

Town of Haverstraw, NY

Stormwater Management Program (SWMP) Plan

March 2012

STORMWATER MANAGEMENT PROGRAM (SWMP) PLAN

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Table of Contents

1	Introduction	1
1.1	MS4 Stormwater Management Program	2
1.2	Town of Haverstraw Stormwater Management Program Requirements	2
1.3	Storm Sewersheds	3
2	Stormwater Background	4
2.1	Stormwater Pollutants	4
2.2	Physical Pollutants	4
2.3	Chemical Pollutants	4
2.4	Biological Pollutants	5
2.5	Secondary Pollutants	5
3	Minimum Control Measures	6
3.1	Public Education and Outreach (MCM-1)	6
3.2	Public Involvement and Participation (MCM-2)	7
3.3	Illicit Discharge Detection and Elimination (MCM-3)	8
3.4	Construction Site Runoff Control (MCM-4) and Post-Construction Stormwater Management (MCM-5)	10
3.5	Pollution Prevention/Good Housekeeping (MCM-6)	11
4	Summary	13

List of Appendices

Appendix A	SPDES General Permit for Stormwater Discharges From MS4, Permit No. GP-0-10-002
Appendix B	Town of Haverstraw Storm Sewershed and Outfall Location



1 Introduction

The Clean Water Act (CWA) was developed to restore and maintain the physical, chemical, and biological character of the waters of the United States. The CWA developed a number of programs to maintain integrity of waters which include the Water Quality Certification, dredge/fill permitting, Coastal Zone Act Reauthorization Amendments, and National Pollutant Discharge Elimination System (NPDES) regulations.

Amendments to the CWA in 1987 created a new section of the NPDES program providing guidelines for stormwater permitting. Section 402(p) outlines the guidelines for Phase I facilities and identify five categories for stormwater discharges representing the most significant sources of pollution. Facilities covered under the Phase I program include:

1. Facilities already covered by an NPDES permit for stormwater.
2. Facilities engaging in industrial activity (including heavy manufacturing facilities, large construction sites, and transportation facilities).
3. Large municipal separate storm sewer systems (MS4) which serve populations greater than 250,000.
4. Medium MS4s which serve populations between 100,000 and 250,000.
5. Facilities that the U.S. Environmental Protection Agency (USEPA) administrator determines to have stormwater discharges contributing to a violation of water quality, or that are “significant contributors” of pollutants to waters of the United States.

Further legislation occurred over multiple years, and in 1995, the USEPA issued an amendment to the NPDES stormwater permitting requirements to include Phase II discharges. Phase II discharges encompass all stormwater discharges not covered under Phase I, including:

1. Commercial, light industrial, retail, and institutional facilities.
2. Construction activities greater than 1 acre and under 5 acres.
3. MS4s serving fewer than 100,000 people.

The USEPA finalized the Phase II regulations in 1999 which require controls on stormwater discharges from construction sites, industries, and municipalities. Under the Phase II regulations, municipalities are to reduce pollutant discharge to the maximum extent practicable (MEP), meet water quality requirements of the CWA, and protect water quality. To obtain the NPDES stormwater permit, operators of municipalities are required to develop a Stormwater Management Program (SWMP) Plan which implements appropriate Best Management Practices (BMPs), develops measurable goals, evaluates program effectiveness, and includes six minimum control measures (MCMs):

1. Public outreach and education.
2. Public participation and involvement.
3. Illicit Discharge Detection and Elimination (IDDE).
4. Construction site runoff control.



5. Post-construction runoff control.
6. Pollution prevention/good housekeeping.

In New York State, stormwater discharges are regulated by the New York State Department of Environmental (NYSDEC). Specifically, stormwater discharges from MS4s require coverage under the NYSDEC State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from MS4 (GP-0-10-002). The Town of Haverstraw has a series of MS4s, as defined in 40 CFR 122.26(b)(16), and is therefore eligible for coverage under GP-0-10-002. A copy of GP-0-10-002 is included in Appendix A.

1.1 MS4 Stormwater Management Program

As outlined above, the MS4 permit requires traditional, regulated MS4s to develop, implement, and enforce a Stormwater Management Program (SWMP) to reduce pollutant discharges to the MEP as outlined in the CWA. SWMPs must contain appropriate management practices in the six MCM categories.

The Town of Haverstraw has developed and is implementing a SWMP designed to address the six MCMs, reduce the discharge of pollutants from the MS4, protect water quality, and satisfy the requirements of the New York State Environmental Conservation Law and Federal CWA. The program's ultimate goal is to improve water quality within each MS4 by addressing non-point sources of water pollution. The Town of Haverstraw MS4 contains multiple storm sewershed and outfall locations (Figure 1) which are addressed in this SWMP Plan.

1.2 Town of Haverstraw Stormwater Management Program Requirements

The first Phase II MS4 Stormwater General Permit (GP-02-02) was effective January 2003 through January 2008. As outlined in the initial permit cycle, MS4s were required to produce and implement their SWMPs by January 2008. Haverstraw's SWMP has been updated to meet additional requirements of the new General Permit (GP-0-10-002) which is in effect from May 2010 to the end of April 2015. SWMPs must include the six MCMs identified in Section 1 above, for which MS4s must implement management practices to achieve their identified measurable goals.

The SWMP outlines measureable goals to assist the Town of Haverstraw with the progress of the program. Measurable goals allow the Town to assess the status and progress of the program and include, but are not limited to:

1. Distribution of specified quantities of educational material.
2. Conducting seminars and training to increase awareness of stormwater-related issues.
3. Public outreach events such as stream cleaning and bank cleanup.
4. Training of staff regarding inspection and maintenance of stormwater outfalls and management practices.
5. Conducting IDDE evaluations.
6. Conducting inspections of post-construction stormwater management practices.
7. Removal of a specified quantity of debris.



8. Good housekeeping and pollution prevention at Town facilities.
9. Developing electronic and geospatial database for improved recordkeeping.

The SWMP Plan can be used by various town departments and staff responsible for water quality management. These include Patrick Brady, P.E., Stormwater Management Officers, and Land Managers with: (1) the Town Parks Department; (2) Town Highway Department; (3) P.J. Rotella Golf Course; and (4) Town Department of Buildings and Codes.

1.3 Storm Sewersheds

The Town of Haverstraw is located adjacent to five storm sewersheds whose waters ultimately discharge to the Hudson River. Each storm sewershed has been delineated with existing outfalls and post-construction stormwater control practices identified on the Storm Sewershed and Stormwater Outfall Map in Appendix B.

1.3.1 Mahwah River Sewershed

The Mahwah River sewershed is located to the west of Calls Hollow Road and south of Second Reservoir. It is approximately 16,000 acres and encompasses a majority of the Ramapo Mountains. Stormwater discharges from the sewershed travel northeast via overland flow to local tributaries which ultimately discharge to the Mahwah River.

1.3.2 Minisceongo Creek Sewershed

The Minisceongo Creek sewershed is approximately 12,000 acres in size and is bordered to the west by Cranberry Mountain and the Town of Haverstraw to the east. In addition, it extends as far north as Pole Brook Mountain and south beyond Happy Valley. Stormwater flow from the sewershed is conveyed via overland flow to the Minisceongo Creek, which discharges to the Hudson River.

1.3.3 Cedar Pond Brook Sewershed

The Cedar Pond Brook sewershed is located to the west of Calls Hollow Road and south of Second Reservoir. The majority of the Cedar Pond Brook sewershed is in Stony Point. It is approximately 11,000 acres, and stormwater discharges are conveyed southeast via overland flow to local tributaries which discharge to Cedar Pond Brook and extend to the Hudson River.

1.3.4 Headwaters Hackensack River Sewershed

The Headwaters Hackensack River sewershed is located to the south of High Tor State Park and east of the Mount Ivy Swamp. It is approximately 29,000 acres, and stormwater discharges from the sewershed are conveyed via overland and channel flow to local tributaries that discharge to Cedar Pond Brook, which extends to the Hudson River.

1.3.5 Furnace Brook Hudson River Sewershed

The Furnace Brook Hudson River sewershed is approximately 37,000 acres in size and is bordered to the south by the Village of West Haverstraw. Stormwater discharges from the sewershed are conveyed southeast via overland and channel flow which discharge to the Hudson River.



2 Stormwater Background

Stormwater from rain or melting snow often discharges directly to receiving waters during periods of rainfall or snowmelt. As stormwater flows over impervious surfaces and open landscapes, pollutants present on the ground are carried by stormwater to receiving waters. These pollutants may have adverse impacts on surface waters and aquatic habitat.

2.1 Stormwater Pollutants

The MS4 program aims to reduce or prevent stormwater pollutants reaching receiving waters. Polluted stormwater runoff is commonly transported through MS4s, where it frequently discharges untreated into local water bodies. Pollutants are both man-made (spills) and natural (bacteria and viruses). The two primary water quality impacts associated with stormwater are attributed to **increased nutrients and sediment as well as increased temperature of runoff**. The following are examples of common physical, chemical, biological, and secondary pollutants.

2.2 Physical Pollutants

1. Sediment - Clay, silt, sand, or other soil which settles in a water body.
2. Temperature - Changes in temperature of receiving waters adversely impacts organisms and aquatic habitat.
3. Floatables - Trash or other litter material which travels as floating debris in stormwater conveyance systems.

2.3 Chemical Pollutants

1. Nutrients - Nitrogen, phosphorus, potassium, and other nutrients are transported by stormwater runoff, causing an increase in concentration which degrades receiving waters.
2. Hydrocarbons - Such as methane that contain only carbon and hydrogen are classified as hydrocarbons.
3. Metals - Ingredients in many commonly used products such as paints and pesticides. When materials containing heavy metals break down, discharged pollutants can be rapidly transported to receiving waters.
4. Organic Compounds – Include insecticides, herbicides, volatile organic compounds, and other chemicals.
5. Pesticides - Found in the forms of herbicides, rodenticides, and insecticides.
6. Salts – Used as a deicer on impervious surfaces and accumulate during winter months Salts are carried to receiving waters during seasonal changes by snowmelt.

2.4 Biological Pollutants

Biological pollutants are found on the microscopic level and have adverse impacts on living organisms, causing degradation of water bodies. Biological pollutants are encompassed under the single classification



of pathogens, which can be found in humans, wildlife, and sewage. //Microorganisms convey waterborne diseases via stormwater runoff.

2.5 Secondary Pollutants

A secondary pollutant is not directly discharged but forms when other pollutants react in water bodies. Secondary pollutants include pH, algae, oxygen demand, and chlorophyll.

1. pH - The measure of acidity from 1 to 14, where low numbers are more acidic and high numbers are more basic, with 7 being neutral.
2. Algae - A plant that is either suspended in water or attached to submerged materials. Algae blooms may have negative impacts to other organisms by introducing toxins to an aquatic habitat.
3. Oxygen Demand - Occurs when dissolved oxygen decreases in receiving waters which results in a decreased dissolved oxygen for aquatic life.
4. Chlorophyll – A pigment that allows plants to convert sunlight into organic compounds through photosynthesis. Excessive amounts of chlorophyll indicate the presence of algae blooms discussed above.



3 Minimum Control Measures

Stormwater runoff can have adverse impacts to local waterways in many forms, from degrading aquatic habitat to preventing recreational use. The six MCMs were developed to minimize stormwater pollutants discharged to surface waters. Implementing these measures can help reduce pollutant impact and protect water resources.

3.1 Public Education and Outreach (MCM-1)

3.1.1 Requirements

Under MCM 1, MS4 communities are required to:

1. Identify pollutants of concern (POCs), waterbodies of concern, geographic areas of concern, and target audiences.
2. Implement an ongoing public education and outreach program designed to describe stormwater and protecting receiving waters to the general public and target audiences:
 - the impacts of stormwater discharges on waterbodies
 - POCs and their sources
 - steps that can be taken by contributors of these pollutants to reduce pollutants in stormwater runoff
 - SPDES General Permit for Stormwater Discharge from MS4s
 - steps that can be taken by contributors of non-stormwater discharges to reduce pollutants.
3. Record, periodically assess, and modify, as needed, measurable goals.
4. Select and implement appropriate education and outreach activities and measurable goals to ensure the reduction of all POCs in stormwater discharges to the MEP.

3.1.2 Ongoing Outreach Efforts

The Town of Haverstraw has implemented a series of outreach efforts including printed material, on-line information, and workshops. Sediment has been identified as the primary POC; and Minisceongo Creek, the Hudson River, and tributaries of the Mahwah River have been identified as waterbodies of concern.

In this framework, the Town has targeted several key audiences which include land developers (contractors), homeowners, industries, and schools, among others. The Town of Haverstraw has developed and disseminated approximately 5,000 (annually) informational brochures targeting these groups with a focus on erosion and sediment control and waste control. Additionally, the Town has partnered with the Cornell Cooperative Extension of Rockland County to develop printed informational materials focused on pollution prevention for homeowners.

Through the Stormwater Management Officer, the Town is an active member in the Stormwater Consortium of Rockland County and routinely updates a Town website for stormwater management. In addition to these measures, the Town has:

1. Participated in Rockland County sponsored workshops.
2. Maintained a stormwater website and frequently posts information and the MS4 Annual Report.



3. Begun working with local schools to develop a series of workshops to discuss POCs and what can be done.
4. Maintained monthly department meetings to coordinate stormwater activities between local Town departments

3.1.3 Future Outreach Efforts

The Town of Haverstraw is proposing to continue its public outreach efforts and expand its list of targeted audiences. Specifically, the Town has established the following goals:

1. Increase quantity of printed information materials and brochures.
2. Target additional audiences for public outreach efforts (i.e., senior centers, etc.).

3.2 Public Involvement and Participation (MCM-2)

3.2.1 Requirements

As a regulated MS4, the Town must involve the public in the stormwater program. This varies from MCM-1, which focuses on increasing awareness. MCM-2 is intended to actively solicit community involvement and public participation in the Town's SWMP. In accordance with MCM-2, MS4 communities must comply with local public notice requirements, such as the Open Meetings Law, when implementing a public involvement or public participation program. Specifically, the MS4 shall implement a public involvement/participation program that:

1. Identifies key individuals and groups, public and private, who are interested in or affected by the SWMP.
2. Identifies the types of input the covered entity will seek from the key individuals and groups, public and private, to support development and implementation of the SWMP and how the input will be used.
3. Describes the public involvement/participation activities the covered entity will undertake to provide program access to those who desire it and to gather the needed input. The activities include, but are not limited to, a water quality hotline (report spills, dumping, construction sites of concern, etc.), stewardship activities such as stream cleanup; storm drain marking; and volunteer water quality monitoring.
4. Provides the public an opportunity to participate in the development, implementation, review, and revision of the SWMP.
5. Identifies a local point of contact for public concerns regarding stormwater management and compliance with this SPDES General Permit.

By June 1 of each reporting year, MS4s must present the draft Annual Report in a format that is open to the public (i.e., public meeting via internet), where the public can ask questions and make comments on the report. The goal is to solicit feedback and discussion from those impacted by stormwater management activities.



3.2.2 Ongoing Efforts

To accomplish the public outreach and participation goals, most notably was the appointment of Patrick Brady, P.E., as the Town's MS4 point person. Mr. Brady is an experienced professional with 20 years of water quality engineering. He is currently expanding his capacity for stormwater management through a series of stormwater and erosion control workshops. In his role as point person, Mr. Brady has engaged those responsible for water quality within the Town, including directors at the Highway Department, Town Parks Department, the Town golf course, and the Department of Building and Codes. As a result, the communication and awareness of stormwater-related issues has grown within the Town. In addition, the Town has hosted and participated in multiple stream and trash cleanup events, engaged adjacent MS4s to identify opportunities for shared training and/or public outreach, and annually presents the SWMP and recent actions to the public via public hearings, meetings, and the internet.

3.2.3 Future Efforts

The Town has and will continue to make its Annual Report available for public review and comment. In addition, the Town is actively pursuing methods to improve public participation such as additional public hearings, updating stormwater website; hosting more environmental cleanup events and workshops, and integrating public outreach with public education.

3.3 Illicit Discharge Detection and Elimination (MCM-3)

3.3.1 Requirements

As a regulated MS4, the Town must develop a program to identify and eliminate illicit discharges into the separate storm sewer system. Specifically, MS4s are required to

1. Implement and enforce a program to detect and eliminate illicit discharges.
2. Develop and maintain a map within the covered entity's jurisdiction in the urbanized area, at a minimum, and additionally designated area, showing stormwater outfall locations.
3. Field verify outfall locations.
4. Conduct an outfall reconnaissance inventory, as described in the USEPA publication entitled "*Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessment*," addressing every outfall within the urbanized area and additionally designated area within the covered entity's jurisdiction at least once every five years, with reasonable progress each year.
5. Map new outfalls as they are constructed or newly discovered within the urbanized area and additionally designated area.
6. Prohibit, through a law, ordinance, or other regulatory mechanism, illicit discharges into the small MS4 and implement appropriate enforcement procedures and actions. This mechanism must be equivalent to the State's model IDDE local law and must be certified as such by the attorney representing the small MS4.
7. Implement a program to detect and address non-stormwater discharges, including illegal dumping, to the small MS4 in accordance with current assistance and guidance documents from



the State and USEPA. The program must include procedures for identifying priority areas of concern (geographic, audiences, or otherwise) for the IDDE program; description of priority areas of concern, available equipment, staff, funding, etc.; procedures for identifying and locating illicit discharges (trackdown); procedures for eliminating illicit discharges; and procedures for documenting actions.

8. Inform public employees, businesses, and the general public of the hazards associated with illegal discharges and improper disposal of waste, and maintain records of notifications.
9. Address the categories of non-stormwater discharges or flows listed in Part I.A.2 as necessary.
10. Develop, record, periodically assess, and modify as needed, measurable goals.
11. Select and implement appropriate IDDE BMPs and measurable goals to ensure the reduction of all POCs in stormwater discharges to the MEP.

3.3.2 Ongoing IDDE Efforts

The Town focused efforts on three major areas relative to MCM-3: (1) GIS mapping; (2) outfall inspections; and (3) inventory of stormwater management practices. A GIS geodatabase for stormwater and infrastructure throughout the Town was developed and consisted of compiling available paper and electronic maps and data into a singular database and repository. Data pertaining to size, location, type, and other criteria were organized in the database, which will allow for increased efficiency in the routine maintenance of existing infrastructure. Working with a single source of data is intended to improve recordkeeping, improve mapping efficiency and improve reporting of various activities related to stormwater. The Town Stormwater Management Officer has been trained in GIS software.

The Town also implemented an IDDE inspection and monitoring program. An outside engineering consultant was retained to perform various IDDE activities for the 192 known stormwater outfalls within the Town which were identified and mapped by Rockland County in May 2009. While the MS4 General Permit calls for dry weather monitoring of stormwater outfalls once every five years, an initial quarterly monitoring plan was developed so that each outfall can be initially inspected in the next one to two years.

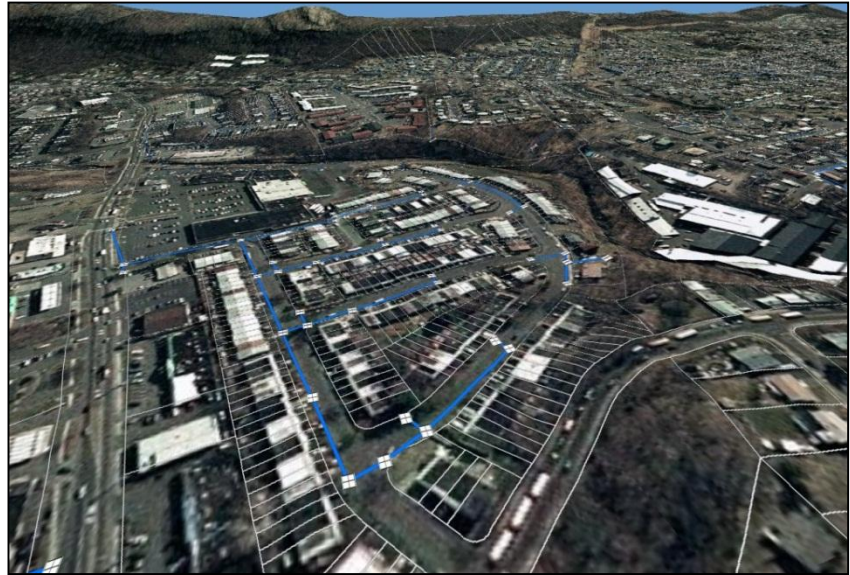
The initial inspections occurred within the lower elevation Hudson River and Minisceongo Creek storm sewersheds. The first round of quarterly inspections, completed on December 2, 21, and 22, 2010 focused on the high priority area adjacent to the Hudson River near Haverstraw Bay and within the densely





developed portion of Town east of the Palisades Interstate Parkway. During these inspections, staff from the Town of Haverstraw Highway Department assisted in the field work. In total, 66 outfalls were initially inspected and found to be in generally good condition. Additional inspections occurred in 2011 and 2012. In particular, many outfalls and streams were inspected following Hurricane Irene. Damaged areas were assessed and recommendations made to the Town Highway Department. All outfalls are scheduled to be inspected before the end of spring 2012.

Once outfalls have been inspected at least once and necessary corrective actions made, the outfall inspection schedule may be modified based on the five-year period outlined in the MS4 General Permit. Results of the initial inspections are included in the Town of Haverstraw IDDE Report dated March 2011.



3.3.3 Future IDDE Efforts

The Town plans to evolve and expand their IDDE program to include the following measures:

1. Continue dry weather inspections of stormwater outfalls. If additional outfalls are identified during the inspections, they should be mapped with GPS and inspected. Provide additional Town staff training as needed.
2. Provide routine maintenance for all post-construction stormwater control practices within the Town.
3. Continue to develop and refine the GIS geodatabase of stormwater infrastructure. Begin to implement GIS data for reporting and maintenance activities.
4. Evaluate the use of mobile technology to improve IDDE field work and reporting efficiencies.

3.4 Construction Site Runoff Control (MCM-4) and Post-Construction Stormwater Management (MCM-5)

3.4.1 Requirements

The Town must develop and implement a local law or regulatory mechanism to control erosion of sediment and pollution of stormwater runoff from construction sites **during construction activity** and stormwater runoff via **post-construction** stormwater controls. The law or mechanism must be equivalent to the State's SPDES General Permit for Stormwater Discharges Associated with Construction Activities. The Town passed its erosion control laws in 2003; the laws are currently being implemented via the Town Planning Board, typically through the site plan review and specific use permit process.



3.4.2 Ongoing Efforts

The Town passed its stormwater laws in 2003; the laws are currently being implemented via the Town Planning Board, typically through the site plan review and monitoring process. The Town Planning Board and the Building Code Enforcement Officer routinely work with developers and applicants to review SWPPPs for construction projects within the Town and address post-construction stormwater management practices and establish maintenance protocols. The following actions occurred during previous reporting periods:

1. The Town reviewed multiple SWPPPs for construction projects. All met the state criteria outlined in the *New York State Stormwater Management Design Manual*, and the New York State Standards and Specifications for Erosion and Sediment Control and were approved.
2. The Town and/or their consultant conducted site inspections to monitor erosion control practices. Inspections were completed in accordance with New York State guidelines for site inspections.
3. Developed a standardized inspection form for monitoring post-construction stormwater management practices.
4. The Town and/or their consultant conducted site inspections to monitor post-construction stormwater management practices. Inspections were completed in accordance with the New York State guidelines for site inspections.
5. Identified and inspected post-construction stormwater management practices as shown in the "*Post-Construction Stormwater Control Practice Monitoring Report*" dated March 2012.

3.4.3 Future Efforts

The Town of Haverstraw anticipates implementing the following objectives:

1. Conduct erosion control and green infrastructure training sessions for Town staff members responsible for project review, approval, and maintenance.
2. Evaluate and review checklists and inspection procedures.
3. Continue review of SWPPPs for new construction projects within the Town.
4. Continue post-construction BMP inspection training for Town staff members responsible for inspection and maintenance with a focus on low impact development and green infrastructure.
5. Identify newly installed post-construction stormwater management practices.
6. Develop and implement a MS4 EMS that tracks and documents post-construction management practices within the Town. The tracking system will focus on field inspections, violations, and corrective actions.

3.5 Pollution Prevention/Good Housekeeping (MCM-6)

3.5.1 Requirements

MS4s must identify their operations and implement good housekeeping and pollution prevention for each municipal operation in order to protect water quality. Appropriate Town staff must be trained on the issues pertaining to stormwater management, IDDE, and routine site maintenance.



3.5.2 Ongoing Efforts

The Town of Haverstraw identified properties either owned or managed by Town staff, including the golf course, Highway Garage, Palisades Parkway Park and Ride, Letchworth Village Park, Ambulance Corps Building, Town Hall, Town Police Station, State Police Barracks, Bowline Park, Rosman Park, and Cheescote Mountain Park. For each of the sites, a SWPPP was developed which focused on daily operation activities as well as routine and long-term maintenance and inspection. The goal of the SWPPP is to provide responsible Town staff with a framework and guide to implement long-term stewardship of the Town-run facilities. The SWPPPs are available for review at the Town Hall.

In addition, the appropriate Town staff, including the MS4 point person, Director of Town Parks Department, Town Golf Course Superintendent, and the Town Highway Department Director, actively participated in the development of the SWPPPs and receive SWPPP training.

3.5.3 Future Efforts

The Town has established the following goals with regard to its good housekeeping and pollution prevention program:

1. Increase awareness among Town staff via internal and external training.
2. Train appropriate Town staff on spill prevention.
3. Identify needs for additional operational-based SWPPPs that may be required for such activities as municipal repair projects.
4. Implement inspection schedule according to the SWPPPs. Provide recommendations for revisions based on field experience.
5. Evaluate SWPPP and maintenance operation to increase efficiencies and improve effectiveness.



4 Summary

This SWMP Plan is intended to outline the overall goals and actions of the Town of Haverstraw related to stormwater management and water quality protection. Many of the Town's on-the-ground efforts to monitor, inspect, and improve water quality are documented in other project-specific documents. These reports as well as the SWMP Plan are available for Town staff, residents, or agencies interested in requesting this information.

The measures outlined in this report demonstrate the Town's commitment to protecting water quality. Moreover, it serves as a guide for long-term compliance and effective stormwater management. The report should be evaluated and revised in three-year increments to reflect changes in approach, new actions, and/or modified requirements.



APPENDICES



Appendix A

SPDES General Permit for Stormwater Discharges From MS4
Permit No. GP-0-10-002



Appendix B

Town of Haverstraw Storm Sewershed and Outfall Location