

VILLAGE OF HEWLETT NECK

STORMWATER MANAGEMENT PLAN

Village of Hewlett Neck
30 Piermont Avenue
Hewlett, NY 11557

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Introduction

The Village of Hewlett Neck has prepared this Stormwater Management Plan (SWMP) in accordance with the requirements of the New York State Environmental Conservation State Pollutant Discharge Elimination System (SPDES) General Permit GP-0-24-001 for Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s). This document outlines the Village of Hewlett Neck's program to develop, implement and enforce a storm water management program designed to reduce the discharge of pollutants to the maximum extent practicable, to protect water quality, and to satisfy the respective requirements of the federal and state regulations. The SWMP addresses the six minimum control measures as required by the regulations. A Notice of Intent (NOI) to discharge stormwater has been filed with the New York State Department of Environmental Conservation in accordance with the terms and conditions of the General Permit. A copy of the NOI is included in the Appendix.

The Village is located within the Hempstead Bay watershed, which is an impaired water body listed in the inventory of such by the NYSDEC. It should be noted that Hempstead Bay is not a watershed for which total maximum daily loads (TMDLs) have been established. As such, the NYSDEC General Permit requires that the Village SWMP address the items contained in Parts IV, V and VI of the General Permit. This SWMP is on file with the NYSDEC as well as the USEPA, per the NYSDEC General Permit requirements.

Municipal Setting

The Village of Hewlett Neck is a municipality located along the south shore of Long Island in Nassau County, NY. The Village was incorporated in 1927. It is bordered on the north by Hewlett Bay Park, and to the west by the Village of Woodsburch, and the south and east by Georges Creek. The topography of the Village ranges from approximately 20 feet above sea level in the northern part of the Village, to sea level in the southeastern portion of the Village.

The Village encompasses approximately 0.2 square miles. The Village has a population of approximately 570 people, residing in 160 single-family dwellings. The Village is exclusively zoned single family residential. The minimum lot sizes allowed in the Village range from 5,000 square feet to 40,000 square feet. The only land use in the Village that is not residential is a yacht club, located on the southern border of the Village. The Village has 2.8 center line miles of Village roads.

Village Stormwater System

The Village stormwater system consists of 27 catch basins located within the Village road system, which are connected to 7 outfalls. The stormwater outfalls are listed below.

Village of Hewlett Neck

Stormwater Outfall Monitoring Locations

Hewlett Neck Road: 12" RCP to Georges Creek
Adams Lane: 12" RCP outfall to Georges Creek
Alden Road: 12" outfall to Brosewere Bay
Pricilla Road: 12" RCP outfall to Brosewere Bay
Curtis Road: 12" CPP outfall to Brosewere Bay

Two interconnections with Nassau County storm system

1. Hewlett Neck Road at Browers Point Branch and
2. Woodmere Blvd. between Browers Point Branch and Dolphin Drive

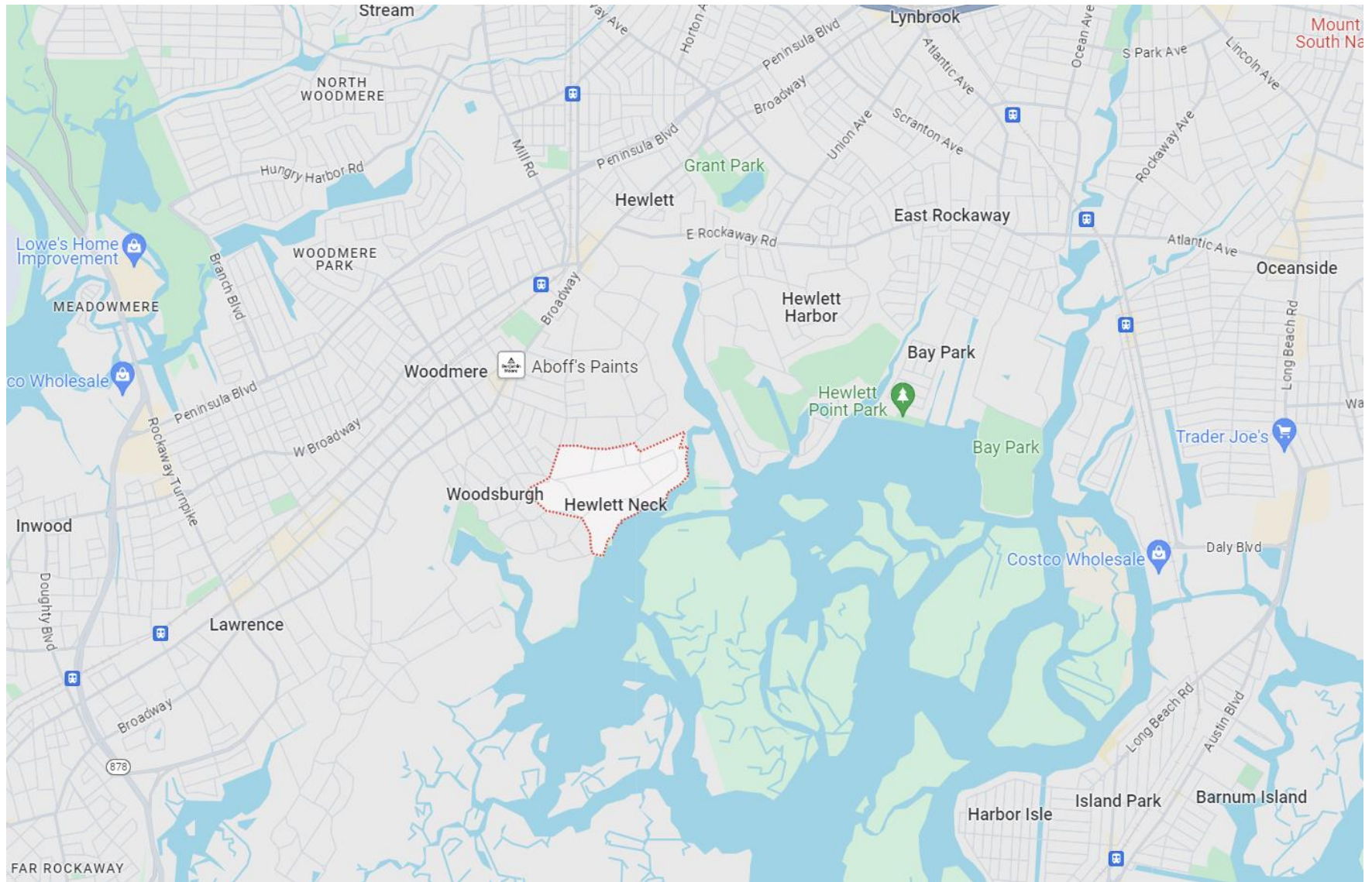
Village Stormwater Program Implementation

To implement the SWMP, the Village has developed the following staffing plan/organization chart. The Village has a Village Clerk/Treasurer, a Deputy Clerk, a Building Department Coordinator, and a Building Inspector. The Village office is open Monday through Friday, from 8 am until 4 pm.

<u>Name</u>	<u>Title</u>	<u>Responsibility</u>
Michelle Blandino	Village Clerk	SWMP Coordinator, Village contact with NYSDEC, coordinates documents among the Village Building Department, Board of Trustees and Village consultants
Karen Quintavalle	Village Deputy Clerk	Assists the Village Clerk
Dana Garraputa	Building Department Coordinator	Receiver of building permit applications and related plans, and coordinates with Village Building Inspector and Village consultants
Dennis Fromigia	Building Inspector	Review of building permit materials, conducts field inspections for building code and permit compliance, issues violation notices, summonses and work stop orders
	Code official	
Jim Antonelli	Village Engineer	Advises the Building Department for site engineering matters, provides professional services to the Village for public works projects including drainage improvements

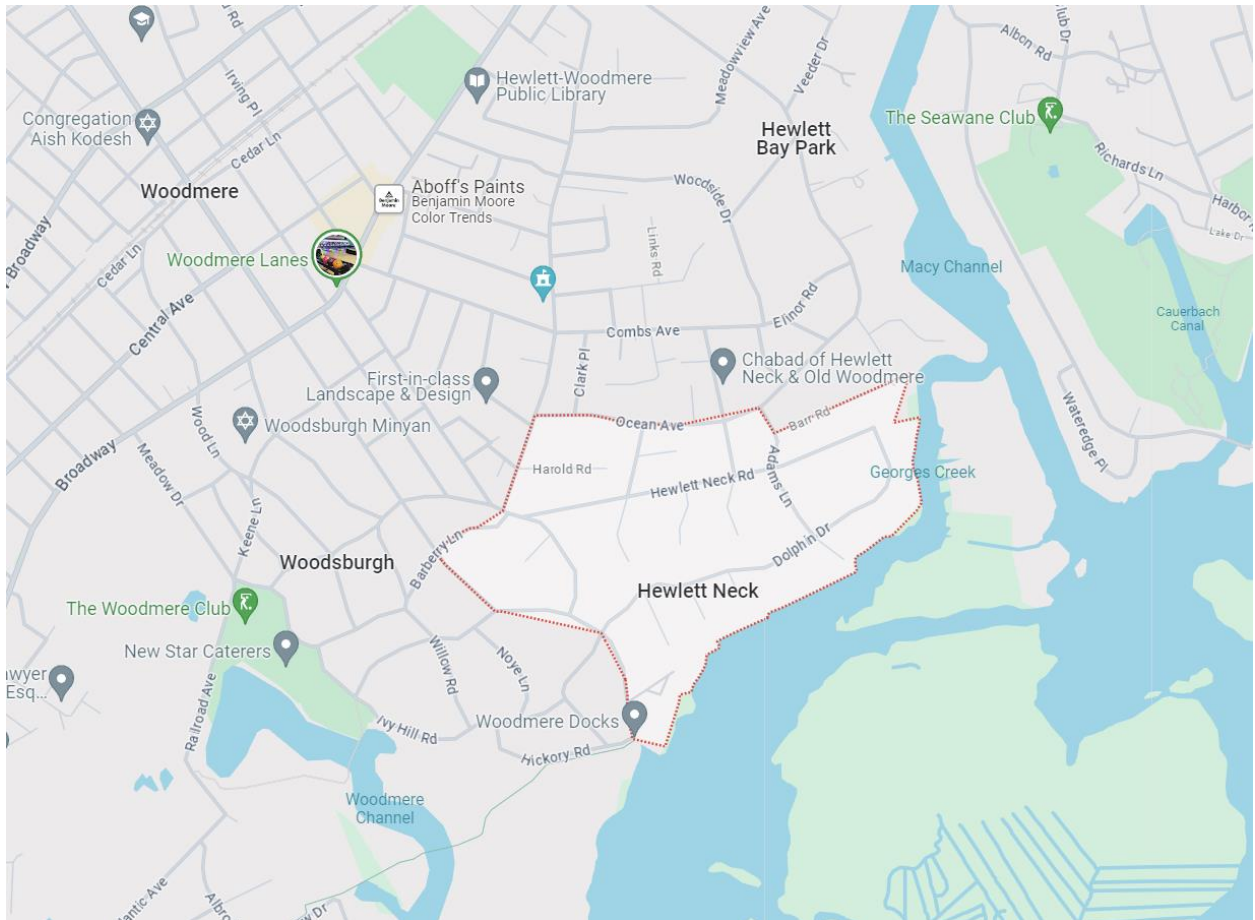
Area Map

Village of Hewlett Neck



Location Map

Village of Hewlett Neck



Illicit Discharge and Construction Site Local Laws

In 2006, the Village adopted local laws which were part of the first General Permit issued by the NYSDEC, GP-02-02. The laws pertain to the detection and elimination of illicit stormwater discharges to the Village storm system, and the requirement for the preparation of a Stormwater Pollution Prevention Plan (SWPPP) for construction projects that disturb an acre or more of land. The local laws are cited as follows and are found in the Village Code.

Chapter 78: Illicit Discharges, Activities and Connections; and

Chapter 179: Stormwater Management and Erosion and Sediment Control.

The Village's illicit discharge local law prohibits illicit discharges, spills and other releases of pollutants, as stipulated in §78-5. Illicit connections to the Village storm sewer system are prohibited as stipulated in §78-6. The local law at §179-9 and §179-14 requires the installation and maintenance of post construction best management practices (BMPs) and includes references to the NYSDEC Stormwater Design Manual and NYSDEC Guidelines for Erosion and Sediment Control.

Mechanisms for the Village to receive and collect information related to the introduction of pollutants to the storm system, as well as site access for monitoring, are included in §179-10. The Village office may be called (516-295-1400), where a recorded message may be left during off-hours. Nassau County also includes an illicit discharge hotline at 516-571-7535. Additionally, all petroleum spills that occur within New York State (NYS) must be reported to the NYS Spill Hotline (1-800-457-7362) within 2 hours of discovery, except spills which meet **all of the following criteria:**

1. The quantity is known to be less than 5 gallons; and
2. The spill is contained and under the control of the spiller; and
3. The spill has not and will not reach the State's water or any land; and
4. The spill is cleaned up within 2 hours of discovery.

A spill is considered to have not impacted land if it occurs on a paved surface such as asphalt or concrete. A spill in a dirt or gravel parking lot is considered to have impacted land and is reportable.

Enforcement actions for illicit discharges are addressed in §78-12 of the Village Code.

The Village Code at §179-8 requires the preparation of a SWPPP for land disturbances greater than one acre. This section of the Code also requires the inspection, maintenance and repair of erosion control and stormwater management measures as they pertain to the SPPP sites. The latest version of the NYS Stormwater Management Design Manual is specified for design criteria and maintenance for stormwater structures under §179-9 and §179-10 of the Village Code.

Enforcement Response Plan

The following outlines the Village's procedure for enforcement as it relates to the protection of the Village's stormwater system.

Site Construction Enforcement Procedure

<u>Issue</u>	<u>Enforcement Action</u>	<u>Responsibility</u>
	Verbal Warning	
	Written Violation Notice	
	Summons/Appearence Ticket	
	Stop Work Order	

The Village enforcement responses are to be based on the type of issue, the magnitude of the issue, the duration of the situation, the impact on a water body, the compliance history of the operator and good faith efforts regarding compliance. The Village tracks enforcement by conducting follow-up investigations at a frequency depending on the above listed criteria and further evaluation.

Record Keeping

The Village intends to keep records pertaining to its stormwater system and construction activities as required by the NYSDEC General Permit for a period of 5 years. If requested by the NYSDEC, the Village intends on sharing information and records, as applicable, and the Village intends on cooperating with the NYSDEC.

SWMP Evaluation

The SWMP will be evaluated at least every 5 years and updated as applicable.

NYSDEC General Permit Requirements

As part of an amendment to the federal Clean Water Act, the Village has been required to file an annual stormwater report with the New York State Department of Environmental Conservation (NYSDEC) each year since 2003, under the NYSDEC's General Permit for Municipal Separate Storm Sewer Systems (MS4s). An MS4 is defined as a publicly owned stormwater conveyance system which discharges to state waters. The Clean Water Act amendments regulate stormwater discharges to surface waters and is applicable to certain municipalities. The Village is required to comply with 6 minimum control measures. As part of the Village's stormwater program, the Village is a coalition member with Nassau County, and shares their efforts for applicable activities pertaining to the stormwater program.

1. Minimum Control Measure 1: Public Education and Outreach

The Village provides education materials through its coalition membership with Nassau County, as well as stormwater related posts on the Village website, including recycling/trash/yard waste information, water usage, irrigation, water quality and water supply information to the residents.

The Village is within the Hempstead Bay watershed, which is an impaired water body designated by the NYSDEC. The listed impairments are pathogens and nitrogen. Pathogens are organisms which may cause disease. Pathogens include viruses, bacteria, parasites, and fungi. The Village efforts in education and outreach should target sources of pathogens. Typical sources of pathogens are pet and animal waste, leaking sewer pipes, discharges from septic systems, and other illicit connections to the storm system. Sources of nitrogen in stormwater include animal waste (including humans, pets, and other animals), fertilizer and yard waste.

The target audience for information pertaining to pathogens in stormwater would be the Villages residents, who are best reached on the Village website and by way of a Mayor's Letter. Further topics and information may be developed as information is collected and observations are made. The NYSDEC requires that the Village evaluate its education and outreach strategy annually and updates the SWMP as applicable.

2. Minimum Control Measure 2: Public Involvement/Participation

The Village provides opportunities for public participation through its coalition membership with Nassau County and by supporting and promoting the County's efforts and events. The Village invites the public to various Board meetings where land development issues are discussed. The Village also holds annual meetings to solicit public participation in the development and implementation of its stormwater program, including the SWMP, and its annual report to the NYSDEC. The Village posts its draft annual report on the Village website for public comment.

The Village will receive information from the public regarding the SWMP through the Village Clerk, who is available by phone at 516-295-1400, or email at Villages3@optimum.net.

3. Minimum Control Measure 3: Illicit Discharge Detection and Elimination

As a tool to detect illicit discharges, the Village will monitor outfalls and/or key stormwater structures annually during dry weather as a screening tool. The Village uses the dry weather flow monitoring to detect potential illicit discharges to its storm system. If dry weather flow is found, the Village will investigate further to find its source. The following information pertains to the would be collected from a site with a suspected illicit discharge and recorded on the Monitoring Location Inspection and Sampling Field Sheet forms (2 pages) found in the Appendix.

- Background data, date, location, date, setting
- Description of material, dimensions
- Flow quantity, temperature, pH, color, odor, appearance
- Evaluate whether laboratory analysis is needed

Records of dry weather flow monitoring would be documented, and records would be kept, regardless of dry weather flow results. All illicit (non-stormwater) discharges to the Village storm system and documentation thereof will be included in each update of the SWMP and kept in a designated section of the SWMP.

Illicit discharges to the Village storm system may be reported to the Village office (516-295-1400), where a recorded message may be left during off-hours. Nassau County also includes an illicit discharge hotline at 516-571-7535. Additionally, all petroleum spills that occur within New York State (NYS) must be reported to the NYS Spill Hotline (1-800-457-7362).

Monitoring locations are included in the following table. Since the Village has no outfalls, system monitoring will consist of an investigation of the stormwater catch basins. There are no interconnections to other municipal storm systems, other than a pipe connection to a Nassau County recharge basin, which is not regulated as part of an MS4 system since it is a groundwater discharge structure.

The monitoring locations will be prioritized and documented in the SWMP once information is gathered and analyzed. Annually, after the initial monitoring location prioritization, the prioritization will be updated and included in the SMWP based on information gathered as part of the monitoring process. The Village would prioritize new monitoring locations as they are found or constructed within the Village storm system.

The NYSDEC General Permit includes criteria for the prioritization of stormwater system monitoring points. High priority municipal facilities include municipal facilities that have one or more of the following on site and exposed to stormwater:

- i) Storage of chemicals, salt, petroleum, pesticides, fertilizers, antifreeze, lead-acid batteries, tires, waste/debris;
- ii) ii) Fueling stations; and/or
- iii) iii) Vehicle or equipment maintenance/repair.

None of the above occur in the Village.

Another high priority for monitoring would be a suspected illicit discharge that occurs in impaired water body watershed. Since there are no outfalls in the Village system, this would

not apply. However, the Village will continue to monitor their storm system on an annual basis.

An additional criterion for a high priority monitoring location is where there are 3 or more confirmed citizen complaints of an illicit discharge within a 12-month period.

If dry weather flow is found and the source of a discharge has the potential of being an illicit discharge, the Village would sample the flow. Sampling may be done using field test kits or field instruments which may detect pH, color, chlorine, ammonia, phosphorus, nitrates, and temperature. Each of these test parameters help to identify the potential source of the discharge. The field test is the initial step in the tracking of an illicit discharge.

Once an illicit discharge is found, additional inspection and possible sampling on a more frequent time frame, at least within 30 days, would be done, with the goal of eliminating the illicit discharge.

The NYSDEC General Permit for stormwater discharges includes a requirement for illicit discharge detection (IDDE) and elimination training for municipal personnel. The Village has no public works, highway/roads or maintenance personnel. The Village uses a consultant to conduct IDDE activities.

The Village reviews and updates the monitoring locations and sampling procedures annually. Based on the monitoring and inspection results, trends, and patterns, as well as common problems would be documented in the SWMP.

Tracking down illicit discharges will be done as information is found and evaluated. The Village will use escalating enforcement and tracking procedures to eliminate illicit discharges. The Village will document findings for each inspection, and confirmation of corrective actions and the elimination of an illicit discharge.

The tracking of illicit discharges in the Village will consider the fact that the entire Village is connected to the Nassau County sewage treatment system.

Time frames for the Village to track illicit discharges are as follows:

- within 24 hours of discovery for flowing monitoring locations with obvious illicit stormwater discharges;
- within 2 hours of discovery, for illicit discharges of sanitary wastewater that would affect bathing areas during the bathing season, shellfish areas, public water supply intakes and a report will be made to the following

NYSDEC, Region 1, SUNY Stony Brook
50 Circle Road
Stony Brook, NY 11790-3409
ATTN: Regional Water Engineer
516-444-0405

And

Nassau County Department of Health
200 County Seat Drive
Mineola, NY 11501
ATTN: Division of Environmental Health
516-227-9697

- within 5 days for suspect illicit discharges.

Once an illicit discharge is found, there are several methods to track the discharge to its source. The location and type of discharge at the point of initial discovery of an illicit discharge offers many clues to the source of the discharge, so the location and other characteristics of the discharge would be documented on the inspection and monitoring forms found in the Appendix. Tracking may be done by additional monitoring/sampling/testing, visual inspection either with or without the use of a video camera, dye testing, smoke testing, property owner surveys and investigations, surface inspections, and/or the study of infrared photography. The tracking of the storm system or discharge stream, as applicable, is typically done by working from downstream to upstream. Additional details for the tracking of illicit stormwater system discharges are found in the Illicit Discharge Detection and Elimination guidance manual prepared by the Center for Watershed Protection.

Time frames for the elimination of illicit discharges are as follows:

- within 24 hours of the identification of the illicit discharge that has a reasonable likelihood of adversely affecting human health or the environment; or
- within 5 days of the identification of an illicit discharge that does not have a reasonable likelihood of adversely affecting human health or the environment.

If it is not possible to eliminate the illicit discharge within the above specified time frames the NYSDEC Regional Water Engineer will be notified.

Village of Hewlett Neck
Storm Drain Inventory

<u>Road</u>	<u>Location</u>
Anchorage Road	1 catch basin connected to outfall
Cedar Avenue	24 catch basins, connected to an outfall located near the intersection of Macy Drive
Everit Avenue	8 catch basins, connected to outfalls
Lefferts Road	8 catch basins, connected to an outfall
Macy Drive	5 catch basins connected to the Cedar Lane system
Pond Lane	3 catch basins, connected to an outfall
Veeder Drive	1 catch basin, connected to an outfall
Woodside Drive	9 catch basins, connected to the Lefferts Road system

4. Minimum Control Measure 4: Erosion Control for Construction Activities

The Village requires erosion control measures for all land development projects. The NYSDEC requires additional erosion control and pollution control measures for land disturbance projects of an acre or more, as they require the preparation of a Stormwater Pollution Prevention Plan (SWPPP) which the Village must review, approve, and oversee. All building permit applications which proposed to disturb an acre or more are reviewed by the Village engineering consultant. The Village requires that all SWPPP sites are monitored and inspected by a professional engineer trained in stormwater management and erosion control.

The Village office phone number at 516-292-1400 is equipped with a recording device whereby residents and concerned citizens may report construction-related complaints which will be followed up by the Village Building Department. The Village will document the information on the Construction Site Complaint Form, as provided with the SWMP. All complaints contain the date, location, nature of the complaint and information pertaining to follow-up and inspection outcomes.

The Village construction oversight program applies to the control of stormwater runoff and erosion and sedimentation is applicable to construction sites that disturb an acre or more of land surface area. As such, the Village requires that a Stormwater Pollution Prevention Plan (SWPPP) be submitted to the Village Building Department in conformance with Chapter 179-6 of the Village Code. The Village Code at §179-8 specifies the required contents of a SWPPP as well as the procedures for the submission of a SWPPP. The Village has procedures in place applicable for the review of a SWPPP submission. All SWPPPs will be reviewed by the Village Engineer.

Each SWPPP review will ensure on behalf of the Village that erosion and sediment control measures conform to the NYS Erosion & Sedimentation Control manual of 2016 (or later version), or equivalent. Each SWPPP would be reviewed to ensure conformance with the NYS Stormwater Management Design Manual of 2015 (or later version), or equivalent. All post construction Stormwater Management Practices (SMPs) must meet the sizing criteria given in the NYS General Permit for Stormwater Discharges from Construction Activity. Any deviations from the NYS manuals must demonstrate equivalence. Additionally, every SWPPP must include an operation and maintenance plan (O&M) that includes maintenance schedules and actions to ensure continuous and effective operation of each erosion and sedimentation control measure, as well as every post construction stormwater management practice.

The SWMP will include documentation of each SWPPP review, and particular reference to the requirements contained in the NYS General Permit for Stormwater Discharges from Construction Activity. The SWMP will also include the priority category for each new construction activity.

Upon completion of the review of the SWPPP, the Village will notify the construction site owner/operator that the SWPPP has been accepted by the MS4, by issuing the appropriate SWPPP Acceptance Form, as included in the Appendix of the SWMP.

Prior to groundbreaking for any SWPPP site, the Village requires a preconstruction meeting to ensure that the NYSDEC (and Village) requirements of the SWPPP are met. The meeting shall be documented and included in the Village SWMP. The documentation of the preconstruction meeting must include the following:

- Date of the meeting
- Attendees, including the owner/operator (Village representative), the contractors responsible for the implementation for the SWPPP, and the qualified inspector as specified by Part VI.D.8 of the NYSDEC General Permit.
- Confirmation that the approved project has received or will receive coverage under the General Permit
- Verification of qualified individuals for inspection and implementation of the SWPPP
- Review of the Village's oversight program.

The Village oversight program will consist of periodic site inspections, using the SWPPP Site Inspection Form, and the frequency of the Village inspections would be determined by the sensitivity of the activity and/or construction site location and the project length or duration, and linked to project milestones during construction.

The Village would prioritize construction sites as high or low priority. A construction site would be a high priority if any of the following were true.

If there is a direct conveyance to a surface water that is:

- listed by the NYSDEC as an impaired water body with silt/sediment., phosphorus or nitrogen as the pollutant of concern (;
- classified as AA-S, AA or A waters (none in the Village); or
- classified as a trout stream or trout spawning stream (none in the Village)

If the area of land disturbance is greater than 5 acres at one time;

If the area of land disturbance is within 100 feet of a lake or pond listed as a priority water body by the NYSDEC (none in the Village)

If the area of land disturbance is within 50 feet of a river or stream listed as a priority water body by the NYSDEC (none in the Village).

Other construction sites are considered low priority.

The following is intended to help the Village and contractors to comply with the intent of the SWMP. The Village requires an as-built survey of the drainage system for all SWPPP sites. Additional information for contractors is included in the appendix.

Contractor's Responsibilities

For SWPPP Sites

For all construction activities that result in a land disturbance of an acre or more, the Contractor shall be familiar with and implement stormwater control measures in accordance with the New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit of Stormwater Discharges from Construction Activities, Permit No. GP-0-10-001. The Contractor shall also comply with the provisions of the Stormwater Pollution Prevention Plan (SWPPP) prepared for the project.

The contractor shall sign the SWPPP Certifications for conformance to the NYSDEC SPDES (State Pollutant Discharge Elimination System) that certifies that said contractor will implement the erosion control measures and stormwater quality and quantity measures, as applicable, in conformance with the approved Notice of Intent and SWPPP. Contractors and subcontractors (if any) must comply with terms and conditions of the General Permit and shall not take any action or fail to take action that may result in the owner or municipality being held in violation of the General Permit.

Work performed by the Contractors shall not result in the discharge of anything other than uncontaminated runoff to any nearby catch basin or any part of the municipal storm system, or a conveyance to a surface water. Runoff from the construction site shall be free of floatables, sediment and other materials. Work performed by the Contractor shall not cause an illicit discharge to the storm system or surface water, as defined by the NYSDEC. Additionally, work performed by said Contractor shall not result in an unauthorized direct or indirect connection, pipe, hose or other conveyance to a catch basin drain, trench, etc., which would allow a non-stormwater discharge to enter any nearby catch basin or any part of the municipal storm system, or a conveyance to a surface water.

The Contractor shall be responsible for the required inspections of their work site pursuant to the SWPPP. They shall be responsible for ensuring that the site is in conformance with the conditions of the General Permit and the appropriate inspection form.

The Village will conduct a final construction site inspection once all land disturbance has been stabilized. The Village will document the inspection in the SWMP. If the site conditions are acceptable, the Village would sign and issue the Notice of Termination form, which is included in the appendix.

5. Minimum Control Measure 5: Post Construction Stormwater Management

The Village requires post development stormwater management for land development projects for land disturbances of an acre or more. The intent is that the Village promotes the long-term performance of post construction stormwater management practices to remove pollutants from stormwater runoff.

Post construction stormwater management practices include catch basins, surface inlets, trench drains, storm collection pipes, and stormwater storage structures (drywells) which function as a below grade stormwater infiltration system. Catch basins are box-like structures and trench drains are rectangular structures designed to capture runoff as an inlet to the stormwater system. A surface inlet includes the open grate top of a dry well, as well as a yard drain. A stormwater storage structure is a subsurface storage structure that receives and temporarily stores stormwater runoff. The discharge from a stormwater storage structure occurs through infiltration into subsurface soil. A stormwater storage structure reduces the total runoff volume from a water quality design storm.

Catch basins, trench drains, surface inlets and stormwater storage structures shall be protected during construction so that debris, silt and sediment does not get into the structures and cause clogging that would compromise the functioning of the stormwater system. Once the construction site achieves final stabilization, the catch basins and stormwater storage structures shall be inspected by the contractor to ensure they are functioning as designed.

The Village will keep an inventory of stormwater management practices that have been installed since March 10, 2003. The inventory will be updated in the SWMP annually. The inventory will include the following information.

- Street address/tax parcel number
- Type of stormwater management practice
- Receiving water body name and status per NYSDEC
- Date of installation of the stormwater management practice
- Ownership of the stormwater management practice
- Responsible party for maintenance with contact information
- Location of the stormwater management practice
- Frequency of inspection
- Reason for installation
- Date of each inspection
- Results of inspections/ corrective actions as applicable

The Village will ensure that individuals conducting inspections of stormwater management practices would be appropriately trained. The individuals trained will be included in the SWMP. It should be noted that since the Village has no full time staff, the Village would have a consultant conduct inspections.

Maintenance items for catch basins include:

- Initial inspection and removal of sediment from construction activities
- Monitoring drainage inlets
- Keeping the surface clear of debris
- Removing debris from the surface of the inlet and its surrounding area
- Clearing debris from catch basin boxes, trench drain and storm pipes
- Clearing overflow passageways
- Repairing surface erosion and making sure that seeded and landscaped areas are maintained to ensure coverage

Stormwater storage structures maintenance items include:

- Initial inspection and removal of sediment from construction activities
- Performance shall be monitored after rainfall events to ensure that they drain properly
- Inspection of the bottom of the stormwater storage structure to make sure it is not clogged with debris
- Ensure that the stormwater storage structure capacity is not compromised with excess sediment

Leaves, trash, sediment, silt and debris that clog inlets, pipe components and stormwater storage structures shall be removed and disposed of at a suitable location, in compliance with local, state and federal regulations.

The Village would initiate follow-up actions within 30 days of an inspection if the results of the inspection are not satisfactory. The Village would initiate enforcement within 60 days of the inspection if follow-up actions are not complete.

6. Minimum Control Measure 6: Good Housekeeping for Municipal Activities

The Village has a maintenance garage located behind Village Hall. Currently, the Village has _____ maintenance staff personnel. Typical duties of the maintenance staff include _____. The Village has equipment _____.

The Village has standards for good housekeeping and pollution prevention for municipal activities, as included in the appendix.

The following best management practices (BMPs) shall be taken by the Village to control potential pollutants from entering the municipal storm system.

1. Minimize exposure of potentially polluting materials to rain, snow, snowmelt and runoff, including the protection of areas of loading, unloading, storage, disposal, cleaning, maintenance, and fueling operations, as applicable. The following are considered best management practices.
 - Locate materials and activities inside, or protect them with storm resistant cover
 - Use grading, berming, or curbing as containment features to prevent runoff of contaminated flows and create a diversion away from stormwater inlets and locate materials, equipment and activities (including cleaning of vehicles and equipment) so that leaks and spills would be within the containment area
 - Clean up spills and leaks promptly using dry methods such as absorbents to prevent the discharge of pollutants
 - Store leaky vehicles and equipment indoors, and use drip pans and absorbents
 - Use spill/overflow protection, such as a secondary containment system
 - Inspect unused equipment monthly for leaks
 - Minimize the use of chemicals and replace them with less toxic alternatives and non-hazardous cleaners and other items, as applicable
2. Follow a preventative maintenance program that includes routine inspection, testing, maintenance, and repair of all fueling areas, vehicles and equipment and systems to prevent leaks, spills and other releases, including
 - Performing inspections and preventive maintenance of storm drainage systems, source control systems or devices, treatment systems, and plant equipment
 - Maintain spill response supplies, containment measures, and coverings (including buildings), and maintain personnel training, as applicable
 - Wash vehicles and equipment such that washwater would not be discharged to surface waters
 - Routinely maintain best management practices, to ensure that the measures are effective and ready for the next storm event
 - Use temporary measures to minimize discharges of pollutants during times of repair or replacement of permanent measures, including the cleaning up of contaminated surfaces to eliminate a potential discharge
3. Spill prevention and response procedures shall follow what is included in the appendix.
4. Implementation of erosion and sediment control measures to include stabilization of exposed area to control runoff using structural and/or non-structural control found in the NYSDEC Erosion & Sedimentation Control manual.
5. Management of vegetated areas and open space on municipal property
6. Proper storage of salt storage, which does not apply to the Village, as the Village has no maintenance facility.

7. The Village keeps all dumpsters closed when not in use. Exposed areas will be free of waste, garbage and debris.

The Village storm system consists of a series of catch basins which are piped to either dry wells or groundwater recharge basins. The catch basins collect runoff from the roads, and they function as inlets to the storm system. Each catch basin has a recessed sump which serves as a storage area for debris, so it does not enter the piping system. It is important to keep the sumps clean because if they are full, the debris may enter the piping system and it would clog the Village drainage system. The Village maintains its catch basins by periodically having an outside contractor clean them. There is a catch basin inspection and maintenance form in the appendix. The inspection form includes the following information.

- Date of inspection
- Depth of structure
- Depth of sump
- Approximate level of trash, sediment, debris relative to the depth of the sump in the structure.
- Date of cleaning, as applicable

Based on the results of the inspection of the catch basins, the Village cleans its catch basins according to the following schedule

- Within 6 months of the inspection where the debris level had exceeded 50% of the depth of the sump
- Within 1 year of the inspection where the debris level was less than 50% of the depth of the sump

The Village or its contractor must use care when cleaning catch basins and other storm system components so that:

- Water or materials removed from the catch basin are prevented from entering the storm system or waters of the State; and
- materials removed from the catch basin are disposed of in accordance with applicable environmental laws and regulations.

The Village has 2.8 miles of roads owned and maintained by the Village. The remainder of the roads in the Village are private. The Village has a contractor clean or sweep the Village roads at least every other year either during the spring after winter sanding operations have been completed or in the fall when leaves are on the road surface.

The following are best management practices (BMPs) for road maintenance.

- Perform paving, patching and sealing during dry weather
- Stage the paving and patching activities to reduce the potential discharge of pollutants to the Village storm system or to waters of the State
- Restrict the use of herbicides/pesticides on roadsides
- Contain pollutants associated with road maintenance activities
- Routinely calibrate equipment for the appropriate application of sand/salt

- Ensure that snow removal and disposal activities comply with NYS guidance on snow disposal, including
 - the upland disposal/storage in areas least likely to cause runoff to waters of the State,
 - trap solids or remove solids from stockpiles snow as it melts to prevent them from entering the storm system or waters of the State,
 - establishment and maintenance of a buffer (minimum recommended distances range from 50 to 100 feet) between disposal site and surface water,
 - avoidance of wellhead protection areas of a public water supply or within 300 feet of a private well
 - avoidance of areas serving as onsite sewage system leachfields; and
 - as applicable, the use of proper controls such as inlet protection for catch basins.

Appendix

Village Notice of Intent

Stormwater Outfall Monitoring Location Inspection and Sampling Field Sheet Form

Records of Outfall Monitoring

SWPPP Acceptance Form

SWPPP Construction Site Inspection Form

SWPPP Site Inventory

Erosion and Sediment Control Principles

Construction Site Procedures

Construction Site Complaint Form

List of SWPPP Sites 2003 - 2024

SWPPP Notice of Termination Form

Good Housekeeping for Construction Sites

Construction Site Operations and Areas of Concern

Potential Pollutants from Construction

Spill Prevention Plan

Installation and Maintenance Schedule for Erosion and Sedimentation Control Measures

Best Management Practices for Municipal Facilities and Operations

Catch Basin Inspection/Maintenance Form

EPAs Stormwater Management Preferred Practices

Monitoring Locations Inspection and Sampling Field Sheet

Section 1: Background Data

Subwatershed:		Monitoring Location ID:	
Today's date:		Time (Military):	
Investigators:		Form completed by:	
Temperature (°F):	Rainfall (in.):	Last 24 hours:	Last 48 hours:
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	
Land Use in Drainage Area (Check all that apply):			
<input type="checkbox"/> Industrial <input type="checkbox"/> Ultra-Urban Residential <input type="checkbox"/> Suburban Residential <input type="checkbox"/> Commercial		<input type="checkbox"/> Open Space <input type="checkbox"/> Institutional Other: _____ Known Industries: _____	
Notes (e.g., origin, if known):			

Section 2: Monitoring Location Description

LOCATION	MATERIAL	SHAPE	DIMENSIONS (IN.)	SUBMERGED
<input type="checkbox"/> Closed Pipe	<input type="checkbox"/> RCP <input type="checkbox"/> CMP	<input type="checkbox"/> Circular <input type="checkbox"/> Single	Diameter/Dimensions: _____	In Water: <input type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/> Fully With Sediment: <input type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/> Fully
	<input type="checkbox"/> PVC <input type="checkbox"/> HDPE	<input type="checkbox"/> Elliptical <input type="checkbox"/> Double		
	<input type="checkbox"/> Steel	<input type="checkbox"/> Box <input type="checkbox"/> Triple		
	<input type="checkbox"/> Other: _____	<input type="checkbox"/> Other: _____ <input type="checkbox"/> Other: _____		
<input type="checkbox"/> Open drainage	<input type="checkbox"/> Concrete <input type="checkbox"/> Earthen <input type="checkbox"/> Rip-Rap <input type="checkbox"/> Other: _____	<input type="checkbox"/> Trapezoid <input type="checkbox"/> Parabolic <input type="checkbox"/> Other: _____	Depth: _____ Top Width: _____ Bottom Width: _____	
<input type="checkbox"/> In-Stream	{applicable when collecting samples}			
Flow Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <i>If No, Skip to Section 5</i>			
Flow Description (If present)	<input type="checkbox"/> Trickle <input type="checkbox"/> Moderate <input type="checkbox"/> Substantial			

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING MONITORING LOCATIONS				
PARAMETER	RESULT	UNIT	EQUIPMENT	
<input type="checkbox"/> Flow #1	Volume		Liter	Bottle
	Time to fill		Sec	
<input type="checkbox"/> Flow #2	Flow depth		In	Tape measure
	Flow width	_____'	Ft, In	Tape measure
	Measured length	_____'	Ft, In	Tape measure
	Time of travel		S	Stopwatch
Temperature			°F	Thermometer
pH			pH Units	Test strip/Probe
Ammonia			mg/L	Test strip

Monitoring Locations Inspection and Sampling Field Sheet

Section 4: Physical Indicators for Flowing Monitoring Locations Only

Are Any Physical Indicators Present in the flow? ☐ Yes ☐ No (If No, Skip to Section 5)

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	<input type="checkbox"/>	<input type="checkbox"/> Sewage <input type="checkbox"/> Rancid/sour <input type="checkbox"/> Petroleum/gas <input type="checkbox"/> Sulfide <input type="checkbox"/> Other:	<input type="checkbox"/> 1 - Faint	<input type="checkbox"/> 2 - Easily detected	<input type="checkbox"/> 3 - Noticeable from a distance
Color	<input type="checkbox"/>	<input type="checkbox"/> Clear <input type="checkbox"/> Brown <input type="checkbox"/> Gray <input type="checkbox"/> Yellow <input type="checkbox"/> Green <input type="checkbox"/> Orange <input type="checkbox"/> Red <input type="checkbox"/> Other:	<input type="checkbox"/> 1 - Faint colors in sample bottle	<input type="checkbox"/> 2 - Clearly visible in sample bottle	<input type="checkbox"/> 3 - Clearly visible in flow
Turbidity	<input type="checkbox"/>	See severity	<input type="checkbox"/> 1 - Slight cloudiness	<input type="checkbox"/> 2 - Cloudy	<input type="checkbox"/> 3 - Opaque
Floatables -Does Not Include Trash!!	<input type="checkbox"/>	<input type="checkbox"/> Sewage (Toilet Paper, etc.) <input type="checkbox"/> Suds <input type="checkbox"/> Petroleum (oil sheen) <input type="checkbox"/> Other:	<input type="checkbox"/> 1 - Few/slight; origin not obvious	<input type="checkbox"/> 2 - Some; indications of origin (e.g., possible suds or oil sheen)	<input type="checkbox"/> 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Monitoring Locations

Are physical indicators that are not related to flow present? ☐ Yes ☐ No (If No, Skip to Section 6)

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Monitoring Location Damage	<input type="checkbox"/>	<input type="checkbox"/> Spalling, Cracking or Chipping <input type="checkbox"/> Peeling Paint <input type="checkbox"/> Corrosion	
Deposits/Stains	<input type="checkbox"/>	<input type="checkbox"/> Oily <input type="checkbox"/> Flow Line <input type="checkbox"/> Paint <input type="checkbox"/> Other:	
Abnormal Vegetation	<input type="checkbox"/>	<input type="checkbox"/> Excessive <input type="checkbox"/> Inhibited	
Poor pool quality	<input type="checkbox"/>	<input type="checkbox"/> Odors <input type="checkbox"/> Colors <input type="checkbox"/> Floatables <input type="checkbox"/> Oil Sheen <input type="checkbox"/> Suds <input type="checkbox"/> Excessive Algae <input type="checkbox"/> Other:	
Pipe benthic growth	<input type="checkbox"/>	<input type="checkbox"/> Brown <input type="checkbox"/> Orange <input type="checkbox"/> Green <input type="checkbox"/> Other:	

Section 6: Overall Monitoring Location Characterization

☐ Unlikely ☐ Potential (presence of two or more indicators) ☐ Suspect (one or more indicators with a severity of 3) ☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. If yes, collected from:	<input type="checkbox"/> Flow <input type="checkbox"/> Pool
3. Intermittent flow trap set?	<input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, type: <input type="checkbox"/> OBM <input type="checkbox"/> Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?



Department of
Environmental
Conservation

NYS Department of Environmental Conservation Division
of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form
for
Construction Activities Seeking Authorization Under SPDES General Permit
*(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)

Project Owner/Operator Information

Owner/Operator Name:

Contact Person:

Street Address:

City/State/Zip:

Project Site Information

Project/Site Name:

Street Address:

City/State/Zip:

Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information

SWPPP Reviewed by:

Title/Position:

Date Final SWPPP Reviewed and Accepted:

Regulated MS4 Information

Name of MS4:

MS4 SPDES Permit Identification Number: NYR20A

Contact Person:

Street Address:

City/State/Zip:

Telephone Number:

§4 SWPPP Acceptance Form - continued

certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s).

I, the MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Signed Name:

/Position:

Signature:

Date:

Additional Information

**New York State Department of Environmental Conservation Division
of Water**

**625 Broadway, 4th Floor
Albany, New York 12233-3505**

(NOTE: Submit completed form to address above)

**NOTICE OF TERMINATION for Storm Water Discharges Authorized under
the SPDES General Permit for Construction Activity**

Please indicate your permit identification number: NYR _____

Owner or Operator Information

Owner/Operator Name: _____

Street Address: _____

City/State/Zip: _____

Contact Person: _____

Telephone: _____

Contact Person E-Mail: _____

Project Site Information

Project/Site Name: _____

Street Address: _____

City/Zip: _____

County: _____

Reason for Termination

☐ All disturbed areas have achieved final stabilization in accordance with the general permit and SWPPP.
***Date final stabilization completed (month/year):** _____

☐ Permit coverage has been transferred to new owner/operator. Indicate new owner/operator's permit
identification number: NYR _____
(Note: Permit coverage can not be terminated by owner identified in I.1. above until new
owner/operator obtains coverage under the general permit)

☐ Other (Explain on Page 2) _____

Final Site Information:

Did this construction activity require the development of a SWPPP that includes post-construction
stormwater management practices? ☐ yes ☐ no (If no, go to question 10f.)

Have all post-construction stormwater management practices included in the final SWPPP been
constructed? ☐ yes ☐ no (If no, explain on Page 2)

Identify the entity responsible for long-term operation and maintenance of practice(s)?

**NOTICE OF TERMINATION for Storm Water Discharges Authorized under the
SPDES General Permit for Construction Activity - continued**

Has the entity responsible for long-term operation and maintenance been given a copy of the operation and maintenance plan required by the general permit? ☐ yes ☐ no

Indicate the method used to ensure long-term operation and maintenance of the post-construction stormwater management practice(s):

- ☐ Post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality.
- ☐ Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s).
- ☐ For post-construction stormwater management practices that are privately owned, a mechanism is in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the owner or operator's deed of record.
- ☐ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university or hospital), government agency or authority, or public utility; policy and procedures are in place that ensures operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

Provide the total area of impervious surface (i.e. roof, pavement, concrete, gravel, etc.) constructed within the disturbance area? _____
(acres)

Is this project subject to the requirements of a regulated, traditional land use control MS4? ☐ yes

(If Yes, complete section VI - "MS4 Acceptance" statement

Additional Information/Explanation:

(Use this section to answer questions 9c. and 10b., if applicable)

MS4 Acceptance - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative (Note: Not required when 9b. is checked -transfer of coverage)

I have determined that it is acceptable for the owner or operator of the construction project identified in question 5 to submit the Notice of Termination at this time.

Signed Name:

/Position:

Signature:

Date:

**NOTICE OF TERMINATION for Storm Water Discharges Authorized under the
SPDES General Permit for Construction Activity - continued**

Qualified Inspector Certification - Final Stabilization:

I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the general permit, and that all temporary, structural erosion and sediment control measures have been removed. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Signed Name:

/Position:

Signature:

Date:

Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):

I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Signed Name:

/Position:

Signature:

Date:

Owner or Operator Certification

I hereby certify that this document was prepared by me or under my direction or supervision. My determination, based upon my inquiry of the person(s) who managed the construction activity, or those persons directly responsible for gathering the information, is that the information provided in this document is true, accurate and complete. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Signed Name:

/Position:

Signature:

Date:

Stormwater Pollution Prevention Plan Inventory

[illegible]

SWPPP Construction Site Inspection Checklist

Project Name and Location: _____

Date: _____ **Time:** _____ **Weather:** _____

	<u>Yes</u>	<u>No</u>	<u>N/A</u>
--	-------------------	------------------	-------------------

Authority

Is there a copy of the NOI kept at the construction site?	_____	_____	_____
---	-------	-------	-------

Is there a copy of the approved SWPPP on site?	_____	_____	_____
--	-------	-------	-------

Is there a copy of the MS4 SWPPP Acceptance Form kept on site?	_____	_____	_____
--	-------	-------	-------

Is there a copy of the NYSDEC NOI Acknowledgement Letter kept on site?	_____	_____	_____
--	-------	-------	-------

Record Keeping

Are inspections being performed as required?	_____	_____	_____
--	-------	-------	-------

Is there at least one trained contractor on site each day during soil disturbance?	_____	_____	_____
--	-------	-------	-------

Are the site inspections being performed by a qualified professional?	_____	_____	_____
---	-------	-------	-------

Are the inspection reports signed by the qualified professional?	_____	_____	_____
--	-------	-------	-------

Observations

The limits of disturbance are marked and not being trespassed?	_____	_____	_____
--	-------	-------	-------

Have all ESC measures shown on the SWPPP been installed and constructed?	_____	_____	_____
--	-------	-------	-------

All ESC measures are being maintained properly?	_____	_____	_____
---	-------	-------	-------

Are there more the 5 acres of disturbed soil without written approval?	_____	_____	_____
--	-------	-------	-------

Have stabilization measures been initiated in inactive areas?	_____	_____	_____
---	-------	-------	-------

Are materials and equipment properly stored to prevent spills & leaks?	_____	_____	_____
--	-------	-------	-------

Are trash and construction refuse properly stored in appropriate containers?	_____	_____	_____
--	-------	-------	-------

Are portable toilet facilities on site and properly maintained?	_____	_____	_____
---	-------	-------	-------

Have permanent SW control measures (drywells, DRAs) been installed & protected?	_____	_____	_____
---	-------	-------	-------

Is there evidence of an off-site discharge?	_____	_____	_____
---	-------	-------	-------

Is there evidence of turbidity, sediment, or oil reaching the receiving water?	_____	_____	_____
--	-------	-------	-------

Provide digital photographs of items that require corrective actions?	_____	_____	_____
---	-------	-------	-------

Description of condition of runoff at all points of discharge _____

Identification of ESC practices requiring maintenance, repair, replacement or installation _____

Description of disturbance or stabilization since last inspection _____

Current phase of construction of all post-construction SW practices _____

Identification of construction not in conformance with SWPPP and technical standards _____

Corrective actions that must be taken to install, repair, replace or maintain ESC and SW practices _____

Name and Title of Inspector (print)

Signature

Erosion and Sediment Control Principles

1. Minimize the area of disturbance and protect natural features and soil

- The potential for erosion and stormwater pollution is greatly reduced by reducing the amount of area of soil disturbed; limit the disturbed areas to those necessary for the construction of the project.
- Protect and preserve topsoil as a management practice
- Soil layers below the topsoil are much more susceptible to erosion and have less infiltration capacity; keeping natural soil in place aids infiltration of stormwater

2. Phase construction activities

- Minimize soil disturbance by scheduling or sequencing construction activities
- Limit the disturbances to areas where construction is active
- Stabilize areas as soon as possible as a management practice

3. Establish stabilized construction entrances and exits

- Install crushed rock at the construction entrance to help knock off mud, soil, silt and sediment from vehicle tires to prevent tracking onto nearby roads
- The nature of the Development may warrant the construction of multiple construction entrances throughout the site and/or the potential to relocate these entrances during the course of construction

4. Control stormwater flowing onto the construction site

- Analyze topographic and other features for the potential for stormwater runoff to flow onto the construction area
- Take measures to control the volume and velocity of runoff flowing onto or through the site

5. Stabilize soils promptly

- Stabilize soils where construction activities have ceased to minimize erosion. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the current soil disturbance activity ceased. It should be noted that “temporary” is defined as 14 calendar days, according to the General Permit (GP-0-15-002).
- Provide temporary or permanent vegetative or structural cover to protect exposed soils. Temporary cover includes seeding, mulch, blankets, mats and binders.

- Permanent cover includes seeding, sodding, planting, channel stabilization, vegetative buffers and impervious cover such as paving, concrete, bricks, stone and decking

6. Protect slopes

- Protect all slopes with erosion control measures
- Steep slopes, long slopes and erodible soils require more complex measures to control erosion, which include blankets, turf mats and fiber matrices

7. Soil Stockpiles

- Stockpile locations should be relatively level, dry and stable
- Maximum stockpile slopes shall be 2 on 1, and maximum height shall be limited to 20 feet
- Stockpiles shall be protected with silt fence around the perimeter to prevent soil transport
- Inactive stockpiles shall be seeded with a temporary cover

8. Protect storm drain inlets

- Prior to soil disturbance protect inlets that could receive stormwater from the project (on-site and off-site) until final stabilization. Inlet protection is to be removed after the completion of construction and stabilization

9. Establish perimeter controls

- Maintain natural areas using silt fence or fiber rolls around the perimeter of the area to be disturbed (especially the downslope perimeter)

10. Retain sediment on-site and control dewatering practices

- Use a temporary sediment trap with a volume of 3600 cubic feet per acre of the contributing watershed

Construction Site Procedures

During the construction of the project the contractor will adhere to the following general conditions:

- Land grading will be scheduled so as to minimize the areas of ground disturbance and the length of time that the areas are unstable;
- Sediment will be trapped on the site using such temporary structural erosion control measures such as silt fencing, straw bale dikes, etc.;
- Sweeping of site areas and adjacent roadways will be done periodically to remove sediment from the pavement surfaces; and
- On-site protection of construction materials and debris will be provided by best management practices (BMPs), as appropriate. Litter receptacles provided by the contractor will be provided for disposal of garbage and other such normal litter. These receptacles will be checked daily and emptied at least once per week.

The proposed construction sequence is as follows.

Prior to any construction/demolition:

1. Install perimeter silt fences
2. Protect existing catch basin inlets within site areas and along roadways adjacent to site where applicable.
3. Construct stabilized construction entrances
4. Install temporary sanitary facilities and trash receptacles

During Construction:

1. Create construction staging area
2. Begin clearing and demolition operations
3. Strip and store topsoil in stockpiles; provide stabilization and erosion control measures for any/all stockpiles
4. Prepare rough grading
5. Install proposed drainage facilities; install inlet protection as necessary for installed drainage
6. Prepare proposed grades
7. Install proposed curb, sidewalks, etc.
8. Install below grade utilities including:
 - a. Water service lines, hydrants, valves etc.
 - b. Electrical utilities, site lighting, etc.
 - c. Telecommunication utility services
 - d. Sanitary sewer facilities

9. Construct building pads
10. Install base paving course
11. Construct buildings
12. Install final paving sections
13. Install proposed landscaping
14. Remove erosion control measures as site achieves required stabilization

Completion of Site Work:

1. Monitor stabilized areas
2. File Notice of Termination once criteria of the permit are met.

Litter, construction chemicals and construction debris would be prevented from becoming a pollutant source by the implementation of good housekeeping and proper management practices, as follows.

- Keeping stormwater catch basins clean and free of material that may clog the inlet is a priority.
- Provide a perimeter fence of suitable material (such as chain link or orange construction fence) to contain litter on the site.
- Providing sturdy, water tight containers for litter and other trash within the construction area, convenient to workers where they may congregate for breaks.
- The trash containers shall be maintained and emptied appropriately as required, and must not be cleaned, or hosed out on site.
- Receptacles for trash and litter shall not be allowed to overflow, and they should remain covered.
- Litter shall not be allowed to be discarded on site, in or buried in the utility trenches or in the roadway or in other excavations.
- Construction debris larger than containers that is too heavy or too large to be carried or deposited by the elements shall be retrieved and removed by the contractor.
- Trucks and containers for debris shall not be overloaded.
- Tarps should be used to cover truck beds that are full of debris to prevent spillage.
- The contractor shall make every effort to prevent dumping, throwing, disposal, depositing, dropping or otherwise discarding waste litter and debris onto private or public property.
- Chemicals such as insecticides, rodenticides, herbicides and fertilizers must be used according to applicable laws and by qualified personnel. Appropriate application rates shall be adhered to, and the contractor must take precautions to protect the areas of application from people and the environment.
- Construction chemical releases shall be cleaned up as soon as possible so that they do not become a pollutant in the stormwater system.

- Recycling should be encouraged.

Demolition and construction wastes include brick, mortar, concrete, broken asphalt pavement, wood, lumber, sawdust, scrap metal, pipe, packaging materials, wooden pallets, plastic, glass, sanitary wastes, equipment and vehicle maintenance materials, soil, tree stumps, brush and rubble. The following practices shall be used to minimize the exposure of materials to stormwater.

- All waste materials shall be collected by the contractor and disposed of properly, and in accordance with applicable federal, state and local regulations and guidelines.
- Any material of a potentially hazardous nature, such as oil filters, petroleum products (including gasoline, kerosene, diesel fuel, lubricating oil and grease), equipment fluids, cleaning solvents and acids, curing compounds and paint shall be sealed in an appropriate container and clearly labeled, and segregated from other waste materials.
- Secondary containment shall be provided for hazardous liquid storage and transport.
- Providing sturdy, water tight containers for waste materials and other trash within the construction area, convenient to workers depending on the work activity.
- The trash containers shall be maintained and emptied appropriately as required, and must not be cleaned with a hose on site.
- Demolition and construction equipment and maintenance materials would be stored at staging areas, and would be kept away from the stormwater system by using covers (either under a roof or within containers) as applicable.
- Vehicle maintenance shall take place offsite, away from the construction zone, and in an area protected from potential exposure to surface waters.
- Any chemical spill will be cleaned up immediately upon discovery. Absorbent materials will be placed in a container for proper disposal. Spill kits will be kept and maintained on site. A materials inventory, and material safety data sheets for materials contained in the inventory, will be kept at staging areas, as well as emergency contact information.
- Temporary sanitary facilities (portable toilets) will be provided at the construction site.

Temporary measures for erosion control include the use of diversion devices to keep runoff from entering the work trench and soil storage areas. Portable booms or other suitable containment devices will be used to prevent excavated soil from being transported by runoff. If soil would be stockpiled for a period of more than 5 days, it will be seeded with a fast growing vegetative cover. Catch basin inlets will be protected in accordance with the details shown on the plans. Trenches will be promptly backfilled to grade to minimize exposure time to the elements.

The contractor is responsible for the implementation of the SWPPP, including the installation and maintenance of management practices, waste and chemical handling, housekeeping and means and methods of construction. A regular maintenance schedule will be implemented for the maintenance of the erosion control measures.

According to Part IV of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activities (GP-0-15-002), the owner or operator must ensure that all erosion and sedimentation control practices and post construction stormwater management practices identified in the Stormwater Pollution Prevention Plan are always maintained and effective. This includes the following:

- Daily checking to ensure that all measures are intact and functioning, by trained personnel
- Inspections by a qualified inspector on (at least) a weekly basis (and after a 0.5-inch rainfall), to ensure that sediment barriers, erosion control measures, site stabilization measures, etc., are effective and functioning.
- Inspections by a qualified inspector on (at least) a weekly basis (and after a 0.5-inch rainfall), of sediment accumulation in stormwater structures and devices, including catch basins, stormwater storage facilities, drains and construction entrances, and to ensure removal of sediment as necessary.
- Inspections by a qualified inspector on (at least) a weekly basis (and after a 0.5-inch rainfall), of unstabilized, disturbed areas, staging areas, to take corrective actions if areas are susceptible to erosion.
- Inspections by a qualified inspector on (at least) a weekly basis (and after a 0.5-inch rainfall), to ensure that materials storage areas are sufficiently protected and not contributing pollutants to surrounding areas.

Good Housekeeping at Construction Sites

1. Provide for waste management

- Prevent or reduce the potential for the discharge of pollutants to stormwater from solid or liquid wastes by disposing of trash, proper material handling, recycling and cleanup
- Designate trash and bulk waste disposal areas on-site
- Recycle materials whenever possible
- Segregate, label and provide proper disposal for hazardous materials and wastes
- Collect litter from the site daily
- Provide well maintained, stable and properly located toilet facilities (away from storm drains), and use according to Health Department regulations
- Provide secondary containment for spills from collection and sanitary facilities
- Educate employees regarding waste handling on site

2. Establish proper materials handling staging areas

- Paints, solvents, pesticides, fuels, oils and other hazardous materials should be stored indoors or under cover, not exposed to elements
- Designate staging areas for fueling, mixing paint, plaster, mortar, and other materials, as applicable
- Train employees pertaining to the proper handling of materials used at the site

3. Designate paint and concrete washout areas

- Concrete contractors should be encouraged to use washout facilities at their plant
- Washout areas on-site should be designated, and located away from streams, ponds, storm drains, streets or gutters
- Provide adequate containment for wash water
- Inspect washout facilities daily to look for leaks, tears, and breaches in the system, as applicable

4. Establish proper equipment/vehicle fueling and maintenance practices

- Encourage fueling and vehicle/equipment maintenance off-site
- Designate vehicle/equipment fueling and maintenance areas, and locate them away from wash areas, runoff, streams, ponds, storm drains, streets or gutters. Use drip pans, drip cloths and/or absorbent pads for fluid replacement and keep a spill kit nearby. Provide secondary containment.

- Inspect the fueling and maintenance area daily to look for leaks, and breaches in the system, as applicable
- Collect spent fluids, store in labeled containers away from the elements and dispose of or recycle appropriately
- Train employees pertaining to the proper use of the fueling and maintenance area

5. Control equipment washing and allowable stormwater discharges

- Designate vehicle/equipment washing areas, and locate them away from runoff, streams, ponds, storm drains, streets or gutters. Provide secondary containment.
- Use high pressure water spray without detergents
- Train employees pertaining to the proper washing procedures

6. Develop a spill prevention and response plan

Follow the plan included in the SWPPP

Construction Site Operations and Areas of Concern

<u>Activity</u>	<u>Potential pollutant</u>	<u>Controls</u>
Demolition	sediment, trash, debris	Maintain erosion control measures, wind screening
Clearing, grading & excavating	sediment, trash, debris	Maintain erosion control measures, wind screening
Concrete work & washout	metals, pH, trash, debris	Specify a controlled washout area with contained/filtered runoff
Paving	sediment, trash, debris	Maintain erosion control measures
Materials delivery & storage	sediment, trash, debris	Maintain erosion control measures, wind screening and specify locations for handling
Dewatering	sediment, nutrients	Maintain erosion control measures
Landscaping operations	sediment, nutrients, trash, debris	Maintain erosion control measures, use chemicals according to labels, laws and by qualified applicators
Solid waste	trash, debris, other chemicals	Use receptacles, wind screening and litter patrol
Sanitary system	nutrients, pH, bacteria, other chemicals	Use on-site portable facility
Vehicle fueling & maintenance	oil, grease, other chemicals	Do not perform on-site

Potential Pollutants from Construction Sites

<u>Material</u>	<u>Pollutant</u>	<u>Controls to Minimize Stormwater Impacts</u>
Silt/sediment	Suspended solids, pathogens	<ul style="list-style-type: none"> • Adhere to erosion control plan
Gasoline	BTEX, MTBE	<ul style="list-style-type: none"> • Proper labeling of all containers • Proper covered storage of materials • Keep containers above the ground • Keep lids tightly fastened • Provide means of secondary containment • Establish staging areas away from stream corridors • Limit handling to staging areas • Do not overfill equipment • Dispose of wastes appropriately • Use caution to avoid spills
Diesel fuel	Petroleum hydrocarbons	
Oil	Petroleum hydrocarbons	
Kerosene	Petroleum hydrocarbons	
Hydraulic fluids	Petroleum hydrocarbons	
Lubricating oil	Petroleum hydrocarbons	
Grease	Petroleum hydrocarbons	
Antifreeze	Ethylene glycol, metals	
Cleaning solvents	VOCs, naphtha	
Adhesives	VOCs, polymers, epoxies, ammonia, acids	<ul style="list-style-type: none"> • Proper labeling of all containers • Proper storage of materials • Keep lids tightly fastened • Keep materials covered from weather • Limit use where needed • Dispose of wastes appropriately • Use caution to avoid spills
Paint	VOCs, metals, epoxies	
Wood preservatives	Petroleum hydrocarbons, VOCs, resins, metals	
Curing compounds	VOCs, resins, phenols, naphthalene	
Joint compounds	Asbestos	
Plaster/spackle	Asbestos, calcium oxides	
Asphalt	Petroleum hydrocarbons	<ul style="list-style-type: none"> • Specify controlled concrete truck washout area • Isolate construction materials storage areas • Use good housekeeping procedures on site • Dispose of waste materials properly
Asphaltic cement	Petroleum hydrocarbons	
Concrete/mortar	Acids, ketones	

Construction debris	Solid waste	<ul style="list-style-type: none"> • Isolate construction materials storage areas • Use good housekeeping procedures on site • Provide covered trash receptacles on site • Do not overfill receptacles • Pick up litter daily
Litter/paper	Solid waste	
Food waste	Solid waste	
Cardboard/packaging	Solid waste	
Demolition debris	Solid waste	
Trees/shrubs	Solid waste	
Insecticides	Pesticides	<ul style="list-style-type: none"> • Store in areas protected from the elements • Proper labeling of all containers • Proper storage of materials • Keep lids tightly fastened • Use sparingly and according to instructions • For use by qualified individuals
Rodenticides	Pesticides	
Herbicides	Pesticides	
Lawn chemicals	Pesticides	
Fertilizer	Nitrogen, phosphorus	
Sanitary wastes	Bacteria, pathogens	<ul style="list-style-type: none"> • Provide on site sanitary facilities

Stormwater Pollution Prevention Plan Inventory

[illegible]

Spill Prevention/Response Plan

The personnel at the site must be aware of the locations of chemical storage areas, including the types and quantities of hazardous materials stored at the site. All materials should be stored in appropriate containers and must be labeled. Additionally, anything that is susceptible to spillage or leakage must be handled with care to minimize the potential of a chemical or materials release.

All materials shall be stored in their original containers, and labels must be prominently displayed. The contractor is responsible for maintaining the Material Safety Data Sheets (MSDS) for each chemical used or stored on the site, in a convenient location. The MSDS contains valuable information pertaining to the chemical and physical properties of the materials, and indicates handling advice, recommendations for chemical neutralization and precautions for chemical incompatibilities. Individuals who undertake a supervisory role in site operations should be familiar with the chemicals stored and used on the site, and their properties as provided in the MSDS.

The personnel who handle potentially polluting materials should recognize the potential flow path of a spill. The flow path may be determined by knowing how the area storm system functions, knowing the flow direction of a spill and/or analyzing the area topography. The personnel must be aware of the location of existing storm drains, tributary drainage areas (watershed areas), and surface waters, as applicable. Based on this information, secondary containment and barriers to inhibit or stop flow should be used.

Spill prevention procedures shall be posted at the construction site and persons trained in spill handling shall be on site or on call at all times. Spill kits approved by OSHA and materials for cleaning spills shall be kept on site and shall be easily accessible for emergencies and shall be kept near the chemical storage areas. Personnel must be trained to use the spill kit properly and effectively.

The chemical storage area must be inspected periodically and after heavy rains to ensure that the storage area remains dry. Any spills or accumulated rainwater within the storage area shall be collected and placed into storage drums, to be disposed of properly, and not on site. Any liquid collected from the chemical storage area must be handled as hazardous waste.

Spills shall be cleaned as soon as possible upon discovery and all contaminated materials must be disposed of properly. Spills shall not be washed with water, hosed down or buried. If a spill is exposed to rainfall, it shall be covered using tarps or similar methods.

The following are general guidelines for spill response:

- Immediately alert a supervisor and personnel in the area of the spill
- In the case of a fire, explosivity or if medical attention is needed, call 911
- If the spill involves a chemical release with possible contamination, contaminated clothing must be removed and the skin must be flushed with water (if compatible)

- If the spill involves a volatile or flammable material, warn site personnel, clear the area, control ignition sources and ventilate the area, as applicable
- Employ the use of appropriate personal protection equipment, per MSDS information

The basic procedures for the prevention of spilled chemicals from reaching surface waters include the following:

- Stop the source of the spill
- Contain any liquid release, protect floor drains, the storm system, drainage ways or other means of conveyance or transport of the spill, using booms, dikes, covers or similar methods
- Cover the spill with absorbent material
- Collect the absorbed material and place it in a suitable container and label it accordingly
- Dispose of the absorbent properly

The following notifications shall be made in the event of a chemical, petroleum product or hazardous spill:

- NYS Department of Environmental Conservation, chemical or oil spill release

Hotline: 1-800-457-7362

NYSDEC, Region 1 Hotline, Stony Brook, (631) 444-0322

- Nassau County Department of Health Services, (516) 227-9692
- Fire: 911
- Police: 911

Suspected spills must be reported to the department's Spill Hotline (800-457-7362) within 2 hours after discovery for any of the following conditions:

- (i) the discovery of hazardous substance outside of a container at the facility or in the surrounding area (e.g., the presence of free product or vapors in soils, basements, sewer and utility lines, and nearby surface water);
- (ii) unusual operating conditions observed (e.g., the erratic behavior of hazardous substance dispensing equipment, the sudden loss of hazardous substance from the container, an unexplained presence of water in the container, or water in the interstitial space of secondarily contained components), unless the container component is found to be defective but not leaking, and is immediately repaired or replaced;
- (iii) any other conditions or indications of a suspected spill. Where a spill of any hazardous substance has occurred or is suspected, the department may order the owner to inspect any container, location, and/or associated equipment which might be the source of the actual or suspected spill and to test for tightness and structural soundness.

Any spill of a hazardous substance must be reported in accordance with 6 NYCRR 597.4. Any spill of petroleum must be reported in accordance with 6 NYCRR 613.6 or 17 NYCRR 32.3.

After a spill occurs, municipal personnel must evaluate the adequacy of the best management practices which are in place. If the management practices are inadequate, new best management practices must be implemented and the applicable plan (e.g., SWPPP, SWMP) must be updated. The intent of the new practices is the prevention of the reoccurrence of a spill and to improve emergency response to a release.

The cleaning up of a spill or leak must comply with must be consistent with applicable petroleum bulk storage, chemical bulk storage, or hazardous waste management regulations at 6 NYCRR Parts 596 through 599, 613, and 370 through 373.

Construction Site Complaint Form

Date: _____

Person Filing Complaint Name: _____

Address: _____

Location of Construction Site: _____

Nature of Complaint: _____

Follow-up Action: _____

Inspection Outcome: _____

Installation and Maintenance Schedule
Erosion Control and Stormwater Management Facilities
(as applicable for each erosion control measure)

Straw Bales: Straw bales may be used alone or they may be placed flush against the upstream (upslope) side of silt fence. The straw bales shall be installed prior to groundbreaking within areas of site work, and along the perimeter of soil storage stockpiles immediately upon establishment, as applicable and according to the plans. The straw bales shall be inspected at least once each week and after heavy rains. Straw bales that are not installed properly (embedded a minimum of 4 inches into the soil), or that are no longer intact shall be replaced. There should be no gaps in the straw bale barrier. Sediment that accumulates more to a depth of half of the straw bale height must be removed and disposed of so that it would not erode. Straw bales should be replaced annually, or when they are no longer functional, as the life expectancy is several months.

Silt Fence: Silt fence may be used alone or they may be placed flush against the downstream (down slope) side of straw bales. The silt fence shall be installed prior to groundbreaking within areas of site work and after establishment of soil storage stockpiles immediately upon establishment, as applicable and according to the plans. The silt fence shall be inspected at least once each week and after heavy rains. Silt fence that is not installed properly, securely fastened or not properly set into the ground (6 inches), should be reinstalled. Silt fence that is torn, stressed, stretched, weathered or weak shall be replaced. Accumulated sediment shall be removed and disposed of so that it would not erode. Silt fence should be replaced every six months, or when it is no longer functional.

Storm Drain Inlet Protection:

Storm drain inlet protection shall be used as specified on the plans and detail sheets, and in areas where construction activities may cause soil or sediment to enter the storm system. Inlet protection shall be installed prior to groundbreaking, and it shall remain in place until disturbed soils have been stabilized. Inlet protection shall be inspected daily and it shall be reinstalled or replaced if not installed properly or is no longer functional. Accumulated soil, sediment, debris and other potential impediments to the functioning of the stormwater system shall be removed and disposed of properly.

Portable Sediment Tank, or Sump Pit:

The portable sediment tank or the sump pit (option) shall be used to trap sediment from dewatering operations. The sediment tank or sump pit shall be inspected daily for clogging and other problems that may cause the system to malfunction. Accumulated soil, sediment, debris and other potential impediments to the functioning of the stormwater system shall be removed and disposed of properly.

Stabilized Construction Entrance:

A stabilized construction entrance is a pad of aggregate on a geotextile located where there is construction traffic to (or from) an access point. The entrance shall be maintained to prevent tracking of sediment from construction sites. Maintenance includes top dressing of additional aggregate material (e.g., stone). Sediment that has reached a point beyond the stabilized entrance shall be immediately removed. The stone pad may be washed or rinsed, but only if the sediment washed from the stone is contained on site.

Check Dams:

Check dams are small barriers made of stone, bagged sand or gravel, or other durable material, placed across a drainage way. Check dams should be inspected after each rainfall event. Accumulated sediment should be removed and stone (or other material) should be replenished to maintain the original design shape.

Stabilization with Mulch:

Mulching is used to stabilize areas of new plantings or on soils subject to erosion. Mulching also lowers runoff amounts from surfaces. Mulch should be inspected regularly to ensure adequate coverage. Additional mulch should be added if mulch has washed away, biodegraded or become buried or worked into the soil underneath.

Stabilization with Sod:

Installation of sod is applicable to areas where the goal is to establish lawn areas for a long term. Sod should be carefully watered daily and inspected to ensure adequate coverage, without gaps, and to ensure that it is green and healthy, and that moisture is reaching through the root zone (to 4 inches). Pieces of sod that are not thriving shall be replaced. Sod should not be mowed until the roots are firmly established.

Sediment Basin:

A sediment basin is a temporary barrier or dam constructed in a low area or in a drainage way to intercept sediment laden runoff and trap soil particles (silt and sediment). Sediment basins should be inspected daily and erosion and other damages should be immediately repaired. Sediment shall be removed prior to reaching 50% of the basin capacity.

Catch Basin Inspection and Maintenance Form

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Environmental Protection Agency (EPA) Stormwater Management Preferred Practices

Bioretention Cells



A bioretention cell or rain garden is a depressed area with porous backfill (material used to refill an excavation) under a vegetated surface. These areas often have an underdrain to encourage filtration and infiltration, especially in clayey soils. Bioretention cells provide groundwater recharge, pollutant removal, and runoff detention. Bioretention cells are an effective solution in parking lots or urban areas where green space is limited.

Curb and Gutter Elimination

Curbs and gutters transport flow as quickly as possible to a stormwater drain without allowing for infiltration or pollutant removal. Eliminating curbs and gutters can increase sheet flow and reduce runoff volumes. Sheet flow, the form runoff takes when it is uniformly dispersed across a surface, can be established and maintained in an area that does not naturally concentrate flow, such as parking lots. Maintaining sheet flow by eliminating curbs and gutters and directing runoff into vegetated swales or bioretention basins helps to prevent erosion and more closely replicate predevelopment hydraulic conditions. A level spreader, which is an outlet designed to convert concentrated runoff to sheet flow and disperse it uniformly across a slope, may also be incorporated to prevent erosion.

Grassed Swales



Grassed swales are shallow grass-covered hydraulic conveyance channels that help to slow runoff and facilitate infiltration. The suitability of grassed swales depends on land use, soil type, slope, imperviousness of the contributing watershed, and dimensions and slope of the grassed swale system. In general, grassed swales can be used to manage runoff from drainage areas that are less than 4 hectares (10 acres) in size, with slopes no greater than 5 percent. Use of natural, low-lying areas is encouraged, and natural drainage courses should be preserved and utilized.

Green Parking Design



Green parking refers to several techniques that, applied together, reduce the contribution of parking lots to total impervious cover. Green parking lot techniques include: setting maximums for the number of parking lots created; minimizing the dimensions of parking lot spaces; utilizing alternative pavers in overflow parking areas; using bioretention areas to treat stormwater; encouraging shared parking; and providing economic incentives for structured parking.

Infiltration Trenches



Infiltration trenches are rock-filled ditches with no outlets. These trenches collect runoff during a storm event and release it into the soil by infiltration (the process through which stormwater runoff penetrates into soil from the ground surface). Infiltration trenches may be used in conjunction with another stormwater management device, such as a grassed swale, to provide both water quality control and peak flow attenuation. Runoff that contains high levels of sediments or hydrocarbons (for example, oil and grease) that may clog the trench are often pretreated with other techniques such as water quality inlets (series of chambers that promote sedimentation of coarse materials and separation of free oil from storm water), inlet protection devices, grassed swales, and vegetated filter strips.

Inlet Protection Devices



Inlet protection devices, also known as hydrodynamic separators, are flow-through structures with a settling or separation unit to remove sediments, oil and grease, trash, and other stormwater pollutants. This technology may be used as pre-treatment for other stormwater management devices. Inlet protection devices are commonly used in potential stormwater “hot spots”—areas where higher concentrations of pollutants are more likely to occur, such as gas stations.

Permeable Pavement



Permeable pavement is an alternative to asphalt or concrete surfaces that allows stormwater to drain through the porous surface to a stone reservoir underneath. The reservoir temporarily stores surface runoff before infiltrating it into the subsoil. The appearance of the alternative surface is often similar to asphalt or concrete, but it is manufactured without fine materials and instead incorporates void spaces that allow for storage and infiltration. Underdrains may also be used below the stone reservoir if soil conditions are not conducive to complete infiltration of runoff.

Permeable Pavers



Permeable pavers promote groundwater recharge. Permeable interlocking concrete pavements (PICP) are concrete block pavers that create voids on the corners of the pavers (pictured to the right). Concrete grid paver (CGP) systems are composed of concrete blocks made porous by eliminating finer particles in the concrete which creates voids inside the blocks; additionally, the blocks are arranged to create voids between blocks. Plastic turf reinforcing grids (PTRG) are plastic grids that add structural support to the topsoil and reduce compaction to maintain permeability. Grass is encouraged to grow in PTRG, so the roots will help improve permeability due to their root channels.

Rain Barrels and Cisterns



Rain barrels and cisterns harvest rainwater for reuse. Rain barrels are placed outside a building at roof downspouts to store rooftop runoff for later reuse in lawn and garden watering. Cisterns store rainwater in significantly larger volumes in manufactured tanks or underground storage areas. Rainwater collected in cisterns may also be used in non-potable water applications such as toilet flushing. Both cisterns and rain barrels can be implemented without the use of pumping devices by relying on gravity flow instead. Rain barrels and cisterns are low-cost water conservation devices that reduce runoff volume and, for very small storm events, delay and reduce the peak runoff flow rates. Both rain barrels and cisterns can provide a source of chemically untreated “soft water” for gardens and compost, free of most sediment and dissolved salts.

Riparian Buffers



A riparian, or forested, buffer is an area along a shoreline, wetland, or stream where development is restricted or prohibited. The primary function of aquatic buffers is to

physically protect and separate a stream, lake, or wetland from future disturbance or encroachment. If properly designed, a buffer can provide stormwater management and can act as a right-of-way during floods, sustaining the integrity of stream ecosystems and habitats.

Sand and Organic Filters

Sand and organic filters direct stormwater runoff through a sand bed to remove floatables, particulate metals, and pollutants. Sand and organic filters provide water quality treatment, reducing sediment, biochemical oxygen demand (BOD), and fecal coliform bacteria, although dissolved metal and nutrient removal through sand filters is often low. Sand and organic filters are typically used as a component of a treatment train to remove pollution from stormwater before discharge to receiving waters, to groundwater, or for collection and reuse. Variations on the traditional surface sand filter (such as the underground sand filter, perimeter sand filter, organic media filter, and multi-chamber treatment train) can be made to fit sand filters into more challenging design sites or to improve pollutant removal.

Stormwater Planters



Stormwater planters are small landscaped stormwater treatment devices that can be placed above or below ground and can be designed as infiltration or filtering practices. Stormwater planters use soil infiltration and biogeochemical processes to decrease stormwater quantity and improve water quality, similar to rain gardens and green roofs but smaller in size—stormwater planters are typically a few square feet of surface area compared to hundreds or thousands of square feet for rain gardens and green roofs. Types of stormwater planters include contained planters, infiltration planters, and flow-through planters.

Vegetated Roofs



Green roofs consist of an impermeable roof membrane overlaid with a lightweight planting mix with a high infiltration rate and vegetated with plants tolerant of heat, drought, and periodic inundations. In addition to reducing runoff volume and frequency and improving runoff water quality, a green roof can reduce the effects of atmospheric pollution, reduce energy costs, and create an attractive environment. They have reduced replacement and maintenance costs and longer life cycles compared to traditional roofs.

Tree Box Filters



Tree box filters are in-ground containers used to control runoff water quality and provide some detention capacity. Often premanufactured, tree box filters contain street trees, vegetation, and soil that help filter runoff before it enters a catch basin or is released from the site. Tree box filters can help meet a variety of stormwater management goals, satisfy regulatory requirements for new development, protect and restore streams, control combined sewer overflows (CSOs), retrofit existing urban areas, and protect reservoir watersheds. The compact size of tree box filters allows volume and water quality control to be tailored to specific site characteristics. Tree box filters provide the added value of aesthetics while making efficient use of available land for stormwater management. Typical landscape plants (for example, shrubs, ornamental grasses, trees and flowers) are an integral part of the bioretention system. Ideally, plants should be selected that can withstand alternating inundation and drought conditions and that do not have invasive root systems, which may reduce the soil's filtering capacity.

Vegetated Filter Strips



Filter strips are bands of dense vegetation planted downstream of a runoff source. The use of natural or engineered filter strips is limited to gently sloping areas where vegetative cover can be established and channelized flow is not likely to develop. Filter strips are well suited for treating runoff from roads and highways, roof downspouts, very small parking lots, and impervious surfaces. They are also ideal components for the fringe of a stream buffer, or as pretreatment for a structural practice.

