# Township of Elsinboro Municipal Stormwater Management Plan

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**Prepared for:** 

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### Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Township of Elsinboro ("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 impact 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.

A "build-out" analysis has not been included in this plan and will be submitted under separate cover.

The plan also addresses the review and update of existing ordinances, the Township Master Plan, and other planning documents to allow for project designs that include low impact development techniques. The final component of this plan is 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.

## 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;
- maintain the integrity of stream channels for their biological functions, as well as for drainage;
- minimize pollutants in stormwater runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water; 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. Preventative and corrective maintenance strategies are included in the plan to ensure long-term effectiveness of stormwater management facilities. The plan also outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

#### Stormwater Discussion

Land development can dramatically alter the hydrologic cycle (see Figure No. 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 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 habitat from which some species cannot adapt.



#### Figure No. 1: Groundwater Recharge in the Hydrologic Cycle

Source: New Jersey Geological Survey Report GSR-32.

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.

As well as 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.

# Background

The Township encompasses  $\pm 13.29$  square mile area in southwestern Salem County, New Jersey. The Township is bounded by Pennsville Township and Salem City to the north and Lower Alloway Creek to the south.

The population of the Township has decreased from 1,170 in 1990 to 1,092 in 2000. However, the total number of housing units has increased from 492 in 1990 to 530 in 2000. The housing increase, along with changes in the landscape, have most likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality.

Figure No. 2 (see attached) illustrates the waterways in the Township. Figure No. 3 (see attached) depicts the Township boundary on the USGS quadrangle maps.

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.

The major rivers that border the Township to the north, west and south are the Salem River, the Delaware River and Alloway Creek respectively, are not impaired. The tributaries that flow through the Township to these major rivers are also not impaired based on AMNET data.

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 dioxin concentrations and PCB concentrations of the Delaware River frequently exceed the state's criteria. This means that these rivers are impaired waterways and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for these pollutants for each waterway.

A TMDL is the amount of a pollutant that can be accepted by a waterbody without causing an exceedance of water quality standards or interfering with the ability to use a waterbody for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant, such as stormwater and wastewater discharges, which require an NJPDES permit to discharge, and nonpoint source, which includes stormwater runoff from agricultural areas and residential areas, along with a margin of safety. Provisions may also be made for future sources

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

The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)) (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 TMDLs are needed.

In addition to water quality problems, the Township has exhibited severe water quantity problems including flooding, stream bank erosion, and diminished base flow in its streams. Many of the culverts associated with road crossings in the Township are undersized. During severe storm events, these undersized culverts do not have adequate capacity, thereby causing a backwater effect and flooding upstream.

These culverts were designed for much different hydrologic conditions (i.e., less impervious area) than presently exist in the Township. As the imperviousness increased in the Township, the peak and volumes of stream flows also increased. The increased amount of water resulted in stream bank erosion, which resulted in unstable areas at roadway/bridge crossings, and degraded stream habitats. The high imperviousness of the Township has significantly decreased groundwater recharge, decreasing base flows in streams during dry weather periods. Lower base flows can have a negative impact on instream habitat during the summer months.

A map of the groundwater recharge areas is shown in Figure No. 4 (see attached). Wellhead protection areas, also required as part of the MSWMP, are shown in Figure No. 5 (see attached).

Although there are no wellhead protection areas within the Township, the Township may want to consider adoptings specific ordinances to minimize the infiltration of pollutants into aquifers.

### 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 4/1/06.

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

### Plan Consistency

The Township is not within a Regional Stormwater Management Planning Area and no TMDLs 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 TMDLs. If any

RSWMPs or TMDLs are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent.

The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. The municipality will utilize the most current update of the RSIS in the New Jersey Stormwater Best Management Practices Manual for stormwater management review of residential areas. This Municipal Stormwater Management Plan will be updated to 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 measures and report any inconsistencies to the local Soil Conservation District.

#### Nonstructural Stormwater Management Strategies

The Township has reviewed the master plan and ordinances, and has provided a list of the sections in the Township land use and zoning ordinances that are to be modified to incorporate nonstructural stormwater management strategies. These are the ordinances identified for revision. Once the ordinance texts are completed, they will be submitted to the county review agency for review and approval within 4/1/06. A copy will be sent to the Department of Environmental Protection at the time of submission.

The Township Code was reviewed with regard to incorporating nonstructural stormwater management strategies. Several changes should be made to the Township Code, to incorporate the following strategies.

- 1) Chapter III-Zoning
  - a) Article III–Supplementary District Regulations
    - i) § 3.7: Flood Hazard Areas describes procedures for construction within a floodplain designation. It is intended to prevent unsafe development, prevent unsanitary conditions and related hazards, minimize danger to public health by protecting water supplies, recharge areas and the natural drainage system.

We recommend this section be amended to encourage the use of natural vegetated swales.

- b) Article IV–General Standards
  - i) § 3.9: Fences and Walls detail the requirements for fences and walls.

We recommend this section be amended to encourage the use of native vegetation for landscaped fencing.

ii) § 3.10: Driveways describe the provisions for driveways within the Township.

We recommend this section be amended to allow the use of pervious paving materials for driveways to minimize stormwater runoff and promote groundwater recharge.

- c) Article V-Special Standards and Requirements
  - i) § 3.15: Roadside Stands describe the requirements for roadside stands.

We recommend this section be amended to include language of using pervious materials (i.e. gravel, crushed stone, pavers) for parking or temporary stopping areas to minimize stormwater runoff and promote groundwater recharge.

ii) § 3.17: Campgrounds describes the requirements for campgrounds.

We recommend this section be amended to require that leaf litter and other beneficial aspects of the woodlands are maintained in addition to the natural condition of the trees (i.e. prevent cutting tree limbs for firewood).

We recommend the natural screening within the buffer area be amended to require the use of native vegetation.

We also recommend this section incorporate language to encourage the use of pervious materials for driveways and/or access roads to control sedimentation and promote groundwater recharge.

iii) § 3.24: Private or Public Swimming Clubs provide standards for private and public swimming clubs.

We recommend this section be amended to allow the use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge.

We also recommend this section encourage the use of native ground cover and plants for landscaping purposes.

iv) § 3.25: Planned Shopping Centers provides standards to permit planned shopping centers.

The Township may want to consider reducing the maximum percentage of impervious surfaces by the encouraging the following:

- Use of pervious paving materials (for overflow parking, therefore reducing the impervious parking area) to minimize stormwater runoff and promote groundwater recharge,
- Use of curb cuts or flush curbs with curb stops to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas.
- Use of vegetative roofs to reduce impervious surfaces by retaining precipitation on and within the planting bed and on the surface of vegetation, ultimately reducing the volume of runoff from the roof.
- Use of native ground cover and plants for landscaping purposes.
- 2) Chapter IV-Site Plan Review
  - a) Article III–Improvements and Design Standards
    - i) § 4.6: Off-street Parking details off-street parking requirements.

We recommend this section be amended to allow the use of pervious paving materials (i.e. porous concrete or porous asphalt) to minimize stormwater runoff and promote groundwater recharge.

This section should also be amended to allow for curb cuts or flush curbs with curb stops to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas.

We also recommend this section encourage considering the use of parking decks for the larger sites. This can reduce the impervious coverage by concentrating the total required parking area into a smaller spot.

ii) § 4.7: Off-street Loading details off-street loading requirements.

We recommend this section be amended to allow the use of pervious paving materials (i.e. porous concrete or porous asphalt) to minimize stormwater runoff and promote groundwater recharge.

iii) § 4.8: Access describes the requirements for access to a site.

We recommend this section be amended to allow the use of pervious paving materials (i.e. porous concrete or porous asphalt.

iv) § 4.10: Buffering and Screening requires sufficient buffering and screening to minimize any adverse impacts of the site or from adjacent areas and to improve the physical appearance of the site.

We recommend this section amend the landscaping portion to require the use of native vegetation, which requires less fertilization and watering and to also include language to require the preservation of natural wood tracts and limits land disturbance for new construction.

We recommend this section be amended to incorporate language to allow buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces.

v) § 4.11: Landscaping details the landscaping requirements.

We recommend this section be amended to require the use of native vegetation.

The Township may want to consider providing a list of approved tree and shrub species.

- 3) Chapter V-Land Subdivision
  - b) Article II–Improvements and Design Standards
    - i) § 5.5: Streets and Roads provide specific design requirements for streets and roads.

We recommend this section be amended to encourage developers to limit on-street parking to allow for narrower paved widths.

This section should also be amended to allow for curb cuts or flush curbs with curb stops to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas.

ii) § 5.6: Drainage details the design standards for drainage within the Township.

We recommend this section be amended to implement the use of natural vegetated swales in lieu of inlets and pipes.

iii) § 5.11: Pedestrian Circulation

We recommend this section be amended to encourage/incorporate the following:

- Allow the use of pervious paving materials for sidewalks to minimize stormwater runoff and promote groundwater recharge.
- Design sidewalks to discharge stormwater to neighboring lawns where feasible to disconnect these impervious surfaces, and/or use permeable paving materials where appropriate.

The Township has 3 residential districts. Each district has a maximum percent impervious surface allocation, ranging from 15 percent for the RR-A District, which has a minimum lot size of 50,000 square feet for detached single-family homes, to 25 percent for the MR District, which has a minimum lot size of 18,000 square feet for single-family homes.

The Township has 2 nonresidential districts. Each of these districts has a maximum percent impervious surface allocation, ranging from 5 percent for the CONS District to 35 percent for the C District.

We recommend the Township Code be amended to remind a developer that satisfying the percent impervious requirements does not relieve them of responsibility for complying with the Design and Performance Standards for Stormwater Management Measures.

If a developer is given a variance to exceed the maximum allowable percent imperviousness, the developer must mitigate the impact of the additional impervious surfaces. This mitigation effort must address water quality, flooding, and groundwater recharge. A detailed description of how to develop a mitigation plan is included in this Municipal Stormwater Management Plan.

# Land Use/Build-Out Analysis

A detailed land use analysis for the Township shall be submitted under separate cover.

# Mitigation Plans

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.

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 Chapters 8 and 9 of the NJDEP Stormwater BMP Manual.
  - a. 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. Listed below are specific projects that can be used to address the mitigation requirement.

Groundwater Recharge

- ii. Retrofit the L.B. Middle School site and detention basin to provide an additional 300,000 cf of average annual groundwater recharge.
- iii. Replace the existing deteriorated 20,000 sf overflow impervious parking lot at Children's Memorial Soccer Complex with permeable paving to provide 150,000 cf of additional average annual groundwater recharge.

#### Water Quality

- i. Retrofit the existing stormwater management facility at Matisse Elementary School to provide the removal of 80 percent of total suspended solids from the parking lot runoff.
- ii. Retrofit the existing parking area at the West Side Municipal Complex to provide the removal of 80 percent of total suspended solids. Due to site constraints, the retrofit BMP must be installed underground and cannot reduce the existing number of parking spaces.

#### Water Quantity

- i. Install stormwater management measures in the open space in the Woodlot Development to reduce the peak flow from the upstream development on the receiving stream by 20 cfs, 35 cfs, and 100 cfs for the 2, 10, and 100-year storms respectively.
- 2. If a suitable site cannot be located in the same drainage area as the proposed development, as discussed in Option 1, 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. For example, if a variance is given because the 80 percent TSS requirement is not met, the selected project may address water quality impacts due to a fecal impairment. Listed below are specific projects that can be used to address the mitigation option.

### Water Quality

- i. Re-establish a vegetative buffer (minimum 50 foot wide) along 1,500 linear feet of the shoreline at Sunshine Pond as a goose control measure and to filter stormwater runoff from the high goose traffic areas.
- ii. Provide goose management measures, including public education at Central Park.

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.

Figures















