- Maximize the protection of natural drainage features and vegetation
- Minimize the decrease in the pre-construction “time of concentration.”
- Minimize land disturbance including clearing and grading.
- Minimize soil compaction.
- Encourage low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.
- Encourage vegetated open-channel conveyance systems that discharge into and through stable vegetated areas.
- Encourage preventative source controls.
- Encourage public education through distribution of brochures and handouts regarding stormwater pollution and prevention.

Once the ordinance texts are completed, they will be submitted to the county review agency for review and approval within 12 months of the adoption of the Stormwater Management Plan. A copy will be sent to the Department of Environmental Protection at the time of submission.

Land Use/Build-Out Analysis

Since the Township of Shrewsbury has a combined total land area of 0.1 square miles with very little vacant lands (there are no agricultural lands), therefore the Township is not required to do a build-out analysis.

Mitigation Plans

Applicants for development will be expected to mitigate the impacts of development on stormwater at their own site. No variances and exemptions from the standards shall be granted. The Township of Shrewsbury has little or no land area within the Township suitable for flood control or water quality enhancement mitigation projects. The lack of available lands for such purposes can be seen from the Aerial photo Map provided in Figure 8. It is unlikely that the municipality could facilitate a major development as a result of the land constraints. It is more practical for any new development to provide on-

site stormwater facilities rather than implementing a municipal system that would disrupt the existing built environment.

Recommended Implementing Stormwater Control Ordinances

The Township will implement or revise the following ordinances:

- Illicit Connection Ordinance
- Improper Waste Disposal Ordinance
- Litter Ordinance
- Pet Waste Ordinance
- Wildlife Feeding Ordinance
- Yard Waste Ordinance
- The Stormwater Control Ordinance will be implemented in accordance with NJAC 7:8-4.