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# **STORMWATER MANAGEMENT PLAN**

**FOR THE**

**TOWN OF DOVER  
MORRIS COUNTY, NJ**

**February 2005**

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## TABLE OF CONTENTS

1.0	INTRODUCTION.....	2
2.0	GOALS.....	3
3.0	STORMWATER DISCUSSION.....	4
4.0	BACKGROUND.....	6
5.0	DESIGN AND PERFORMANCE STANDARDS.....	8
6.0	PLAN CONSISTENCY.....	10
7.0	NONSTRUCTURAL MANAGEMENT STRATEGIES.....	11
8.0	LAND USE/BUILD OUT ANALYSIS.....	14
9.0	MITIGATION PLANS.....	15

## FIGURES

- Figure C-1: Groundwater Recharge in the Hydrologic Cycle
- Figure C-2: Town and Its Waterways.
- Figure C-3: Town Boundary on USGS Quadrangles.
- Figure C-4: Groundwater Recharge Areas
- Figure C-5: Wellhead Protection Areas in the Town
- Figure C-6: Town's Existing Land Use
- Figure C-7: Hydrologic Units (HUC14s) Within the Town
- Figure C-8: Zoning Districts within the Town
- Figure C-9: Wetlands and Water Land Uses within the Town – Constrained Land.

## 1.0 INTRODUCTION

The Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Town of Dover (“the Town”) 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 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 base flow in receiving water bodies. The plan also describes long-term operation and maintenance measures for existing and future stormwater facilities.

Overall this Plan relies on the existing regulatory framework as the basis for the management of stormwater. These regulatory requirements and the technical guidance documents on which they are based have been incorporated into this Plan. The Town of Dover Stormwater Ordinance further strengthens the reliance on these technical specifications and provides the means for insuring implementation and ongoing evaluation.

The 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. 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.

## 2.0 GOALS

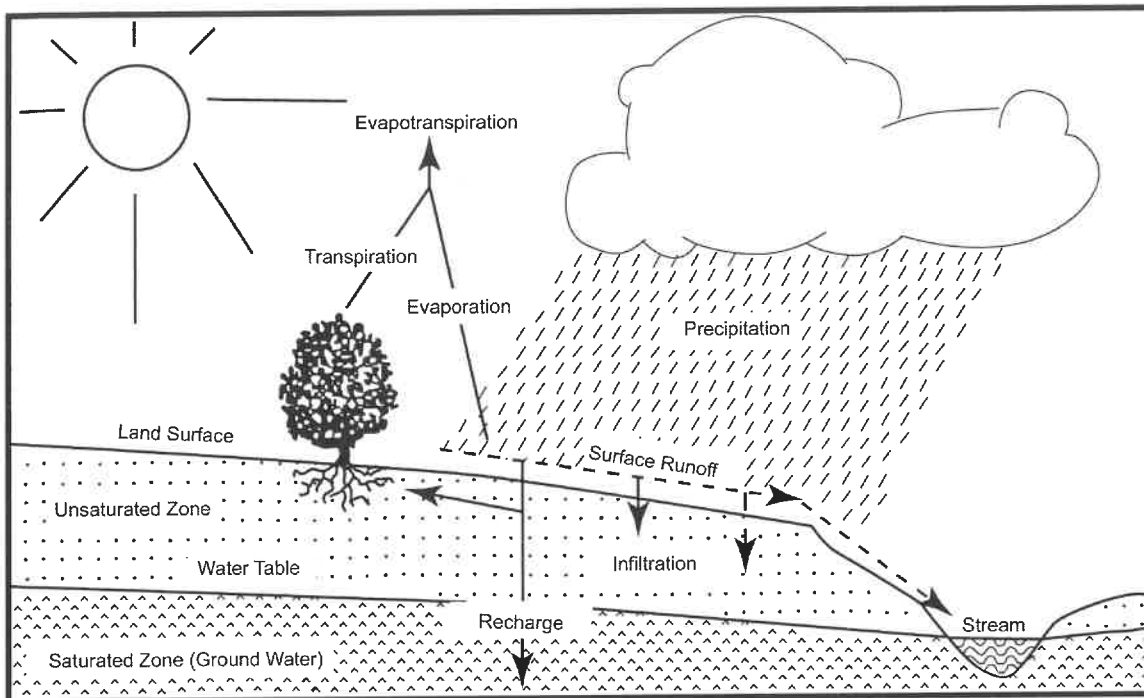
The goals of this MSWMP are to:

- 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 property;
- 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 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.

### **3.0 STORMWATER DISCUSSION**

Land development can dramatically alter the hydrologic cycle 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 C-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.

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.

## 4.0 BACKGROUND

The Town of Dover is located in Morris County and is at the foothills of the Appalachian Mountains. The Town of Dover consists of 2.7 square miles. The Town has a population of 18,188 (2000 Census) residents with 6,788 persons per square mile. The Town of Dover is the second most densely populated Town in the County. Due to its geographic location, Dover is in a prime location to concentrate growth and redevelopment. The Rockaway River flows from west to east dividing the Town in half. The Town has secured a "greenway" along the Rockaway River in Dover which runs from Mercer Street east along the north bank of the River. Dover is bounded by the communities of Wharton, Mine Hill, Randolph, Rockaway Township, Victory Gardens and Rockaway Borough. Figure C-2 illustrates the waterways in the Town. Figure C-3 depicts the Town boundary on the USGS quadrangle maps.

There are several water bodies located within the Town: The Rockaway River, Jackson Brook, Spring Brook, McKeels Brook and Munson Brook. 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. The major goal of AMNET is to establish a network of stream sites that would adequately represent New Jersey's major drainage basins and NJDEP's Watershed Management Areas (WMA). Twenty (20) WMAs have recently been delineated within New Jersey's five (5) basins. Each basin constitutes a "Water Region." The results from the 2000 Passaic Region AMNET Study for Watershed Management Areas 4,5,6,7 indicate that bio-assessment ratings for the Rockaway River in nearby Jefferson are moderately impaired. The Rockaway River in Randolph is non-impaired. There were no AMNET sites in the waterbodies located within Town of Dover.

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 Total Maximum Daily Load (TMDLs) are needed. 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 a New Jersey Pollutant Discharge Elimination System (NJPDES) permit to discharge, and nonpoint source, which includes stormwater runoff from agricultural areas and residential areas, along with a margin of safety. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan is developed to identify how the various sources will be reduced to

the designated allocations. Implementation strategies may include improved stormwater treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems, and other best management practices (BMPs). There are no TMDLs for any of the waterbodies in Dover. However, there is a TMDL for benthic macroinvertebrates for the Rockaway River in Jefferson. There is also a TMDL for Fish Mercury for the Rockaway River, no location specified.

The Town of Dover reported that flood damage from the September 1992 event along the Jackson Brook created severe stream bank erosion, undermined private retaining walls along the rear of commercial and residential properties and caused the loss of the pedestrian bridge in Hurd Park. The flooding of a 50 year storm event during the October, 1996 storm, also caused concern for the Town. More recently, the flood of September, 1999 again caused damages to the Jackson Brook upstream of Hurd Park. A Stormwater Management Study for the Jackson Brook Watershed was completed which addressed the management of stormwater flows to alleviate existing flooding problems.

A map of the Town's groundwater recharge areas are shown in Figure C-4. Recharge areas are differentiated by the number of inches per year water infiltrates below the water table as groundwater. The Wellhead protection areas are shown in Figure C-5. 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.

## 5.0 DESIGN AND PERFORMANCE STANDARDS

The Town will adopt the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 through its stormwater management ordinance, 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 Morris County for review and approval within 24 months of the effective date of the Stormwater Management Rules.

Non-structural measures to be considered first shall include site design and preventive source controls. To confirm the effectiveness of such measures, applicants must verify the control of stormwater quantity impacts as detailed in the Stormwater Management Rules. The tests of assuring control of the quantity impacts as detailed in these Rules will be incorporated into the Town's Stormwater Ordinance.

The general standards for structural measures are specified in the Stormwater Management Rules and will be incorporated into the Town of Dover's Stormwater Ordinance. These measures shall be incorporated as needed to meet the soil erosion, infiltration and runoff quantity standards included in the Town's Stormwater Ordinance. The design standards for the specific structural stormwater management measures are those included in the New Jersey Stormwater Best Management Practices Manual. Other designs or practices may be used if they are approved by the Soil Conservation District. The design and construction of such facilities must comply with the NJ Soil Erosion and Sediment Control Standards as well as any other applicable state regulations including the Freshwater Wetland Protection Act rules, the Flood Hazard Control Rules, the Surface Water Quality Standards and the Dam Safety rules. The requirement to be consistent with all other applicable rules will be included in the Town's Stormwater Ordinance. Stormwater runoff quality controls for total suspended solids and nutrient load shall meet the design and performance standards as specified in the Stormwater Management Rules. The minimum design and performance standards for infiltration and groundwater recharge specified in the Stormwater Management Rules will be incorporated into the Town's Stormwater Ordinance

and will be required to be met for all applicable development. Consistent with the Stormwater Management Rules, the Ordinance will allow for an exemption from this requirement where the applicant can demonstrate that it is not practicable to meet the standards but has taken all possible steps to meet all stormwater management measures.

During construction, Town inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed. Adequate long term operation as well as preventative & corrective maintenance of the selected stormwater management measures will be ensured by requiring the design engineer to prepare a maintenance plan for its stormwater management facilities incorporated into the design of the major development. The maintenance plan shall have specific preventative maintenance tasks, schedules and cost estimates as well as the responsible party for corrective and preventative maintenance.

Where the Town assumes maintenance responsibility, preventative maintenance shall be performed on a regular basis and will be appropriate for the particular structural management measure being implemented. These maintenance measures shall be in accordance with N.J.A.C 7:8-5 and may include: periodic inspections, vegetation management, sediment, debris and trash removal and mosquito control. Corrective maintenance shall be performed on an as needed basis for structure repairs or replacements, removal of outlet and pipe blockages, erosion restoration, snow and ice removal etc. The person or persons responsible for maintenance shall keep a detailed log of all preventative and corrective maintenance for the structural management measures incorporated into the design of the development, including a record of all inspections and work orders.

Similarly, all new stormwater management basins will be designed and operated to protect public safety as mandated through ordinance.

## **6.0 PLAN CONSISTENCY**

The County of Morris has completed a Jackson Brook Watershed Stormwater Management Plan, dated March 2001, which addresses the overall stormwater issues within the Jackson Brook drainage area covering parts of the Town of Dover. The Plan recommends the improvement of the Dover Twin Reservoir Impoundment on Reservoir Road on Wallace Brook including the removal of sediment deposits. The Jackson Brook Plan requires that stormwater quality and quantity control be implemented. This Plan for the Town of Dover will be consistent with the Jackson Brook Plan. Additionally, this Plan will be consistent with any TMDLs developed for the Rockaway River.

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 stormwater management review of residential projects. This Municipal Stormwater Management Plan will be updated to be consistent with any future updates to the RSIS.

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

## 7.0 NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES

The Town has reviewed its Land Use/Zoning Ordinances.

The Zoning and Design Requirements of the Town Code, were reviewed with regard to incorporating nonstructural stormwater management strategies. Several changes are recommended and described below. Non-structural measures to be considered shall include site design and preventive source controls. To confirm the effectiveness of such measures applicants must verify the control of stormwater quantify impacts as detailed in the Stormwater Management Rules. The tests of assuring control of the quantity impacts as detailed in these rules will be incorporated into the Town Ordinance.

**Buffers: Section 236-94 (H).** Buffers are required around three sides of an industrial or commercial site. The Board shall require a larger zone when it is needed. Multiple dwellings shall be buffered as required by the board to provide screening from sight and noise as well as providing good aesthetic value. This section should be revised to require the use of native vegetation and to allow buffers to be used for stormwater management.

**Drainage: Section 236-54 (F).** Provides for requirements to control drainage. It is recommended that this section be modified to encourage non-structural stormwater management measures.

**Flood Damage Prevention: Section 236-64.** This Section minimizes public and private losses due to flood conditions in specific areas by designating certain provisions. This Section outlines methods and restrictions for reducing flood losses. Additionally, this Section lists the general standards in all areas of special flood hazard areas. The purposes of this Ordinance include discouraging construction and regrading in special flood hazard areas, obstructing water, controlling erosion and preventing pollution. It further restricts specific permitted uses in the flood hazard area. The existing code adequately addresses non-structural stormwater management strategies.

**Preservation of Natural Features: Section 236-61.** Natural features such as trees, brooks, hilltops, and views shall be preserved whenever possible. It is recommended that this Section be revised to expand trees to forested areas.

**Off-tract improvements: Section 236-62 .** Requirements for off tract improvements including street improvements, water systems, sewer, drainage and easements. It is recommended that language be added to this section to require that any off site and off tract stormwater management and drainage improvement conform to the Design and Performance Standards described in this Plan and provided in the Town Stormwater Ordinance.

**Shade Trees: Section 236-54 (L).** Requires two (2) new Shade Trees to be installed on each lot and not to interfere with utilities, roadways or walkways and sidewalks. Trees shall be two inches or more in diameter, eight feet or more in height and of the following types including but not limited to: evergreen or silver linden, London or Oriental plane, Norway, Schwedler's or sugar maple, chestnut, red, pin, black or scarlet oak. This Section also encourages site design that preserves existing wooded areas and specimen trees. This Section recognizes that forested areas is a key strategy in the management of environmental resources and an effective non-structural stormwater management measure.

**Tree Removal: Section 236-89.** This Section requires a tree removal and re-planting plan in certain circumstances. The Section details where tree removal is prohibited and when it is permitted. This Section recognizes that forested areas is a key strategy in the management of environmental resources and an effective non-structural stormwater management measure.

**Performance Standards: Section 236-42.** Provides pollution source control for noise, electricity, glare, heat, odor, liquid and solid wastes, radiation, fire and explosion hazard, temperature, smoke and vibrations. It prohibits substances to be emitted into the atmosphere in quantities which are injurious to human, plant or animal life or to property or which will interfere unreasonably with the comfortable enjoyment of life and property anywhere in the Town of Dover. The existing code adequately addresses non-structural stormwater management strategies.

**Curbs and gutters: Section 236-54.** All streets shall be curbed. Surface material and installation of catch basins shall be in accordance with the Town Engineer. It is recommended that this Section be revised to allow for curb cuts of flush curbs with curb stops to allow vegetated swales to be used for stormwater conveyance and to encourage the disconnection of impervious areas.

**Sidewalks: Section 236-54.** This Section describes the requirements for construction of sidewalks. It requires sidewalks to be constructed of coarse concrete or equal. It is recommended that language be added to require developers to design sidewalks to discharge stormwater to neighboring lawns where feasible to disconnect these impervious surfaces, or use permeable paving materials where appropriate.

**Soil Disturbance: Section 236-79.** Requires a permit to disturb the soil on any premises in Town. This Section outlines the requirements to submit a permit and lists restrictions on soil removal operations. It is recommended that this Section also require developers to comply with the NJ Soil Erosion and Sediment Control Standards and outline some general design principals including, but not limited to, minimizing disturbance, protecting natural vegetation, minimizing runoff and facilitating groundwater recharge.

**Streets: Section 236-54 (G).** This Section describes the requirements for streets in the Town. The paving widths of streets and the quality of surfacing and base materials shall adhere to the minimum standards set forth by the Town, County or State Engineers when said paving concerns roads under their jurisdiction and where such standards exist.

**Off Street Parking and Loading: Section 236-43.** This Section sets forth the number and size of off-street parking spaces and off street loading space required. Off street parking and loading areas shall be effectively screened by a fence or hedge on the sides abutting a residential zone. Parking areas shall be landscaped to minimize noise, glare and other nuisance characteristics, as well as to improve the environment of the site and surrounding area. Large parking lots shall be broken into sections separated by landscaped dividing strips, berms and similar elements. This Section also includes guidance on minimum distances and setbacks. Any off street parking and loading area shall be graded and drained so as to dispose of all surface water without detriment to surrounding uses. Additionally, this Section requires surfacing of any off street parking or loading area of four (4) or more spaces to be surfaced with cement pavement or similar durable and dust free surface. It is recommended that this Section be amended to allow pervious paving used in areas to provide for overflow parking, vertical parking structures, smaller parking stalls and shared parking.

The Town has six (6) types of residential districts. Each district has a maximum percent impervious surface allocation ranging from 30% to 65%. There are five (5) non-residential districts with maximum allowable impervious surface of 80%. The Town is also evaluating the maximum allowable impervious surface for each zone to determine whether a reduction in impervious cover requirement is appropriate. Additionally, if a developer is given a variance to exceed the maximum allowable percent impervious cover, the developer must mitigate the impact of the additional impervious surface allowed. The detailed descriptions of suitable mitigation areas in the Town is discussed in Section 9 of this SWMP.

Once the ordinance texts are completed, they will be submitted to Morris County for review and approval. A copy will be sent to the Department of Environmental Protection at the time of submission.

## **8.0 LAND USE/BUILD-OUT ANALYSIS**

A detailed land use analysis was not conducted for the Town since the total area of vacant lands in the Town is less than one square mile. The Town zoning map is shown in conjunction with the HUC 14 zones in the Town in order to show the total area of the town and to illustrate the extent of developed land.

## 9.0 MITIGATION PLAN

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

The 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 Town Engineer. Listed below are specific projects that can be used to address the mitigation requirement when granting waivers or variances in redevelopment and infill areas of the Town

- Retrofit of existing outfalls
- Improving the quality of existing stormwater runoff
- Stabilize stream banks

The Town of Dover may allow a developer to provide funding or partial funding to the Town's Stormwater Fund 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.