Town of Chelmsford

Stormwater Management Program (SWMP)

Appendix

Standard Procedures and Inspection Forms

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MA 02109-3912

VIA EMAIL

December 14, 2018

Glenn Diggs
Chairman, Board of Selectmen

And;

Stephen Jahnie
Assistant Director of Public Works
9 Alpha Rd
Chelmsford, MA. 01824
sjahnle@townofchelmsford.us

Re: National Pollutant Discharge Elimination System Permit ID #: MAR041185, Town of Chelmsford

Dear Stephen Jahnie:

The 2016 NPDES General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts (MS4 General Permit) is a jointly issued EPA-MassDEP permit. Your Notice of Intent (NOI) for coverage under this MS4 General Permit has been reviewed by EPA and appears to be complete. You are hereby granted authorization by EPA and MassDEP to discharge stormwater from your MS4 in accordance with the applicable terms and conditions of the MS4 General Permit, including all relevant and applicable Appendices. This authorization to discharge expires at midnight on **June 30, 2022.**

For those permittees that certified Endangered Species Act eligibility under Criterion C in their NOI, this authorization letter also serves as EPA's concurrence with your determination that your discharges will have no effect on the listed species present in your action area, based on the information provided in your NOI.

As a reminder, your first annual report is due by **September 30, 2019** for the reporting period from May 1, 2018 through June 30, 2019.

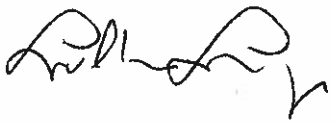
Information about the permit and available resources can be found on our website: https://www.epa.gov/npdes-permits/massachusetts-small-ms4-general-permit. Should you have

any questions regarding this permit please contact Newton Tedder at tedder.newton@epa.gov or (617) 918-1038.

Sincerely,

Thelma Murphy, Chief
Stormwater and Construction Permits Section
Office of Ecosystem Protection
United States Environmental Protection Agency, Region 1

and;



Lealdon Langley, Director
Wetlands and Wastewater Program
Bureau of Water Resources
Massachusetts Department of Environmental Protection

Office of the Board of Selectmen

50 Billerica Road
Chelmsford, MA 01824-2777

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Fax: 978.250.5252

Documentation for delegation of "Authorized Representative" for NPDES 2016 Massachusetts Small Municipal Separate Storm Sewer System (MS4) General Permit

This document serves to affirm that **Paul Cohen, Town Manager,** has responsibility for the operation of the MS4 and is hereby designated as an authorized person for signing all reports including but not limited to the Stormwater Management Plan (SWMP), Stormwater Pollution Prevention Plans (SWPPPs), inspection reports, annual reports, monitoring reports, reports on training, and other information required by the General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in for **The Town of Chelmsford**. This authorization cannot be used for signing a NPDES permit application (e.g., Notice of Intent (NOI)) in accordance with 40 CFR 122.22).

By signing this authorization, I confirm that I meet the following requirements to make such a designation as set forth in Part B.11 of Appendix B of the Small MS4 General Permit:

> *For a municipality, state, federal, or other public agency: By either a principal executive officer or ranking elected official.*

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Board of Selectmen

Kenneth M. Lefebvre, Chairman — **[Date]** 6/10/19

The Town of Chelmsford

SSO Inventory

Chelmsford, Massachusetts
Revision Date: June 1, 2020

SSO Location[1]	Discharge Statement[2]	Date[3]	Time Start[3]	Time End[3]	Estimated Volume[4]	Description[5]	Mitigation Completed[6]	Mitigation Planned[7]
200 Wotton Street, North Chelmsford (Southwell Field)	SSO discharged to Deep Brook/Merrimack River surface water	3/24/2020 – 3/31/2020	2:00 pm	7:30 pm	3,000,000 gals	Ruptured force main	Bypass installed; line permanently repaired; surface water cleaning along edges	Complete

[1] Location (approximate street crossing/address and receiving water, if any)
[2] A clear statement of whether the discharge entered a surface water directly or entered the MS4
[3] Date(s) and time(s) of each known SSO occurrence (i.e., beginning and end of any known discharge)
[4] Estimated volume(s) of the occurrence
[5] Description of the occurrence indicating known or suspected cause(s)
[6] Mitigation and corrective measures completed with dates implemented
[7] Mitigation and corrective measures planned with implementation schedules
[8] N/A = Not applicable

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DEPARTMENT OF PUBLIC WORKS

9 Alpha Road
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Gary J. Persichetti, CFM
Director

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SWMP 3-8
PRIVATE DRAINAGE CONNECTIONS

Introduction

The 2003 Massachusetts MS4 Permit described a number of non-stormwater discharges to the engineered storm drain system that are considered "allowable", as long as an individual community has not prohibited the discharge. Allowable non-stormwater discharges to the storm drain system can include the following, per Page 8 of the 2003 Massachusetts MS4 Permit (not inclusive):

- Diverted stream flows;
- Uncontaminated groundwater infiltration (as defined at 40 CFR 35.2005(20));
- Uncontaminated pumped groundwater;
- Foundation drains;
- Water from crawl space pumps;
- Footing drains; and
- Flows from riparian habitats and wetlands.

This Standard Operating Procedure intends to provide guidance on how to evaluate non-stormwater discharges to the engineered storm drain system from private connections such as foundation drains (also referred to as perimeter drains), footing drains (similar to foundation drains), non-pumped groundwater infiltration, and other private non-stormwater discharges. Discharges from sump pumps or other pumped groundwater sources are being addressed by a separate Sump Pump Discharge Policy, and are not covered by this Standard Operating Procedure.

Applicability of Private Drainage Connections

Connections of private drainage to the municipal storm drain system generate two primary concerns. The first concern is the potential for pollution from the connection, such as if subsurface contamination or septic system waste is conveyed via drainage from a foundation drain to the stormwater outfall. The second concern is that system capacity can be reduced because of pipe space occupied by flow from private sources. This results in a decreased capacity for the system to convey stormwater during wet weather events, increasing pipe surcharging and the potential for localized street flooding.

For both of these reasons, this SOP is not intended to encourage connections of private drainage to the engineered storm drain system. Instead, this SOP is to be used as guidance for connecting private drainage in scenarios where property

damage may result, where discharge of water to the ground surface would result in a public hazard or nuisance, and where there is no other reasonable alternative for discharge of stormwater from the private property.

The connection of private drainage cannot be used for the discharge of non-stormwater from the site.

Requirements for Connection of Private Drainage

A community may consider connection of private drainage to the engineered storm drain system if all of the following conditions are met.

1. The owner of the private drainage (hereafter referred to as the applicant) accepts responsibility for securing all other permits or approvals for the completion of the work, including any right-of-way process required by the municipality.
2. The applicant agrees to submit plans for review by the municipality, showing the location of all proposed work.
3. The applicant agrees to pay for all costs associated with the completion of the work, including but not limited to the costs of land survey, legal reviews, testing, permitting, construction, engineering design, and traffic control.
4. The applicant agrees to compensate the municipality for the time of its Town Engineer, Code Enforcement Officer, water department (or quasi-municipal water district), consulting engineer, and/or other official, as required, for their review of the proposed connection plans.
5. The applicant agrees to perform flow metering (upon request) to determine the volume of discharge that would enter the municipal system from the property.
6. The applicant agrees to have dye and/or smoke testing performed to confirm that no prohibited fixtures would be connected to the municipal system from the property (i.e., to document that the connection would not represent an illicit discharge).
7. The applicant agrees to use the same materials specified by the municipality for construction of the system, and provide a materials list to the municipality for review and approval in advance of construction. If any pump is to be utilized to convey the drainage, cut sheets on the selected pump shall be provided to the municipality for review and approval in advance of construction.
8. The applicant's contractor agrees to secure all road opening permits, drain-layer permits, and other construction permits as required by the municipality.
9. The applicant agrees to execute a covenant for the property to reflect the drainage connection, and record this covenant with the Registry of Deeds for the property if needed.
10. The applicant agrees to install a backflow preventer, cleanout, and a shutoff device in such places that all fittings are accessible to the municipality if needed/required.
11. The applicant agrees to install an oil/water separator, if required by the municipality, and provide documentation of maintenance of this device.
12. The applicant agrees to complete confirmation analytical testing of the discharge, with pollutants and laboratory specified by the municipality. This testing may occur during the initial evaluation phase, and may be required annually or on some other frequency to demonstrate ongoing compliance if needed/required.
13. The applicant agrees to provide record drawings to the municipality documenting the location of the discharge, with ties to permanent structures.
14. The applicant agrees to pay any annual review or inspection fees associated with the discharge if required.

Right of Refusal for New Connections of Private Drainage

The municipality shall reserve the right to refuse connection of the private drainage to the engineered storm drain system if any of the following can be demonstrated:

1. The municipal system does not have adequate capacity to manage proposed flow from the connection.
2. The private drainage includes flow from municipal users or sources.
3. The Town will carefully review applications where the applicant's discharge is in close proximity to the municipal system, for example, within 300 linear feet, and the connection to the municipal system can be completed without impacting other private property or municipal infrastructure and without significant impact to aboveground assets. Aboveground assets may include trees, fences, stone walls, utility poles, gardens, signs, or other semi-permanent features.
4. The stormwater outfall that manages flow from the applicant's property discharges to a water body identified as impaired in the most current version of the Integrated List of Waters (i.e., the 303(d) list) or is subject to stringent local controls.
5. The connection would be located within 100 linear feet of a subsurface wastewater disposal system (i.e., septic system).
6. The connection would be located within a public drinking water supply Zone I.
7. The connection would be located within a public drinking water supply Zone II, and the municipality's water department (or quasi-municipal water district) has not approved of the connection in writing.
8. Flow conveyed by the discharge would create a safety hazard such as ponding or freezing to vehicular, pedestrian, bicycle or other transportation, or would create erosion or the potential for erosion.
9. The connection jeopardizes public health, safety, or natural resources.
10. The connection fails to meet the terms and conditions of this SOP.

Existing Connections of Private Drainage

Existing private connections are considered to be a grandfathered, as long as they are used only for discharge of non-stormwater discharges allowed by the 2003 Massachusetts MS4 Permit. Any modification made to any grandfathered connection shall be subject to the conditions in this SOP.

The municipality may revoke grandfathered approval if the municipality determines that any of the nine conditions under "Right of Refusal for New Connections of Private Drainage" become applicable.

_____

Approved by Public Works Director (or authorized official) Date

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SWMP 3-8
PRIVATE DRAINAGE CONNECTION INSPECTION

The 2003 Massachusetts MS4 Permit described a number of non-stormwater discharges to the engineered storm drain system that are considered "allowable", as long as an individual community has not prohibited the discharge. Allowable non-stormwater discharges to the storm drain system can include the following, per Page 8 of the 2003 Massachusetts MS4 Permit (not inclusive):

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- Uncontaminated pumped groundwater;
- Foundation drains;
- Water from crawl space pumps;
- Footing drains; and
- Flows from riparian habitats and wetlands.

When inspecting private drainage connections to the storm drain system, this form shall be used by the inspector to ensure that the connection remains in compliance with the current SOP. The inspector has the right to enter and inspect the premises where the private drainage connection is located, including any tanks, storage areas, or rooms that may discharge or be caused to discharge to the connection. The inspector also has the right to sample or monitor any substances or parameters at any location for purposes of assuring compliance with the Private Drainage Connection Agreement or as otherwise authorized by the Clean Water Act. In addition, the inspector has the right to have access to and copy any records required to be kept under the terms and conditions of the Agreement.

General Information

Address of Connection			
Private Drainage Description			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	

Compliance Review

Each of the following conditions should be evaluated as "True" during the on-site inspection to demonstrate compliance. If any of the following conditions, as recorded during the inspection, are not satisfied (i.e., if the evaluation is "False"), the drainage connection shall be considered to be in violation of the original connection Agreement.

Prior to the Inspection

The inspector shall review the following questions prior to completing the on-site inspection.

Condition	Evaluation	Comment
A covenant for the property to reflect the drainage connection has been recorded at the Registry of Deeds	True ☐ False ☐	
Record drawings documenting the location of the discharge were supplied to the municipality after construction.	True ☐ False ☐	
If property has an oil/water separator: evidence of annual maintenance of oil/water separator was provided to municipality in previous period	True ☐ False ☐	
If property was required to complete analytical monitoring: results of analytical testing of discharge provided to municipality in previous period.	True ☐ False ☐	
Other:		

During the On-Site Inspection

The inspector shall make the following observations during the on-site inspection, and note the results in the table.

Condition	Evaluation	Comment
The drainage connection is used for the discharge of stormwater only	True ☐ False ☐	
The discharge is visibly free of oil or other pollutants.	True ☐ False ☐	
Grey water/black water is not visibly present in the discharge	True ☐ False ☐	
Sediment-laden surface water is not visibly present in the discharge	True ☐ False ☐	
Flow from the connection does not exceed approved flow	True ☐ False ☐	
No prohibited fixtures are connected to the municipal system from the property	True ☐ False ☐	
If a pump has been approved: the pump presently utilized is the same as the pump approved by the municipality.	True ☐ False ☐	
If required in original Application: backflow preventer, cleanout, and shutoff device remain operational and easily accessible to municipality	True ☐ False ☐	
Other:		

Review of Compliance with Private Drainage Connection Policy

If any of the following conditions is applicable, as recorded during the inspection, the municipality shall have the right to revoke approval of the private drainage connection.

☐	There is inadequate capacity of the drainage system to manage flow from the connection.
☐	The private drainage includes flow from municipal users or sources.
☐	The stormwater outfall managing the property flow discharges to a water body identified as impaired in the most current of the Integrated List f Waters (303(d) list) or is subject to stringent local controls.
☐	The connection is located within 100 linear feet of a subsurface wastewater disposal system, such as a septic system.
☐	The connection is located within a public drinking water Zone I.
☐	The connection is located in a public drinking water supply Zone II, and the water department or district has not approved of the connection in writing.
☐	Flow conveyed to the discharge creates a safety hazard such as ponding or freezing to vehicular, pedestrian, bicycle, or other transportation, or creates erosion or the potential for erosion.
☐	The connection jeopardizes public health, safety, or natural resources.
☐	The connection fails to meet the terms and conditions of the SOP.

Non-Compliance Actions

The municipality shall provide the property owner with written notice of the violation with corrective action to be taken. The property owner shall have thirty days from the receipt of the notice to commence curative action of the violation.

_____

Approved by Public Works Director (or authorized official) Date

Item	Description of Site Plan Requirement	Yes	No	Comments
	General Site Plan			
1	Orig. signed, dated and stamped by PE and PLS			
2	Use 24"x36" sheet at scale 1"=10' or 1"=20' w/north arrow			
3	Registry Block and Planning Board signature lines and File number			
4	Property lines (berings and distances) certified by PLS			
5	Owner and abutter information (now or formerly)			
6	Driveway indust. 24' min. (Zoning Regs.) Res. 10' max (Phy Alt. regs)			
7	Lot size (square feet) and assessor's map and lot info			
8	Proposed street sideline, curb and gutter grades			
9	Existing and finish grades of the site, incl spot grades			
10	Location and dimensions of driveway(s), curb cuts and parking aras			
11	Names and widths of abutting streets - public or private noted			
12	Location and size of public trees or statement of none			
13	List all easements (public/private) with desc. of restriction, if any			
14	All public sidewalks and curbing (exist and prop)			
15	Building foundation location and elevations (top of concrete and slab)			
16	Reference to flood zone elevation			
17	Cut and Fill calculations provided			
18	Slope stabilization for slopes > 3:1			

	Water and Sewer			
1	Location, size and type of existing mains, services and strutures w&s			
2	Location, size and type of proposed mains, services and strutures w&s			
3	Elevations; rim, inverts, profile, slopes, crossing conflicts-sewer			
4	10' horiz offset from water to sewer (domestic and fire)			
5	Curb stops in ROW - is easement req's to access			
6	Is a licensed Drainlayer requirement noted			
7	Is the water service at least 5' deep and 5' from any structure			
8	Is nearest hydrant shown			

Item	Description of Site Plan Requirement	Yes	No	Comments
9	MDC separator for any commercial overhead door			
10	Grease trap for any commercial kitchen			
11	Sewer Manhole at the property line			
12	Backup power for pump system			
13	Each owned unit needs its own sewer service			
14	Can the pump station handle the flow			
15	Can the sewer line handle the flow			
16	Are buoyancy calculations needed			
17	Note: Design to Town Standards			
18	Note: Town must inspect bottom of infil system			
19	Note: Give Inspector's proper notice			
20	Note: Testing requirements			
21	SMH detail should have crushed stone underneath and have 26" opening			

	Drainage and Stormwater Management			
1	Stormwater calcs submitted and PE stamped			
2	Infiltration rate based on NCRS Rawl's or Field permeability tests			
3	Test pits in recharge area and witnessed by Town Rep.			
4	System separation to GW 4' or 2' with mounding analysis			
5	Existing and proposed impervious areas			
6	O&M required/submitted			
7	Erosion control shown and detailed			
8	Construction entrance shown and detailed (3"-6" rip rap)			
9	SWPPP Req'd			
10	Stormwater standards checklist provided			
11	BMPS used to manage runoff			
12	Potential wter quality impacts addressed			
13	Evaluation of opportunities for low impact design			
14	Are they in Aquifer Protection Zone			
15	Any additional escrow needed for Insp.during construction of BMPs			
16	Require an as-built			
17	Signs for no snow storage in detention basin			

	Roadway			

Item	Description of Site Plan Requirement	Yes	No	Comments
1	VGC listed			
2	5' concrete sidewalks			
3	ADA compliant			
4	Temp and permenant patch details/notation			
5	Any connecting streets under 5-year No-Cut moratorium			
6	Is there proper sight distance			
7	Is there going to be any negitive traffic impacts			
8	Are cross walks required			
9	Proper parking spaces and size - ample handicapped spots			
10	Are guardrails needed			
11	Bounds required			
12	Pavement detail			
13	Sidewalk detail			
14	Any additional improvements needed for this neighborhood			

	Potential Permits			
1	Road Opening Permit - $50/trench and $50/linear foot			
2	Sewer Permit - connection (Res$200 Comm$300)			
3	Sewer Permit - capacity based on size of building/occupancy			
4	Sewer Modification Permit - $100			
5				
6				
7	Trench Permit - $50			
8	NPDES Permit (EPA)			
9	53G parking spaces contribution			

Subdivision Design Guides		
	ROW	Pave
50 homes is Collector Street	60	30
49-11 homes is Minor Street	50	26
10 homes or less is Lane	40	22

Item	Description of Site Plan Requirement	Yes	No	Comments
	Site Distance Lane to Lane is 200 feet			
	Site Distance Any street onto a Minor, Collector, or Business Street is 300 feet			
	Min CL Radii is 300' for business and collector; 150 for minor and lanes			
	Intersection with streets should be 150 feet apart,			
	Intersection with collector streets should be 400 feet apart			
	Corner entrance radii 30' to a collector or business street, others 20' radius			
	Dead-end street turnaround radius 62.5 feet outside layout			
	Maximum grade: Lane 12%, Minor 10%, Collector 6%			
	Level 4% at intersection for 50 feet			
	Street lights			
	Underground utilities			
	Sidewalks both sides in RC zone			
	Sidewalk on one side in other zones			
	Provide all needed easements for public maintenance 30 feet wide			
	Guardrails needed?			
	Subdrain needed?			
	Street signs required			

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SWMP 4-3
CONSTRUCTION SITE STORMWATER INSPECTION REPORT

General Information

Project Name			
Project Location			
Site Operator			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Subject to USEPA Construction General Permit? Yes ☐ No ☐ If yes, has NOI been approved? Yes ☐ No ☐ If yes, attach approved NOI to this report. **If no, contact site operator immediately to determine status of NOI.**			
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			
Describe the current phase of construction			

Site-Specific BMPs

Customize the following BMPs to be consistent with the SWPPP for the site being inspected.

	BMP Description	Installed and Operating Properly?	Corrective Action Needed
1		Yes ☐ No ☐	
2		Yes ☐ No ☐	
3		Yes ☐ No ☐	
4		Yes ☐ No ☐	
5		Yes ☐ No ☐	
6		Yes ☐ No ☐	
7		Yes ☐ No ☐	
8		Yes ☐ No ☐	
9		Yes ☐ No ☐	
10		Yes ☐ No ☐	
11		Yes ☐ No ☐	
12		Yes ☐ No ☐	
13		Yes ☐ No ☐	
14		Yes ☐ No ☐	
15		Yes ☐ No ☐	
16		Yes ☐ No ☐	
17		Yes ☐ No ☐	
18		Yes ☐ No ☐	
19		Yes ☐ No ☐	
20		Yes ☐ No ☐	

Erosion and Sedimentation Control

Document any of the following issues found on the construction site, and the corrective action(s) required for each.

Issue	Status	Corrective Action Needed
Have all ESC features been constructed before initiating other construction activities?	Yes ☐ No ☐	
Is the contractor inspecting and maintaining ESC devices regularly?	Yes ☐ No ☐	
Is existing vegetation maintained on the site as long as possible?	Yes ☐ No ☐	
Is construction staged so as to minimize exposed soil and disturbed areas?	Yes ☐ No ☐	
Are disturbed areas restored as soon as possible after work is completed?	Yes ☐ No ☐	
Is clean water being diverted away from the construction site?	Yes ☐ No ☐	
Are sediment traps and sediment barriers cleaned regularly?	Yes ☐ No ☐	
Are vegetated and wooded buffers protected and left undisturbed?	Yes ☐ No ☐	
Are soils stabilized by mulching and/or seeding when they are exposed for a long time?	Yes ☐ No ☐	
Has vegetation been allowed to establish itself before flows are introduced to channels?	Yes ☐ No ☐	
Is regular, light watering used for dust control?	Yes ☐ No ☐	
Is excessive soil compaction with heavy machinery avoided, to the extent possible?	Yes ☐ No ☐	

(continued)

Issue	Status	Corrective Action Needed
Are erosion control blankets used when seeding slopes?	Yes ☐ No ☐	
Are trees and vegetation that are to be retained during construction adequately protected?	Yes ☐ No ☐	
Are areas designated as off-limits to construction equipment flagged or easily distinguishable?	Yes ☐ No ☐	
If excavated topsoil has been salvaged and stockpiled for later use on the project, are stockpiles adequately protected?	Yes ☐ No ☐	
Are temporary slope drains or chutes used to transport water down steep slopes?	Yes ☐ No ☐	
Do all entrances to the storm sewer system have adequate protection?	Yes ☐ No ☐	

Overall Site Conditions

Document any of the following issues found on the construction site, and the corrective action(s) required for each.

Issue	Status	Corrective Action Needed
Are slopes and disturbed areas not being actively worked properly stabilized?	Yes ☐ No ☐	
Are material stockpiles covered or protected when not in use?	Yes ☐ No ☐	
Are natural resource areas protected with sediment barriers or other BMPs?	Yes ☐ No ☐	
Are perimeter controls and sediment barriers installed and maintained?	Yes ☐ No ☐	

(continued)

Issue	Status	Corrective Action Needed
Are discharge points and receiving waters free of sediment deposits and turbidity?	Yes ☐ No ☐	
Are storm drain inlets properly protected?	Yes ☐ No ☐	
Is there evidence of sediment being tracked into streets?	Yes ☐ No ☐	
Is trash/litter from the construction site collected and placed in dumpsters?	Yes ☐ No ☐	
Are vehicle/equipment fueling and maintenance areas free of spills and leaks?	Yes ☐ No ☐	
Are potential stormwater contaminants protected inside or under cover?	Yes ☐ No ☐	
Is dewatering from site properly controlled?	Yes ☐ No ☐	
Are portable restroom facilities properly sited and maintained?	Yes ☐ No ☐	
Are all hazardous materials and wastes stored in accordance with local regulations?	Yes ☐ No ☐	

Non-Compliance Actions

The municipality shall provide the site operator with a copy of this report, and notice of the corrective action(s) to be taken. The site operator shall have thirty days from the receipt of the notice to commence curative action of the violation.

_____

Approved by Public Works Director (or authorized official) Date

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SWMP 4-3
CONSTRUCTION SITE INSPECTION

Construction sites that lack adequate stormwater controls can contribute a significant amount of sediment to nearby bodies of water. This Standard Operating Procedure describes the major components of a municipal Stormwater Construction Inspection Plan, as well as procedures for evaluating compliance of stormwater controls at construction sites.

Stormwater Construction Inspection Plan

A stormwater Construction Site Inspection program is a program developed by municipalities to track, inspect, and enforce local stormwater requirements at construction sites.

The Chelmsford Department of Public Works (DPW) has the legal authority to require construction site operators "to implement a sediment and erosion control program which includes [Best Management Practices] that are appropriate for the conditions at the construction site, including efforts to minimize the area of the land disturbance." Town Code gives inspectors the authority to enter the site.

A municipal stormwater Construction Site Inspection program includes or addresses the following:

1. Construction Site Inventory
    - A tracking system to inventory projects and identify sites for inspection.
    - Track the results of inspection and prioritize sites based on factors such as proximity to waterways, size, slope, and history of past violations.
2. Construction Requirements and BMPs
    - Municipalities provide contractors with guidance on the appropriate selection and design of stormwater BMPs.
3. Plan Review Procedures
    - Submitted plans must be reviewed to ensure they address local requirements and protect water quality.
4. Public Input
    - Per the 2003 Massachusetts MS4 Permit, a program must allow the public to provide comment on inspection procedures, and must consider information provided by the public.
5. Construction Site Inspections
    - Identify an inspection frequency for each site.
    - See more detailed information below.

6. Enforcement Procedures
    - A written progressive enforcement policy for the inspection program.
    - Sanctions, both monetary and non-monetary, shall be utilized to ensure compliance with the program
7. Training and Education
    - Municipal staff conducting inspections should receive training on regulatory requirements, BMPs, inspections, and enforcement.

Conducting Stormwater Inspections at Construction Sites

The role of the construction inspector is to ensure that site operations match the approved site plans and the Stormwater Pollution Prevention Plan (SWPPP) for the project, and that all precautions are taken to prevent pollutants and sediment from the construction site from impacting local waterways. The inspector is also expected to determine the adequacy of construction site stormwater quality control measures.

The attached Construction Site Stormwater Inspection Report shall be used by the inspector during site visits. Construction site inspectors should abide by the following guidelines:

1. Inspections to monitor stormwater compliance should be performed at least once per month at each active construction site, with priority placed on sites that require coverage under the USEPA 2012 Construction General Permit (i.e., that disturb one or more acres), and sites that are located in the watershed of any 303(d) water bodies.
2. The inspection shall begin at a low point and work uphill, observing all discharge points and any off-site support activities.
3. Written and photographic records shall be maintained for each site visit.
4. During the inspection, the inspector should ask questions of the contractor. Understanding the selection, implementation, and maintenance of BMPs is an important goal of the inspection process, and requires site-specific input.
5. **The inspector should not recommend or endorse solutions or products. The inspector may offer appropriate advice, but all decisions must be made by the contractor.**
6. The inspector shall always wear personal protective equipment appropriate for the site.
7. The inspector shall abide by the contractor's site-specific safety requirements.
8. The inspector has legal authority to enter the site. However, if denied permission to enter the site, the inspector should never force entry.

Prior to planning a site visit, the inspector shall determine if the project is subject to USEPA's 2017 (or latest) Construction General Permit, which is true if the the project disturbs one or more acres, total. Older versions of the Construction General Permit have expired. If the site requires this coverage, the inspector shall visit the USEPA Region 1 websites.

To search for an NOI visit: https://www.epa.gov/npdes/electronic-notice-intent-enoi

For the CGP forms visit: https://www.epa.gov/npdes/2017-construction-general-permit-cgp

The inspector should print a copy of the project's NOI.

If the project disturbs one or more acres and is under construction, but does not show up in either database, the project is in violation of the Construction General Permit. Call the contractor to determine if the NOI process has been started. If not, notify the contractor verbally of this requirement and the violation. Work cannot proceed on the site until a Notice of Intent (NOI) for coverage under the latest Construction General Permit has been approved by USEPA. The inspector can issue a written Stop Work Order until the NOI has been approved by USEPA.

Once it has been determined that the site is in compliance with the latest Construction General Permit, the site inspection process can continue. The Construction Site Inspection process shall include the following:

1. Plan the inspection before visiting the construction site
    a. Obtain and review permits, site plans, previous inspection reports, and any other applicable information.
    b. Print the approved NOI from the USEPA Construction General Permit NOI website, listed previously.
    c. Inform the contractor of the planned site visit.
2. Meet with the contractor
    a. Review the Construction SWPPP (if the site includes over one acre of disturbance) or other document, as required by the municipality's legal authority. Compare BMPs in the approved site plans with those shown in the SWPPP.
    b. Review the project's approved NOI and confirm that information shown continues to be accurate.
    c. Get a general overview of the project from the contractor.
    d. Review inspections done by the contractor.
    e. Review the status of any issues or corrective actions noted in previous inspection reports.
    f. Discuss any complaints or incidents since the last meeting.
3. Inspect perimeter controls
    a. Examine perimeter controls to determine if they are adequate, properly installed, and properly maintained.
    b. For each structural BMP, check structural integrity to determine if any portion of the BMP needs to be replaced or requires maintenance.
4. Inspect slopes and temporary stockpiles
    a. Determine if sediment and erosion controls are effective.
    b. Look for slumps, rills, and tracking of stockpiled materials around the site.
5. Compare BMPs in the site plan with the construction site conditions
    a. Determine whether BMPs are in place as specified in the site plan, and if the BMPs have been adequately installed and maintained.
    b. Note any areas where additional BMPs may be needed which are not specified in the site plans.
6. Inspect site entrances/exits
    a. Determine if there has been excessive tracking of sediment from the site.
    b. Look for evidence of additional entrances/exits which are not on the site plan and are not properly stabilized.
7. Inspect sediment basins
    a. Look for signs that sediment has accumulated beyond 50% of the original capacity of the basin.
8. Inspect pollution prevention and good housekeeping practices

a. Inspect trash areas and material storage/staging areas to ensure that materials are properly maintained and that pollutant sources are not exposed to rainfall or runoff.
b. Inspect vehicle/equipment fueling and maintenance areas for the presence of spill control measures and for evidence of leaks or spills.

9. Inspect discharge points and downstream, off-site areas
    a. Walk down the street and/or in other directions off-site to determine if erosion and sedimentation control measures are effective in preventing off-site impacts.
    b. Inspect down-slope catch basins to determine if they are protected, and identify whether sediment buildup has occurred.
10. Meet with the contactor again prior to leaving
    a. Discuss the effectiveness of current controls and whether modifications are needed.
    b. Discuss possible violations or concerns noted during the site inspection, including discrepancies between approved site plans, the SWPPP, and/or the implementation of stormwater controls.
    c. Agree on a schedule for addressing all discrepancies, and schedule a follow-up inspection.
11. Provide a written copy of the inspection report to the contractor.
12. Follow up, as determined, and provide copy of subsequent inspection to the contractor.
13. Use Stop Work orders, as needed, until compliance with the Construction General Permit and/or other document, as required by the municipality's legal authority, can be achieved.

_____

Approved by Public Works Director (or authorized official) Date

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SWMP 4-3

EROSION AND SEDIMENTATION CONTROL INSPECTION REPORT

General Information

Project Name			
Project Location			
Inspector's Name			
Site Operator			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	

Subject to USEPA Construction General Permit? Yes ☐ No ☐

If yes, has NOI been approved? Yes ☐ No ☐

If yes, attach approved NOI to this report.

If no, contact contractor immediately to determine status of NOI.

Type of Inspection:

Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐

Describe the weather conditions at time of inspection	
Describe the current phase of construction	

Erosion and Sediment Control (ESC) on Construction Sites

Document any of the following issues found on the construction site, and the corrective action(s) required for each.

Issue	Status	Corrective Action Needed
Have all ESC features been constructed before initiating other construction activities?	Yes ☐ No ☐	
Is the contractor inspecting and maintaining ESC devices regularly?	Yes ☐ No ☐	
Is existing vegetation maintained on the site as long as possible?	Yes ☐ No ☐	
Is construction staged so as to minimize exposed soil and disturbed areas?	Yes ☐ No ☐	
Are disturbed areas restored as soon as possible after work is completed?	Yes ☐ No ☐	
Is clean water being diverted away from the construction site?	Yes ☐ No ☐	
Are sediment traps and sediment barriers cleaned regularly?	Yes ☐ No ☐	
Are vegetated and wooded buffers protected and left undisturbed?	Yes ☐ No ☐	
Are soils stabilized by mulching and/or seeding when they are exposed for a long time?	Yes ☐ No ☐	
Has vegetation been allowed to establish itself before flows are introduced to channels?	Yes ☐ No ☐	
Is regular, light watering used for dust control?	Yes ☐ No ☐	
Is excessive soil compaction with heavy machinery avoided, to the extent possible?	Yes ☐ No ☐	

(continued)

Issue	Status	Corrective Action Needed
Are erosion control blankets used when seeding slopes?	Yes ☐ No ☐	
Are trees and vegetation that are to be retained during construction adequately protected?	Yes ☐ No ☐	
Are areas designated as off-limits to construction equipment flagged or easily distinguishable?	Yes ☐ No ☐	
If excavated topsoil has been salvaged and stockpiled for later use on the project, are stockpiles adequately protected?	Yes ☐ No ☐	
Are temporary slope drains or chutes used to transport water down steep slopes?	Yes ☐ No ☐	
Do all entrances to the storm sewer system have adequate protection?	Yes ☐ No ☐	

Non-Compliance Actions

The municipality shall provide the site operator with a copy of this report, and notice of the corrective action(s) to be taken. The site operator shall have thirty days from the receipt of the notice to commence curative action of the violation.

_____

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SWMP 4-3
EROSION AND SEDIMENTATION CONTROL

Erosion and sedimentation from land-disturbing human activities can be a significant source of stormwater pollution. This Standard Operating Procedure describes methods for reducing or eliminating pollutant loading from such activities.

Controlling Erosion and Sediment through Design and Planning

Prevention of erosion and sedimentation is preferable to installing treatment devices. Consistent application and implementation of the following guidelines during the design and review phases can prevent erosion and sedimentation:

1. Avoid sensitive areas, steep slopes, and highly erodible soils to the maximum extent possible when developing site plans.
2. Identify potential problem areas before the site plan is finalized and approved.
3. Plan to use sediment barriers along contour lines, with a focus on areas where short-circuiting (i.e., flow around the barrier) may occur.
4. Use berms at the top of a steep slopes to divert runoff away from the slope's edge.
5. Design trapezoidal or parabolic vegetated drainage channels, not triangular.
6. Use vegetated channels with rip rap check dams, instead of impervious pavement or concrete, to reduce the water velocity of the conveyance system.
7. Design a check dam or sediment forebay with level spreader at the exit of outfalls to reduce water velocity of the discharge and collect sediment.
8. Use turf reinforcement matting to stabilize vegetated channels, encourage vegetation establishment, and withstand flow velocities without scouring the base of the channel.
9. Plan open channels to follow land contours so natural drainage is not disrupted.
10. Use organic matting for temporary slope stabilization and synthetic matting for permanent stabilization.
11. Provide a stable channel, flume, or slope drain where it is necessary to carry water down slopes.

Controlling Erosion and Sediment on Construction Sites

During the construction phase, it is important to inspect active sites regularly to ensure that practices are consistent with approved site plans and the site's Stormwater Pollution Prevention Plan (SWPPP) or other document, as required by the municipality's legal authority. The following guidelines apply:

1. Erosion and sediment control features should be constructed before initiating activities that remove vegetated cover or otherwise disturb the site. These shall be installed consistent with the approved site plans and with manufacturer's instructions.
2. Erosion and sediment control devices shall be inspected by the contractor regularly, and maintained as needed to ensure function.
3. In the SWPPP or other document, the contractor shall clearly identify the party responsible for maintaining erosion and sediment control devices.
4. An inspection should be completed of active construction sites every month, at a minimum, to check the status of erosion and sedimentation controls. Refer to standard procedures for construction site inspection, for construction site stormwater inspection procedures.
5. Existing vegetation should be maintained on site as long as possible.
6. Construction should proceed progressively on the site in order to minimize exposed soil, and disturbed areas should be restored as soon as possible after work has been completed.
7. Stockpiles shall be stabilized by seeding or mulching if they are to remain for more than two weeks.
8. Disturbed areas shall be protected from stormwater runoff by using protective Best Management Practices (BMPs).
9. Clean water shall be diverted away from disturbed areas on construction sites to prevent erosion and sedimentation.
10. Sediment traps and sediment barriers should be cleaned out regularly to reduce clogging and maintain design function.
11. Vegetated and wooded buffers shall be protected.
12. Soils shall be stabilized by mulching and/or seeding when they would be exposed for more than one week during the dry season, or more than two days during the rainy season.
13. Vegetation shall be allowed to establish before introducing flows to channels.
14. Regular light watering shall be used for dust control, as this is more effective than infrequent heavy watering.
15. Excessive soil compaction with heavy machinery shall be avoided, to the extent possible.
16. Construction activities during months with higher runoff rates shall be limited, to the extent possible.

Controlling Erosion and Sediment by Proper Maintenance of Permanent BMPs

Many construction phase BMPs can be integrated into the final site design, but ongoing inspection and maintenance are required to ensure long-term function of any permanent BMP. Refer to SOP 9, "Inspection of Constructed Best Management Practices", for more information. The following guidelines summarize the requirements for long-term maintenance of permanent BMPs.

1. Responsibility for maintaining erosion and sediment control devices shall be clearly identified.
2. Erosion and sediment control devices shall be inspected following heavy rainfall events to ensure they are working properly.
3. Erosion control blankets shall be utilized when seeding slopes.
4. Vegetated and wooded buffers shall be protected, and left undisturbed to the extent possible.
5. Runoff shall not be diverted into a sensitive area unless this has been specifically approved.
6. Sedimentation basins shall be cleaned out once sediment reaches 50% of the basin's design capacity.
7. Snow shall not be plowed into, or stored within, retention basins, rain gardens, or other BMPs.

Easements and service routes shall be maintained, to enable maintenance equipment to access BMPs for regular cleaning.

_____

Approved by Public Works Director (or authorized official) Date

SWMP 6-5 CATCH BASIN INSPECTION FORM

Inspector: _____ **Date:** _____ **Street:** _____

Catch Basin I.D.	_____	**Final Discharge from Structure?** Yes ☐ No ☐ **If Yes, Discharge to Outfall No:** _____	
Catch Basin Label:	**Stencil** ☐ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other** _____		
Basin Material:	Concrete ☐ Corrugated metal ☐ Stone ☐ Brick ☐ Other: _____ ☐	**Catch Basin Condition:**	Good ☐ Poor ☐ Fair ☐ Crumbling ☐
Pipe Material:	Concrete ☐ HDPE ☐ PVC ☐ Clay Tile ☐ Other: _____	**Pipe Measurements:**	Inlet Dia. (in): d= ____ Outlet Dia. (in): D= ____

Required Maintenance/ Problems (check all that apply):

- ☐ Tree Work Required
- ☐ New Grate is Required
- ☐ Pipe is Blocked
- ☐ Frame Maintenance is Required
- ☐ Remove Accumulated Sediment
- ☐ Pipe Maintenance is Required
- ☐ Basin Undermined or Bypassed
- ☐ Cannot Remove Cover
- ☐ Ditch Work
- ☐ Corrosion at Structure
- ☐ Erosion Around Structure
- ☐ Remove Trash & Debris
- ☐ Need Cement Around Grate

Other: _____

Catch Basin Grate Type : Grate: ☐ Bar: ☐ Cascade: ☐ Other: _____ Properly Aligned: Yes ☐ No ☐	Depth before cleaning A= Depth after cleaning B= Depth of Sediment B-A=	**Sediment Buildup Depth :** 0-6 (in): _____ 6-12(in): _____ 12-18 (in): _____ 18-24 (in): _____ 24 + (in): _____	**Description of Flow:** Heavy ☐ Moderate ☐ Slight ☐ Trickling ☐ None ☐

***If the outlet is submerged check yes and indicate approximate height of water above the outlet invert.** h above invert (in):____	Yes ☐	No ☐

☐ **Flow** ☐ **Standing Water** **(check one or both)**	**Observations:**		**Circle those present:**
	Color:		Foam / Oil Sheen
	Odor:		Sanitary Waste / Bacterial Sheen
Weather Conditions :	Dry > 24 hours ☐	Wet	Orange Staining / Floatables
Sample of Screenings Collected for Analysis? Yes ☐ No ☐			Excessive sediment / Pet Waste
Comments:			Other: _____ / Optical Enhancers
			None

Last Revised: August 2019

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SWMP 6-5
CATCH BASIN INSPECTION AND CLEANING

Introduction

Catch basins help minimize flooding and protect water quality by removing trash, sediment, decaying debris, and other solids from stormwater runoff. These materials are retained in a sump below the invert of the outlet pipe. Catch basin cleaning reduces foul odors, prevents clogs in the storm drain system, and reduces the loading of suspended solids, nutrients, and bacteria to receiving waters.
During regular cleaning and inspection procedures, data can be gathered related to the condition of the physical basin structure and its frame and grate and the quality of stormwater conveyed by the structure. Observations such as the following can indicate sources of pollution within the storm drain system:

- Oil sheen
- Discoloration
- Trash and debris

Both bacteria and petroleum can create a sheen on the water surface. The source of the sheen can be differentiated by disturbing it, such as with a pole. A sheen caused by a oil will remain intact and move in a swirl pattern; a sheen caused by bacteria will separate and appear "blocky". Bacterial sheen is not a pollutant but should be noted.
Observations such as the following can indicate a potential connection of a sanitary sewer to the storm drain system, which is an illicit discharge.

- Indications of sanitary sewage, including fecal matter or sewage odors
- Foaming, such as from detergent
- Optical enhancers, fluorescent dye added to laundry detergent

Each catch basin should be cleaned and inspected at least annually. Catch basins in high-use areas may require more frequent cleaning. Performing street sweeping on an appropriate schedule will reduce the amount of sediment, debris, and organic matter entering the catch basins, which will in turn reduce the frequency with which structures need to be cleaned.

Operations

- Prioritize inspection and maintenance for catch basins located near construction activities. Clean catch basins in such areas more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings.
- Establish a schedule with a goal that the frequency of routine cleaning will ensure that no catch basin at any time will be more than 50% full.
- If a catch basin sump is more than 50% full during two consecutive routine inspections/ cleaning events we will document that finding, and investigate the contributing drainage area for sources of excessive sediment loading, and to the maximum extent practicable, abate contributing sources. We will describe any actions taken in our annual report.

- Excessive sediment or debris loading is a catch basin sump more than 50% full. A sump is more than 50% full when the contents within the sump exceed one half the distance between the bottom interior of the catch basin to the invert of the deepest outlet of the catch basin.
- In our annual SWMP, we will document the plan for optimizing catch basin cleaning, inspection plans or schedule for gathering information to develop the optimization plan. Documentation shall include metrics and other information used to reach the determination that the established plan for cleaning and maintenance is optimal for our Town. We will keep a log of catch basins cleaned or inspected.
- We will report annually on the total number of catch basins, number inspected, number cleaned and the total volume or mass of material removed from all catch basins.

Cleaning Procedure

Catch basin inspection cleaning procedures should address both the grate opening and the basin's sump. Document any and all observations about the condition of the catch basin structure and water quality on the Catch Basin Inspection Form (attached).
Catch basin inspection and cleaning procedures include the following:

1. Work upstream to downstream.
2. Clean sediment and trash off grate.
3. Visually inspect the outside of the grate.
4. Visually inspect the inside of the catch basin to determine cleaning needs.
5. Inspect catch basin for structural integrity.
6. Determine the most appropriate equipment and method for cleaning each catch basin.
    a. Manually use a shovel to remove accumulated sediments, or
    b. Use a bucket loader to remove accumulated sediments, or
    c. When available, use a high pressure washer to clean any remaining material out of catch basin while capturing the slurry with a vacuum.
    d. If necessary, after the catch basin is clean, use the rodder of the vacuum truck to clean downstream pipe and pull back sediment that might have entered downstream pipe.
7. If contamination is suspected, chemical analysis will be required to determine if the materials comply with the Massachusetts DEP Hazardous Waste Regulations, 310 CMR 30.000 (http://www.mass.gov/dep/service/regulations/310cmr30.pdf). Chemical analysis required will depend on suspected contaminants. Note the identification number of the catch basin on the sample label, and note sample collection on the Catch Basin Inspection Form.
8. Properly dispose of collected sediments. See following section for guidance.
    a. http://www.mass.gov/eea/agencies/massdep/recycle/regulations/management-of-catch-basin-cleanings.html
9. If fluids collected during catch basin cleaning are not being handled and disposed of by a third party, dispose of these fluids to a sanitary sewer system, with permission of the system operator.
10. If illicit discharges are observed or suspected, notify the appropriate Department.
11. At the end of each day, document location and number of catch basins cleaned, amount of waste collected, and disposal method for all screenings.
12. Report additional maintenance or repair needs to the appropriate Department.

Disposal of Screenings

Catch basin cleanings from storm water-only drainage systems may be disposed at any landfill that is permitted by MassDEP to accept solid waste. MassDEP does not routinely require stormwater-only catch basin cleanings to be tested before disposal, unless there is evidence that they have been contaminated by a spill or some other means.
Screenings may need to be placed in a drying bed to allow water to evaporate before proper disposal. In this case, ensure that the screenings are managed to prevent pollution.

_____

Approved by Public Works Director (or authorized official) Date

INSPECTION OF EXTENDED DRY DETENTION BASINS

Inspections should be conducted bi-annually, and during and after major storm events.

General Information

BMP Description	Extended Dry Detention Basin		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Examine outlet structure for clogging or high outflow release velocities	Bi-Annually	Yes ☐ No ☐	
Mow upper stage, side slopes, embankment and emergency spillway	Bi-Annually	Yes ☐ No ☐	
Remove trash and debris	Bi-Annually	Yes ☐ No ☐	
Remove sediment from basin	At least once every 5 years	Yes ☐ No ☐	
Additional Notes:			

TOWN OF CHELMSFORD

OUTFALL INSPECTION FORM

Outfall ID: _____ **Street:** _____ **Date:**_____ **Time:** _____

Watershed: _____ **Temperature:** _____

Weather: Sunny P. Cloudy Cloudy Rainy Drizzle **Flow:** Yes No **Submerged:** Yes No Partially

Owner: Town State Private Unknown **Inspector's Name:** _____

Precipitation Total in last 24 hours (inches): _____ **Dry Weather / Wet Weather** (>.1 inch rainfall in last 24 hours)

OUTFALL CONDITION

	ODOR (Sewage, Rancid, Gasoline, Sulfide)	WATER COLOR (Clear, Brown, Grey, Yellow, Green, Orange, Red, Other)	TURBIDITY (Clear, Cloudy, Opaque)	FLOATABLES/POLUTANTS (Sewage, Toilet Paper, Petroleum, Soapy Bubbles, Trash, Other)	VEGETATIVE CONDITIONS (Excessive Growth, Inhibitive Growth, Beaver Dam, Normal)	TYPE OF OUTFALL (Pipe Open End, Headwall, FES, Swale, Catch Basin Piped in to Culvert)	OUTFALL DAMAGE	DEPOSITS /STAINS	POOR POOL QUALITY	PIPE BENTHIC GROWTH
DESCRIPTION										
SEVERITY 1-3 (Low-High)										

PIPE CONDITION

MATERIAL (Concrete, Asbestos Concrete, PVC, Corrugated Metal, Clay Tile, HDPE, Ductile Iron, CPP, Other)	CONDITION (Good, Fair, Poor, Crumbling, Buried)	SHAPE (Round, Rectangular, Swale)	INSIDE DIAMETER (in)	OUTSIDE DIAMETER (in)	WIDTH (in)	HEIGHT (in)

HEADWALL CONDITION

CONDITION (Good, Fair, Poor Crumbling)	TYPE (Circular, Arch, Box, Other)	MATERIAL (Stone, Concrete, Other)

SWALE CONDITION

CONDITION (Good, Fair, Poor, Crumbling)	MATERIAL (Ashpalt, Earthen, Brick, Concrete, Block, Stone, Other)	TYPE (Rounded, Trapezoidal, Triangular, Rectangular)	WIDTH (in)	HEIGHT (in)	BOTTOM WIDTH (in)	DATE OF LAST MAINTENANCE

WATER SAMPLING RESULTS

AMMONIA (≥ 0.5 mg/L)	CHLORINE (≥ 0.02 mg/L)	SURFACTANTS (≥ 0.25 mg/L)	CONDUCTIVITY (µS/cm)	SALINITY (ppm)	E. COLI (cfu/100mL	TEMPERATURE (°F)	PHOSPHOROUS (mg/L)	WATER COLLECTED FROM FLOW OR POOL	OBM TRAP SET (Y/N)

OUTFALL DISCHARGE LOCATION

GENERAL BODY OF WATER (River, Stream, Lake, Wetland, Culvert, Detention Area, Drainage Manhole, Infiltrator, Parking Lot, Swale, Field, Farmland, Unkown, Other)	NAME

Notes:

STORMWATER MAINTENANCE LOG

Outfall/Catch Basin ID: _____ **Street:** _____

Date(s):_____ **Time:** _____

Temperature: _____ **Weather:** Sunny P. Cloudy Cloudy Rainy Drizzle

Flow: Yes No Unknown

Inspector(s) Initials: _____

	Odor	Water Color	Floatables/pollutants	Vegetation
	None, sewage, rancid, sulfur, other	Clear, brown, grey, yellow, green, orange, red, other	Sewage, Toilet paper, petroleum sheen, soapy bubbles, trash, Pet waste, other	Excessive growth Inhibitive growth Beaver dam Normal
Additional Description				

Description of initial conditions and damage: _____

_____

_____

_____

_____

_____

Initial Conditions:

Initial Pipe Conditions			**Initial Headwall Conditions**	
Material	Condition	Diameter (inches)	Condition	Material
Concrete, Asbestos Concrete, PVC, Corrugated Metal, Clay Tile, Plastic, Iron, Other:_____	Good, Fair, Poor, Crumbling, Buried		Good, Fair, Poor, Crumbling	Stone, Concrete, Other:_____

Before Picture Taken? Yes No

STORMWATER MAINTENANCE LOG

Conditions Upon Leaving:

Final Pipe Conditions			Final Headwall Conditions	
Material	Condition	Diameter (inches)	Condition	Material
Concrete, Asbestos Concrete, PVC, Corrugated Metal, Clay Tile, Plastic, Iron, Other:_____	Good, Fair, Poor, Crumbling, Buried		Good, Fair, Poor, Crumbling	Stone, Concrete, Other:_____

Description of work completed: _____

_____

_____

_____

_____

Picture taken of completed work: Yes No

Revisit Needed? Yes No

Reason for revisit _____

_____

_____

_____

_____

Work to be completed upon revisit: _____

_____

_____

_____

Additional Notes/sketch:

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SWMP 6-6

SOP 16: Sweeping Streets and Parking Lots

Purpose of SOPs:

Procedures for the operation and maintenance of street sweepers, frequency of sweeping, disposal of debris, and recordkeeping to prevent pollution from entering the stormwater sewer systems.

MA Small MS4 General Permit Requirement Summary:

Part 2.3.7.a.iii.3.

The permittee shall establish and implement procedures for sweeping and/or cleaning streets, and permittee-owned parking lots. All streets with the exception of rural uncurbed roads with no catch basins or high speed limited access highways shall be swept and/or cleaned a minimum of once per year in the spring (following winter activities such as sanding). The procedures shall also include more frequent sweeping of targeted areas (as shown on the attached map) based on the pollutant load reduction potential, inspections, catch basin cleaning or inspection results, land use, water quality limited or TMDL waters or other relevant factors as determined by the Stormwater Division. The permittee shall report in each annual report the number of miles cleaned or the volume or mass of material removed.

For rural uncurbed roadways with no catch basins and limited access highways, the DPW will sweep all streets regardless of these conditions.

Part 2.3.a.iii.4.

The permittee shall ensure proper storage of street sweepings prior to disposal or reuse such that they do not discharge to receiving waters. These are stored at either Swain Road or Richardson Road away from any receiving waters.

Equipment Inventory:

The following is a list of street sweeping equipment:

Equipment Number	Make	Description	Sweeper Speed (or other notes)
SW1	Elgin Pelican	3 wheel NP2147D	5-8 while sweeping; 25-30 MPH
SW2	Elgin Pelican	3 Wheel NP30784	5-8 while sweeping; 25-30 MPH
SW3	Elgin Pelican	3 Wheel S93140	5-8 while sweeping; 25-30 MPH
Sidewalk sweeper		MV1045	2-4 MPH
Truck 8	2015 Peterbilt	10 wheel dump - M91-680	
Truck 5	2013 Peterbilt	10 wheel dump - M85-441	
Truck 19	2010 Peterbilt	6 wheel dump -M82-434	

[Expand table as necessary]

Operations

1. Operate all sweepers and equipment according to the manufacturer's recommended settings, standards, and procedures.

2. While sweeping, drive between the optimal sweeping speed limit, as recorded in the equipment list above.

3. Sweeping will not take place during medium to heavy rain storms.

4. If spills occur or illegal discharges are seen, report to the DPW or the foreman on duty.

Maintenance

1. Sweepers will be checked for leaks after every use. Immediately contain and properly clean up any spills.

2. Regular preventative maintenance to prolong equipment use (such as greasing moving parts and minor adjustments) occur automatically greased daily, grease bucket filled once a week, minor adjustments occur upon wear and tear as needed.

3. Parts are replaced when they are worn beyond repair. Brushes are replaced when bristle length is less than gutter broom at 4" and main broom is 5" off a 12" broom.

4. Equipment is washed at 9 Alpha Road, daily to trap grease, oils and sediment.

5. The left-over debris is scraped out from the hopper and washed out once a day.

Schedule

1. Street sweeping will primarily take place between the months of March and July. Fall sweeping will be from September to November.

2. All streets with curbing and/or catch basins shall be swept a minimum of once per year in the spring (following winter activities such as sanding). Streets are swept according to the street list and schedule located on the Highway Sweeping Map and sections of Town get rotated first by N, S, E + W.

3. Priority roads and parking lots are identified on the basis of pollutant load reduction potential, based on inspections, pollutant loads, catch basin cleaning or inspection results, land use, impaired or TMDL waters or other relevant factors. These roads and parking lots are listed below and will be swept more frequently as indicated in the table.

   These roads/parking lots may be grouped by road category as long as the town's list of streets and parking lots also indicates the applicable road category (e.g. main arterials, residential areas, commercial areas, downtown areas, municipal parking lots, industrial areas, etc.).

Priority Road/ Parking Lot Name (or Category)	**Frequency of Sweeping**
Chelmsford Center	Once a month
Vinal Square - North Chelmsford	Once a month

[Expand table as necessary]

   The list of priority roads and parking lots will be reassessed every year in August.

4. The sweeping schedule is assessed based on resident input and updated as necessary.

5. A map of town roads and parking lots is located at the Highway Tool Room.

6. Events/activities that require special sweeping are; Fourth of July parade, Memorial Day parade, Vinal Square (North Chelmsford) and Chelmsford Center are done once a month.

7. After construction and road paving.

Storage and Disposal

1. Temporary storage of solid sweeping debris is on an impervious surface or in a truck/dumpster that is protected from runoff. The storage location(s) is/are 40 Swain Road.

2. If applicable, solid sweeping debris from ***40 Swain Road*** will be reused as general fill following the MassDEP Reuse and Disposal of Street Sweepings Policy.

3. Decant water is discharged to evaporate.

4. Counting truckloads: 10 wheeler = 8-10 yards and one truck a day approx. per sweeper. (6 wheeler = 6 yards) Hopper holds approx. 2 yards.

Training

1. Employees are trained once per year on this procedure and the proper operation of equipment. Employees are also trained on stormwater pollution prevention, spill and response, and illicit discharge detection and elimination procedures.

Record Keeping

1. Records are kept Highway.
2. Roads are marked on the map after each daily sweeping.
3. The number of curb miles swept per week is calculated annually.
4. One sweeper can clean 4-5 miles a day.
5. A list of employees implementing the SOPs and the completion of their training(s) can be found at the DPW Highway office.

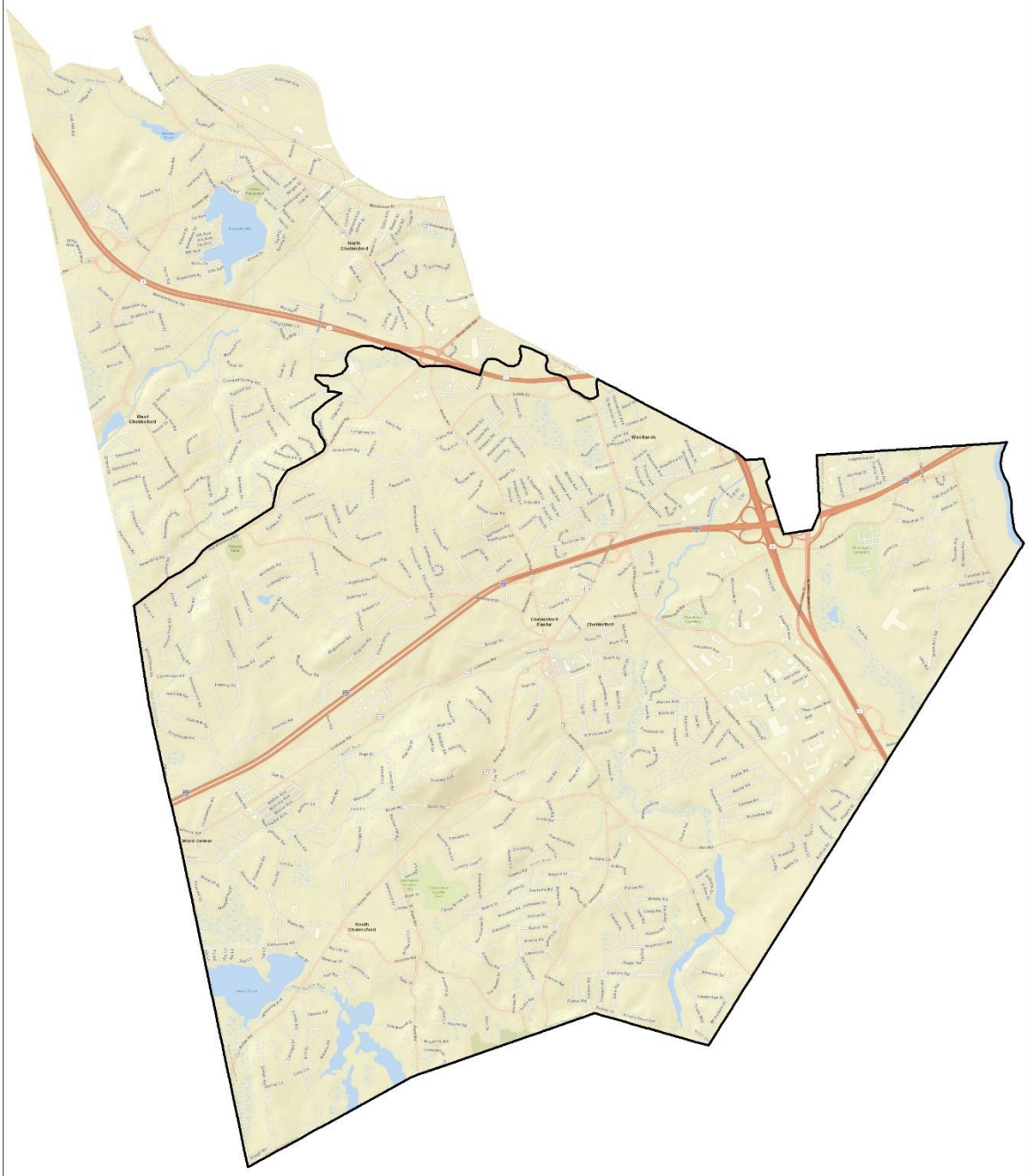
Revising the SOPs

1. These procedures are reviewed once per year and updated as needed.

_____

Approved by Public Works Director (or authorized official) Date

Prioritize
Sweep Twice Area Map



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DEPARTMENT OF PUBLIC WORKS

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SWMP 6-7
SOP 18: WINTER ROAD MAINTENANCE

Introduction

Winter road maintenance includes snow removal and the management of salt[1], sand, or deicers to ensure safe winter driving conditions. Proper maintenance procedures and use and storage of materials can help reduce the discharge of pollutants, such as sand and salt, from the MS4 and to receiving waters. The goal of this written Standard Operating Procedure (SOP) is to provide guidance to municipal employees on the use and storage of salt and sand, minimizing the use of salt, evaluating opportunities for use of alternative materials, and ensuring that snow disposal activities to not result in disposal of snow into surface waters. If services are contracted, this SOP should be provided to the contractor. The contract should specify that the contractor is responsible for compliance with all applicable laws.

Procedures

The Town of Chelmsford has implemented the following winter maintenance procedures to reduce the discharge of pollutants from the MS4:

Equipment and Maintenance

- Calibrate equipment to reduce and optimize salt use and ensure deicing agents are being used efficiently. Provide employee training on proper calibration procedures.
- Do not overfill trucks with deicing materials as it may lead to spills.
- Encourage the use of automated application equipment like zero velocity spreaders.
- When possible, retrofit vehicles to include equipment such as on-board application regulators, temperature sensors for air and pavement, and anti-icing and pre-wetting equipment.
- Wash equipment using proper procedures to prevent pollutants from entering the stormwater system. Dry cleanup procedures should be used when possible. Vehicles dirtied from salt or sand application should be washed in the wash bay, according to procedures in SWMP 6-3 SOP 21: Operations and Maintenance of Municipal Vehicles and Equipment.
- Regularly inspect and maintain equipment to reduce the potential for leaks. See SWMP 6-3 SOP 21: Operations and Maintenance of Municipal Vehicles and Equipment for more information and a complete inventory of municipally owned vehicles and equipment.
    - When conditions warrant, plows are installed on 47 pieces of Town equipment and trucks to move snow the roadways and municipally owned parking lots.

[1] For purposes of the MS4 Permit, salt means any chloride-containing material used to treat paved surfaces for deicing, including sodium chloride, calcium chloride, magnesium chloride, and brine solutions.

- There are approximately 42 contracted pieces of equipment and trucks to supplement the Town owned equipment
- When conditions warrant, sand/salt spreaders are on 15 trucks to spread salt on the roadways and municipally owned parking lots. Each salt spreader is calibrated prior to the deicing season and monitored throughout the season.

Anti-icing and Deicing

- Minimize the use and optimize the application of sodium chloride and other salt (while maintaining public safety) and consider opportunities for use of alternative materials.
- The major material used in snow and ice control is coarse salt. These materials are stockpiled at two locations in advance of a winter weather event and are immediately available when needed and stocks are replenished between events.
- Optimize sand and/or chemical application rates through the use, where practicable, of automated application equipment (e.g., zero velocity spreaders), anti-icing and pre-wetting techniques, implementation of pavement management systems, and alternate chemicals.
- Remove as much snow as practical, using mechanical means like plowing, blowing, or shoveling before deicing to reduce the need for road salt or other deicing chemicals.
- Sand is used as an abrasive for traction on slick roadways. Sand is only used as a spot treatment or in the event of an ice storm for traction.
- Salt is used to expedite the melting of snow and ice from the street surface and also to keep the ice from forming a bond to the street surface. Approximately 10,000 tons of salt are anticipated to be used per year and are ordered from Eastern Salt per State contract prior to and during each deicing season.
- Avoid mixing road salt and sand. Doing so makes both the salt and sand work less efficiently and leads to over-application.
- Use alternative deicing materials instead of sodium chloride as appropriate (e.g., calcium magnesium acetate, magnesium chloride, or calcium chloride).
- Perform unloading/loading of trucks on impervious surfaces whenever possible. These areas should be frequently cleaned and swept to reduce the tracking and runoff of salt and to capture any spills.
- When possible, use anti-icing practices to prevent ice formation and reduce the need for deicers.
- Apply anti-icing agents 1-2 hours before winter weather events to ensure optimal performance (can be applied up to 24 prior).
- Only apply road salt when the pavement temperature is above 15° F.
- When using deicers, use pre-wetting agents (e.g., salt brine) to help them work more efficiently and to reduce road salt scatter and bounce.
- Salt brine solution used for anti-icing and pre-wetting can be stored for up to a year –concentration should be tested before use. If temperatures fall below 0° F, use a circulator pump to prevent the brine from freezing.
- Only apply enough deicer so that plows can remove the snow and ice. Adjust the application rate of deicers based on the type of storm, type of agent used, and anti-icing and pre-wetting techniques used.

Salt Application

- Whenever conditions warrant, salt is applied to the roadway prior to accumulation of snow to prevent compacted snow from bonding to the roadway surface. The on-call Highway Division Foreman or the Assistant Superintendent instructs staff when salt application is appropriate.

- Prior to salt application, equipment will be checked to ensure proper working order and ensure proper calibration of equipment. All fluid levels will be checked and filled to proper levels, all lights must be in working order. A visual walk-around inspection of the truck or equipment must be made. Any repairs must be made and reported to a supervisor or mechanic before leaving the yard.
- Each sander has a designated route. This schedule is located at the DPW. These routes are used for the beginning and end of the storm event.
- All deicing chemicals will be washed from equipment in the wash bay, according to procedures in SWMP 6-3 SOP 21: Operations and Maintenance of Municipal Vehicles and Equipment, following a storm event.

Storage of Deicing Materials

- Prevent exposure of deicing product (salt, sand, or alternative products) storage piles to precipitation by enclosing or covering the storage piles. Implement good housekeeping, diversions, containment or other measures to minimize exposure resulting from adding to or removing materials from the pile. Store piles in such a manner as not to impact surface water resources, groundwater resources, recharge areas, and wells.
    - Salt is stored in covered facilities located at 9 Alpha Road Chelmsford and 40 Swain Road North Chelmsford. Loading areas and yards are swept as needed to prevent salt build-up and run-off.
- Store materials under covered or enclosed areas and on impervious surfaces.
- Ensure that there are adequate drainage controls in storage areas to prevent runoff from entering the stormwater system.
- Follow appropriate loading and unloading procedures. If there are spills when loading or unloading materials, follow the protocol outlined in SWMP 6-3 SOP 4: Spill Response and Cleanup.
- Frequently sweep near the storage/loading areas to reduce the amount of salt, sand, or other materials that is tracked out.
- For liquid deicing chemicals, provide secondary storage containment.
- Do not store road salt near drinking water supplies, surface water resources, groundwater resources, recharge areas, and wells. Follow proper storage guidelines from MassDEP (https://www.mass.gov/guides/guidelines-on-road-salt-storage).

Snow Storage and Disposal

- As the storm develops and 2-3 inches of snow has accumulated, all of the drivers and available equipment will begin to plow their assigned routes.
- Prior to plowing operations, equipment will be checked to ensure proper working order. All fluid levels will be checked and filled to proper levels, all lights must be in working order. A visual walk-around inspection of the truck or equipment must be made. Any repairs must be made and reported to a supervisor or mechanic before leaving the yard.
- The standard plowing speed is: 15 mph.
- Each plow, either Town owned or contracted, has a designated route. Plow routes and maps are available at the DPW.
- Before parking any truck or equipment after use, all fluid levels will be checked and filled. Blades or bolts, which need replacing, will be taken care of unless told to do otherwise by a supervisor. Chains that need repairs will be repaired.
- Snow should not be pushed or dumped into waterbodies or wetlands, into stormwater drainage swales or ditches, or on top of catch basins.
- Snow should not be stored near drinking water areas, waterbodies, or wetlands.

- Avoid storing snow in areas that are unstable, areas of potential erosion, or high points where snow may melt and collect debris as runoff before it enters the stormwater system.
- Consider sun exposure when storing snow. Snow in areas with higher sun exposure will melt faster but may require deicers if the snowmelt refreezes.
- Consider practices such as living snow fences to contain snow piles and reduce snow drifting.
- The MS4 Permit prohibits snow disposal into waters of the United States. Snow disposal and storage activities, including selection of appropriate snow disposal sites, will adhere to the MassDEP Snow Disposal Guidance, Guideline No. BWR G2015-01 (http://www.mass.gov/eea/agencies/massdep/water/regulations/snow-disposal-guidance.html).
- The Town of Chelmsford disposes snow in compliance with MS4 and DEP regulations.

Record Keeping and Documentation

- Maintain snow plowing and sanding routes. Documents are at the DPW.
- Keep copies of manufacturer's recommendations for equipment calibration, plowing speed and salt/sand application rates. Documents are at the Highway Division mechanics.
- Keep records of the amounts of salt applied per season. Documents are available at the DPW Business office.
- Employee training records/dates.

Employee Training

- Employees who perform winter road maintenance are trained annually on these procedures and the proper operation of related equipment.
- Employees are also trained on stormwater pollution prevention, illicit discharge detection and elimination (IDDE) procedures, and spill and response procedures.
- If services are contracted, the contractor should be given a copy of this and any applicable SOPs to ensure compliance with MS4 regulations.

Related Standard Operating Procedures

1. SWMP 6-3 SOP 4: Spill Response and Cleanup
2. SWMP 6-3 SOP 21: Operations and Maintenance of Municipal Vehicles and Equipment

INSPECTION OF OIL/SEDIMENT TRAP

General Information

BMP Description			
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	

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SWMP 6-8
INSPECTING TOWN OWNED
CONSTRUCTED BEST MANAGEMENT PRACTICES

Best Management Practices (BMPs) are policies, procedures and structures designed to reduce stormwater pollution, prevent contaminant discharges to natural water bodies, and reduce stormwater facility maintenance costs. Constructed BMPs are permanent site features designed to treat stormwater before infiltrating it to the subsurface or discharging it to a surface water body.

This Standard Operating Procedure provides a general summary of inspection procedures for eight common constructed BMPs, including:

1. Bioretention Areas and Rain Gardens
2. Extended Dry Detention Basins
3. Wet Basins
4. Dry Wells
5. Infiltration Basins

This SOP is based on the Massachusetts Stormwater Handbook and is not intended to replace that document. This SOP is also not intended to replace the Stormwater BMP Operation and Maintenance (O&M) Plan required by the Massachusetts Wetlands Protection Act, Order of Conditions.

See complete list of BMPs at:
O:\Engineering\Christina\MS4\MS4-Year 2018-19\SWMP-2019\Good Housekeeping SOPs\List of TOC Detention basins.pdf

Bioretention Areas and Rain Gardens

Bioretention areas and rain gardens are shallow depressions filled with sandy soil, topped with a thick layer of mulch and planted with dense native vegetation. There are two types of bioretention cells:

1. Filtering bioretention area: Areas that are designed solely as an organic filter; and
2. Exfiltration bioretention area: Areas that are configured to recharge groundwater in addition to acting as a filter.

Inspection & Maintenance

Regular inspection and maintenance are important to prevent against premature failure of bioretention areas or rain gardens. Regular inspection and maintenance of pretreatment devices and bioretention cells for sediment buildup, structural damage and standing water can extend the life of the soil media.

Maintenance Schedule: Bioretention Areas and Rain Gardens

Activity	Time of Year	Frequency
Inspect for soil erosion and repair	Year round	Monthly
Inspect for invasive species and remove if present	Year round	Monthly
Remove trash	Year round	Monthly
Mulch Void Areas	Spring	Annually
Remove dead vegetation	Fall and Spring	Bi-Annually
Replace dead vegetation	Spring	Annually
Prune	Spring or Fall	Annually
Replace all media and vegetation	Late Spring/Early Summer	As Needed

When failure is discovered, excavate the bioretention area, scarify the bottom and sides, replace the filter fabric and soil, replant vegetation and mulch the surface.

Never store snow within a bioretention area or rain garden. This would prevent required water quality treatment and the recharge of groundwater.

Extended Dry Detention Basins

Extended dry detention basins are designed to control both stormwater quantity and quality. These BMPs are designed to hold stormwater for at least 24 hours, allowing solids to settle and to reduce local and downstream flooding. Pretreatment is required to reduce the potential for overflow clogging. The outflow may be designed as either fixed or adjustable. Additional nutrient removal may be achieved by a micropool or shallow marsh.

Inspection & Maintenance

Annual inspection of extended dry detention basins is required to ensure that the basins are operating properly. Potential problems include: erosion within the basin and banks, tree growth on the embankment, damage to the emergency spillway and sediment accumulation around the outlet. Should any of these problems be encountered, necessary repairs should be made immediately.

Maintenance Schedule: Extended Dry Detention Basins

Activity	Time of Year	Frequency
Inspect basins	Spring and Fall	Bi-Annually, and during and after major storms
Examine outlet structure for clogging or high outflow release velocities	Spring and Fall	Bi-Annually
Mow upper stage, side slopes, embankment and emergency spillway	Spring through Fall	Bi-Annually
Remove trash and debris	Spring	Bi-Annually
Remove sediment from basin	Year round	At least once every 5 years

Wet Basins

Wet basins are intended to treat stormwater quality through the removal of sediments and soluble pollutants. A permanent pool of water allows sediments to settle and removes the soluble pollutants, including some metals and nutrients. Additional dry storage is required to control peak discharges during large storm events, and if properly designed and maintained wet basins can add fire protection, wildlife habitat and aesthetic values to a property.

Inspection & Maintenance

To ensure proper operation, wet basin outfalls should be inspected for evidence of clogging or excessive outfall releases. Potential problems to investigate include erosion within the basin and banks, damage to the emergency spillway, tree growth on the embankment, sediment accumulation around the outlet and the emergence of invasive species. Should any of these problems be encountered, perform repairs immediately. An on-site sediment disposal area will reduce sediment removal costs.

Maintenance Schedule: Wet Basins

Activity	Time of Year	Frequency
Inspect wet basins	Spring and/or Fall	Annually (Minimum)
Mow upper stage, side slopes, embankment and emergency spillway	Spring through Fall	Bi-Annually (Minimum)
Remove sediment, trash and debris	Spring through Fall	Bi-Annually (Minimum)
Remove sediment from basin	Year round	As required, but at least once every 10 years

Dry Wells

Dry wells are used to infiltrate uncontaminated runoff. These BMPs should never be used to infiltrate stormwater or runoff that has the potential to be contaminated with sediment and other pollutants. Dry wells provide groundwater recharge and can reduce the size and cost required of downstream BMPs or storm drains. However, they are only applicable in drainage areas of less than one acre and may experience high failure rates due to clogging.

Inspection & Maintenance

Proper dry well function depends on regular inspection. Clogging has the potential to cause high failure rates. The water depth in the observation well should be measured at 24 and 48 hour intervals after a storm and the clearance rate calculated. The clearance rate is calculated by dividing the drop in water level (inches) by the time elapsed (hours).

Maintenance Schedule: Dry Wells

Activity	Frequency
Inspect dry wells	After every major storm for the first 3 months after construction completion. Annually thereafter.

Infiltration Basins

Infiltration basins are designed to contain stormwater quantity and provide groundwater recharge. Pollution prevention and pretreatment are required to ensure that contaminated stormwater is not infiltrated. Infiltration basins reduce local flooding and preserve the natural water balance of the site, however high failure rates often occur due to improper siting, inadequate pretreatment, poor design and lack of maintenance.

Inspection & Maintenance

Regular maintenance is required to prevent clogging, which results in infiltration basin failure. Clogging may be due to upland sediment erosion, excessive soil compaction or low spots. Inspections should include signs of differential settlement, cracking, erosion, leakage in the embankments, tree growth on the embankments, riprap condition, sediment accumulation and turf health.

Maintenance Schedule: Infiltration Basins

Activity	Time of Year	Frequency
Preventative maintenance	Spring and Fall	Bi-Annually
Inspection	Spring and Fall	After every major storm for the first 3 months after construction completion. Bi-annually thereafter and discharges through the high outlet orifice.
Mow/rake buffer area, side slopes and basin bottom	Spring and Fall	Bi-Annually
Remove trash, debris and organic matter	Spring and Fall	Bi-Annually

_____

Approved by Public Works Director (or authorized official) Date

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SWMP 6-8

INSPECTING CONSTRUCTED BEST MANAGEMENT PRACTICES

Best Management Practices (BMPs) are policies, procedures and structures designed to reduce stormwater pollution, prevent contaminant discharges to natural water bodies, and reduce stormwater facility maintenance costs. Constructed BMPs are permanent site features designed to treat stormwater before infiltrating it to the subsurface or discharging it to a surface water body.

This Standard Operating Procedure provides a general summary of inspection procedures for eight common constructed BMPs, including:

1. Bioretention Areas and Rain Gardens
2. Constructed Stormwater Wetlands
3. Extended Dry Detention Basins
4. Proprietary Media Filters
5. Sand and Organic Filters
6. Wet Basins
7. Dry Wells
8. Infiltration Basins

This SOP is based on the Massachusetts Stormwater Handbook and is not intended to replace that document. This SOP is also not intended to replace the Stormwater BMP Operation and Maintenance (O&M) Plan required by the Massachusetts Wetlands Protection Act, Order of Conditions.

Bioretention Areas and Rain Gardens

Bioretention areas and rain gardens are shallow depressions filled with sandy soil, topped with a thick layer of mulch and planted with dense native vegetation. There are two types of bioretention cells:

1. Filtering bioretention area: Areas that are designed solely as an organic filter; and
2. Exfiltration bioretention area: Areas that are configured to recharge groundwater in addition to acting as a filter.

Inspection & Maintenance

Regular inspection and maintenance are important to prevent against premature failure of bioretention areas or rain gardens. Regular inspection and maintenance of pretreatment devices and bioretention cells for sediment buildup, structural damage and standing water can extend the life of the soil media.

Maintenance Schedule: Bioretention Areas and Rain Gardens

Activity	Time of Year	Frequency
Inspect for soil erosion and repair	Year round	Monthly
Inspect for invasive species and remove if present	Year round	Monthly
Remove trash	Year round	Monthly
Mulch Void Areas	Spring	Annually
Remove dead vegetation	Fall and Spring	Bi-Annually
Replace dead vegetation	Spring	Annually
Prune	Spring or Fall	Annually
Replace all media and vegetation	Late Spring/Early Summer	As Needed

When failure is discovered, excavate the bioretention area, scarify the bottom and sides, replace the filter fabric and soil, replant vegetation and mulch the surface.

Never store snow within a bioretention area or rain garden. This would prevent required water quality treatment and the recharge of groundwater.

Constructed Stormwater Wetlands

Constructed stormwater wetlands maximize the pollutant removal from stormwater through the use of wetland vegetation uptake, retention and settling. Constructed storm water wetlands must be used in conjunction with other BMPs, such as sediment forebays.

Inspection & Maintenance

Regular inspection and maintenance are important to prevent against premature failure of bioretention areas or rain gardens. Regular inspection and maintenance of pretreatment devices and bioretention cells for sediment buildup, structural damage and standing water can extend the life of the soil media.

Maintenance Schedule, Constructed Stormwater Wetlands: Years 0-3

Activity	Time of Year	Frequency
Inspect for invasive species and remove if present	Year round	Monthly
Record and Map:	Year round	Annually
Types and distribution of dominant wetland plants	Year round	Bi-Annually
Presence and distribution of planted wetland species	Spring	Annually
Presence and distribution of invasive species	Fall and Spring	Bi-Annually
Indications other species are replacing planted wetland species	Spring	Annually
Percent of standing water that is not vegetated	Spring or Fall	Annually
Replace all media and vegetation	Late Spring/Early Summer	As Needed
Stability of original depth zones and micro-topographic features		
Accumulation of sediment in the forebay and micropool and survival rate of plants		

Maintenance Schedule, Constructed Stormwater Wetlands: Years 4-Lifetime

Activity	Time of Year	Frequency
Inspect for invasive species and remove if present	Year round	Monthly
Clean forebays	Year round	Annually
Clean sediment in basin/wetland system	Year round	Once every 10 years
Mulch Void Areas	Spring	Annually
Remove dead vegetation	Fall and Spring	Bi-Annually
Replace dead vegetation	Spring	Annually
Prune	Spring or Fall	Annually
Replace all media and vegetation	Late Spring/Early Summer	As Needed

When failure is discovered, excavate the bioretention area, scarify the bottom and sides, replace the filter fabric and soil, replant vegetation and mulch the surface.

Never store snow within a constructed stormwater wetland. This would prevent required water quality treatment and the recharge of groundwater.

Extended Dry Detention Basins

Extended dry detention basins are designed to control both stormwater quantity and quality. These BMPs are designed to hold stormwater for at least 24 hours, allowing solids to settle and to reduce local and downstream flooding. Pretreatment is required to reduce the potential for overflow clogging. The outflow may be designed as either fixed or adjustable. Additional nutrient removal may be achieved by a micropool or shallow marsh.

Inspection & Maintenance

Annual inspection of extended dry detention basins is required to ensure that the basins are operating properly. Potential problems include: erosion within the basin and banks, tree growth on the embankment, damage to the emergency spillway and sediment accumulation around the outlet. Should any of these problems be encountered, necessary repairs should be made immediately.

Maintenance Schedule: Extended Dry Detention Basins

Activity	Time of Year	Frequency
Inspect basins	Spring and Fall	Bi-Annually, and during and after major storms
Examine outlet structure for clogging or high outflow release velocities	Spring and Fall	Bi-Annually
Mow upper stage, side slopes, embankment and emergency spillway	Spring through Fall	Bi-Annually
Remove trash and debris	Spring	Bi-Annually
Remove sediment from basin	Year round	At least once every 5 years

Proprietary Media Filters

Media Filters are designed to reduce total suspended solids and other target pollutants, such as organics, heavy metals or nutrients, which are sorbed onto the filter media, which is contained in a concrete structure. The substrate used as filter media depends on the target pollutants, and may consist of leaf compost, pleated fabric, activated charcoal, perlite, amended sand in combination with perlite, and zeolite. Two types of Media Filters are manufactured: Dry Media Filters, which are designed to dewater within 72 hours; and Wet Media Filters, which maintain a permanent pool of water as part of the treatment system.

Inspection & Maintenance

Maintenance in accordance with the manufacturer's requirements is necessary to ensure stormwater treatment. Inspection or maintenance of the concrete structure may require OSHA confined space training. Dry Media Filters are required to dewater in 72 hours, thus preventing mosquito and other insect breeding. Proper maintenance is essential to prevent clogging. Wet Media Filters require tight fitting seals to keep mosquitoes and other insects from entering and breeding in the permanent pools. Required maintenance includes routine inspection and treatment.

Maintenance Schedule: Proprietary Media Filters

Activity	Time of Year	Frequency
Inspect for standing water, trash, sediment and clogging	Per manufacturer's schedule	Bi-Annually (minimum)
Remove trash and debris	N/A	Each Inspection
Examine to determine if system drains in 72 hours	Spring, after large storm	Annually
Inspect filtering media for clogging	Per manufacturer's schedule	Per manufacturer's schedule

Sand and Organic Filters

Sand and organic filters, also known as filtration basins, are intended for quality control rather than quantity control. These filters improve water quality by removing pollutants through a filtering media and settling pollutants on top of the sand bed and/or in a pretreatment basin. Pretreatment is required to prevent filter media from clogging. Runoff from the filters is typically discharged to another BMP for additional treatment.

Inspection & Maintenance

If properly maintained, sand and organic filters have a long design life. Maintenance requirements include raking the sand and removing sediment, trash and debris from the surface of the BMP. Over time, fine sediments will penetrate deep into the sand requiring replacement of several inches or the entire sand layer. Discolored sand is an indicator of the presence of fine sediments, suggesting that replacement of the sand should be completed.

Maintenance Schedule: Proprietary Media Filters

Activity	Frequency
Inspect filters and remove debris	After every major storm for the first 3 months after construction completion. Every 6 months thereafter.

Wet Basins

Wet basins are intended to treat stormwater quality through the removal of sediments and soluble pollutants. A permanent pool of water allows sediments to settle and removes the soluble pollutants, including some metals and nutrients. Additional dry storage is required to control peak discharges during large storm events, and if properly designed and maintained wet basins can add fire protection, wildlife habitat and aesthetic values to a property.

Inspection & Maintenance

To ensure proper operation, wet basin outfalls should be inspected for evidence of clogging or excessive outfall releases. Potential problems to investigate include erosion within the basin and banks, damage to the emergency spillway, tree growth on the embankment, sediment accumulation around the outlet and the emergence of invasive species. Should any of these problems be encountered, perform repairs immediately. An on-site sediment disposal area will reduce sediment removal costs.

Maintenance Schedule: Wet Basins

Activity	Time of Year	Frequency
Inspect wet basins	Spring and/or Fall	Annually (Minimum)
Mow upper stage, side slopes, embankment and emergency spillway	Spring through Fall	Bi-Annually (Minimum)
Remove sediment, trash and debris	Spring through Fall	Bi-Annually (Minimum)
Remove sediment from basin	Year round	As required, but at least once every 10 years

Dry Wells

Dry wells are used to infiltrate uncontaminated runoff. These BMPs should never be used to infiltrate stormwater or runoff that has the potential to be contaminated with sediment and other pollutants. Dry wells provide groundwater recharge and can reduce the size and cost required of downstream BMPs or storm drains. However, they are only applicable in drainage areas of less than one acre and may experience high failure rates due to clogging.

Inspection & Maintenance

Proper dry well function depends on regular inspection. Clogging has the potential to cause high failure rates. The water depth in the observation well should be measured at 24 and 48 hour intervals after a storm and the clearance rate calculated. The clearance rate is calculated by dividing the drop in water level (inches) by the time elapsed (hours).

Maintenance Schedule: Dry Wells

Activity	Frequency
Inspect dry wells	After every major storm for the first 3 months after construction completion. Annually thereafter.

Infiltration Basins

Infiltration basins are designed to contain stormwater quantity and provide groundwater recharge. Pollution prevention and pretreatment are required to ensure that contaminated stormwater is not infiltrated. Infiltration basins reduce local flooding and preserve the natural water balance of the site, however high failure rates often occur due to improper siting, inadequate pretreatment, poor design and lack of maintenance.

Inspection & Maintenance

Regular maintenance is required to prevent clogging, which results in infiltration basin failure. Clogging may be due to upland sediment erosion, excessive soil compaction or low spots. Inspections should include signs of differential settlement, cracking, erosion, leakage in the embankments, tree growth on the embankments, riprap condition, sediment accumulation and turf health.

Maintenance Schedule: Infiltration Basins

Activity	Time of Year	Frequency
Preventative maintenance	Spring and Fall	Bi-Annually
Inspection	Spring and Fall	After every major storm for the first 3 months after construction completion. Bi-annually thereafter and discharges through the high outlet orifice.
Mow/rake buffer area, side slopes and basin bottom	Spring and Fall	Bi-Annually
Remove trash, debris and organic matter	Spring and Fall	Bi-Annually

Approved by Public Works Director (or authorized official) Date

ENGINEERING 978-250-5228
FACILITIES 978-244-3379
HIGHWAY 978-250-5270

PARKS 978-250-5228
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DEPARTMENT OF PUBLIC WORKS

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SWMP 6-8
Constructed BMPs Inspection Form

INSPECTION OF BIORETENTION AREAS / RAIN GARDENS

General Information

BMP Description	Bioretention Area / Rain Garden		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for soil erosion and repair	Monthly	Yes ☐ No ☐	
Inspect for invasive species and remove if present	Monthly	Yes ☐ No ☐	
Remove trash	Monthly	Yes ☐ No ☐	
Mulch void areas	Annually	Yes ☐ No ☐	
Remove dead vegetation	Bi-Annually	Yes ☐ No ☐	
Replace dead vegetation	Annually	Yes ☐ No ☐	
Prune	Annually	Yes ☐ No ☐	
Replace all media and vegetation	As Needed	Yes ☐ No ☐	

INSPECTION OF CONSTRUCTED STORMWATER WETLANDS
Years 0-3 of Operation

General Information

BMP Description	Constructed Stormwater Wetland		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for invasive species and remove if present	Monthly	Yes ☐ No ☐	
Replace all media and vegetation	As Needed	Yes ☐ No ☐	

In addition, the following information should be recorded and mapped at least once per year:

- Types and distribution of dominant wetland plants
- Presence and distribution of planted wetland species
- Presence and distribution of invasive species
- Indications other species are replacing planted wetland species
- Percent of standing water that is not vegetated
- Replace all media and vegetation
- Stability of original depth zones and micro-topographic features
- Accumulation of sediment in the forebay and micropool and survival rate of plants

INSPECTION OF CONSTRUCTED STORMWATER WETLANDS
Year 4 - Lifetime of Operation

General Information

BMP Description	Constructed Stormwater Wetland		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for invasive species and remove if present	Monthly	Yes ☐ No ☐	
Clean forebays	Annually	Yes ☐ No ☐	
Clean sediment in basin/wetland system	Once every 10 years	Yes ☐ No ☐	
Mulch void areas	Annually	Yes ☐ No ☐	
Remove dead vegetation	Bi-Annually	Yes ☐ No ☐	
Replace dead vegetation	Annually	Yes ☐ No ☐	
Prune	Annually	Yes ☐ No ☐	
Replace all media and vegetation	As Needed	Yes ☐ No ☐	

INSPECTION OF EXTENDED DRY DETENTION BASINS

Inspections should be conducted bi-annually, and during and after major storm events.

General Information

BMP Description	Extended Dry Detention Basin		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Examine outlet structure for clogging or high outflow release velocities	Bi-Annually	Yes ☐ No ☐	
Mow upper stage, side slopes, embankment and emergency spillway	Bi-Annually	Yes ☐ No ☐	
Remove trash and debris	Bi-Annually	Yes ☐ No ☐	
Remove sediment from basin	At least once every 5 years	Yes ☐ No ☐	
Additional Notes:			

INSPECTION OF PROPRIETARY MEDIA FILTERS

General Information

BMP Description	Media Filter		
BMP Location			
Media Type			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for standing water, trash, sediment and clogging	Bi-Annually (minimum)	Yes ☐ No ☐	
Remove trash and debris	Each Inspection	Yes ☐ No ☐	
Examine to determine if system drains in 72 hours	Annually	Yes ☐ No ☐	
Inspect filtering media for clogging	Per manufacturer's schedule	Yes ☐ No ☐	

INSPECTION OF SAND AND ORGANIC FILTERS

Inspections should be conducted after every major storm event for the first 3 months following completion, then every 6 months thereafter.

General Information

BMP Description	Sand/Organic Filter		
BMP Location			
Media Type			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Remove sediment, trash, and debris	Every 6 months	Yes ☐ No ☐	
Rake sand	Every 6 months	Yes ☐ No ☐	

INSPECTION OF DRY WELLS

Regular inspections should be conducted after every major storm event for the first 3 months following completion, then annually thereafter.

General Information

BMP Description	Dry Well		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			
Describe condition of dry well at time of inspection			

After a major storm event, the water depth in the observation well should be measured at 24 and 48 hour intervals and the clearance rate calculated.

INSPECTION OF WET BASINS

Inspections should be conducted after every major storm event for the first 3 months following completion, then biannually thereafter.

General Information

BMP Description	Wet Basin		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			
Describe condition of wet basin at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Preventative maintenance	Bi-Annually	Yes ☐ No ☐	
Mow/rake buffer area, side slopes and basin bottom	Bi-Annually	Yes ☐ No ☐	
Remove trash, debris and organic matter	Bi-Annually	Yes ☐ No ☐	
Inspect and clean pretreatment devices	Every other month and after every major storm event	Yes ☐ No ☐	

INSPECTION OF OTHER BMP

General Information

BMP Description			
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	

Approved by Public Works Director (or authorized official) Date