

Municipal Stormwater Infrastructure Operation and Maintenance Plan

Town of Wilmington, MA

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Operation and Maintenance Plan

Town of Wilmington

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1 Introduction

This Operation and Maintenance (O&M) Plan has been prepared by the Town of Wilmington to address stormwater infrastructure O&M requirements¹ of the United States Environmental Protection Agency's (USEPA's) 2016 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts, hereafter referred to as the "2016 Massachusetts MS4 Permit" or "MS4 Permit."

This O&M Plan addresses Minimum Control Measure 6, Good Housekeeping and Pollution Prevention for Permittee Owned Operations, by describing the activities and procedures the Town of Wilmington will implement so that the MS4 infrastructure is maintained in a timely manner to reduce the discharge of pollutants from the MS4. The O&M Plan outlines inspection and maintenance procedures for catch basins, municipally-owned streets and parking lots, and structural stormwater Best Management Practices (BMPs).

The Department of Public Works is responsible for inspection and maintenance of the stormwater infrastructure in the Town of Wilmington. A map of the existing stormwater infrastructure in the Town of Wilmington is provided in **Appendix A**.

2 Catch Basins

The Department of Public Works performs routine inspections, cleaning, and maintenance of the approximately 2,792 catch basins that are located within the MS4 regulated area. The Town of Wilmington will implement the following catch basin inspection and cleaning procedures to reduce the discharge of pollutants from the MS4

- Routine inspection and cleaning of catch basins. Catch basins should be cleaned such that they are no more than 50 percent full² at any time. The Town will initially review all inspection logs of catch basins within the regulated area within two (2) years of the effective date of the permit to evaluate sediment or debris accumulation and establish optimal inspection and maintenance frequencies to meet the "50 percent" goal. A catch basin inspection/cleaning procedure, and inspection form are included in **Appendix B**. Logs of all catch basin cleaning/inspections are uploaded to the Town's GIS online MS4 map using "Peopleforms" through PeopleGIS. Peopleforms is an online dynamic municipal data management software purchased on a yearly subscription.
- If a catch basin sump is more than 50 percent full during two consecutive routine inspections or cleaning events, the finding will be documented, the contributing drainage area will be investigated for sources of excessive sediment loading, and to the extent practicable, contributing sources will be addressed. If no contributing sources are found, the inspection and cleaning frequency will be increased.

¹ See Part 2.3.7.a.iii of the 2016 MS4 Permit for Infrastructure Operation and Maintenance program requirements.

² A catch basin sump is more than 50 percent full if 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

- Catch basins located near construction activities (roadway construction, residential, commercial, or industrial development or redevelopment) will be inspected and cleaned more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings (i.e., catch basins more than 50 percent full). Priority will also be given to catch basins that discharge to impaired waters. The Engineering Division will coordinate a list of priority streets to the Town's Highway Division.
- The following information will be included in each annual report:
 - Any action taken in response to excessive sediment or debris loadings
 - Total number of catch basins
 - Number of catch basins inspected
 - Number of catch basins cleaned
 - Total volume or mass of material removed from catch basins.

3 Streets and Parking Lots

The Town of Wilmington will implement the following street and parking lot sweeping procedures to reduce the discharge of pollutants from the MS4:

- All streets with the exception of rural uncurbed roads with no catch basins or high speed limited access highways will be swept and/or cleaned a minimum of once per year in the spring (following winter activities such as sanding).
- More frequent sweeping will be considered for targeted areas based on pollutant load reduction potential, inspections, pollutant loads, catch basin cleaning or inspection results, land use, impaired waters, or other factors.
- More frequent sweeping is required for municipally-owned streets and parking lots in areas that discharge to certain nutrient-impaired waters. Sweeping must be performed in these areas a minimum of two times per year, once in the spring (following winter activities such as sanding) and at least once in the fall (Sept 1 – Dec 1; following leaf fall). This includes Industrial Way, Jewel Drive, Woburn Street (from Eames Street south the Town Line), Cook Ave, Border Ave, and Eames Street.
- For rural uncurbed roadways with no catch basins and limited access highways, the Town will either meet the minimum frequencies above, or develop and implement an inspection, documentation, and targeted sweeping plan outlining reduced frequencies within two (2) year of the effective date of the permit, and submit such plan with its year one annual report.
- Number of miles cleaned are logged tracked using an interactive GIS mapping tool and included in the annual report. Street's that are swept are uploaded to the Town's GIS online MS4 map using "Peopleforms" through PeopleGIS. Peopleforms is an online dynamic municipal data management software purchased on a yearly subscription.

4 Catch Basin Cleanings and Street Sweepings

Catch basin cleanings (i.e., solid materials such as leaves, sand and twigs removed from stormwater collection systems during cleaning operations) and street sweepings will be managed in compliance with current Massachusetts Department of Environmental Protection policies:

- Catch Basin Cleanings
<http://www.mass.gov/eea/agencies/massdep/recycle/regulations/management-of-catch-basin-cleanings.html>
- Street Sweepings
<http://www.mass.gov/eea/docs/dep/recycle/laws/stsweep.pdf>

Prior to disposal or reuse, catch basin cleanings and street sweepings will be stored indoors or using proper controls such that they do not discharge to receiving waters.

5 Winter Road Maintenance

The Town performs a variety of maintenance activities to ensure safe winter driving conditions on its roads and parking lots.

The Town will implement the following winter maintenance procedures to reduce the discharge of pollutants from the MS4:

- Minimize the use and optimize the application of sodium chloride and other salt³ (while maintaining public safety) and consider opportunities for use of alternative materials.
- 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. Maintain records of the application of sand, anti-icing and/or de-icing chemicals to document the reduction of chemicals to meet established goals.
- 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.
- The MS4 Permit prohibits snow disposal into waters of the United States. Snow disposal activities, including selection of appropriate snow disposal sites, will adhere to the Massachusetts Department of Environmental Protection Snow Disposal Guidance, Guideline

³ 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.

No. BWR G2015-01 (Effective Date: December 21, 2015), located at:

<http://www.mass.gov/eea/agencies/massdep/water/regulations/snow-disposal-guidance.html>

- Provide training for municipal employees on winter roadway maintenance procedures.

6 Structural Stormwater BMPs

An inventory of structural stormwater Best Management Practices (BMPs) owned and/or maintained by Town is provided in **Appendix D**. The stormwater infrastructure map in **Appendix A** shows the locations of the structural BMPs.

Structural stormwater BMPs will be inspected annually at a minimum. Recommended inspection procedures and checklists are provided in **Appendix E**.

Appendix A

Stormwater Infrastructure Map

<https://www.mapsonline.net/wilmingtonma/ms4>

Appendix B

Catch Basin Inspection and Cleaning Procedure Catch Basin Inspection Form

Catch Basin Street Name	CS Structure #	Mild: Discharge		Date Cleaned	CB Hood (Yes/No)	DSC (ft)	DAC (ft)	DOMR (ft)	Diameter	Approval And (ft)	Vol. of Debris Removed (cu ft)	Condition
		YES	NO									
Apple Tree	281007	✓	NO	4-23-18	NO	16'	6'7"		3'		0.0	G
Apple Tree	281003	✓	NO	4-23-18	NO	6'1"	6'8"		3'			G
Apple Tree	281001	✓	NO	4-23-18	NO	6'	6'7"		3'			G
Apple Tree	281006	✓	NO	4-23-18	NO	4'11"	5'6"		3'			G
Patches Pond	2819017	✓	NO	5-14-18	NO	6'9"	7'7"		3'			G
Patches Pond	2819008	✓	NO	5-14-18	NO	7'6"	8'1"		3'			G
Patches Pond	2819009	✓	NO	5-14-18	NO	5'11"	6'5"		3'			G
Patches Pond	2819001	✓	NO	5-14-18	NO	4'9"	5'4"		3'			G
Patches Pond	2819020	✓	NO	5-14-18	NO	5'8"	6'1"		3'			G
Patches Pond	2819003	✓	NO	5-14-18	NO	7'	7'5"		3'			G
Patches Pond	2819015	✓	NO	5-14-18	NO	7'	7'6"		3'			G
Patches Pond	2819018	✓	NO	5-14-18	NO	5'	5'7"		3'			G
Factory Rd	2811001	✓	NO	5-14-18	NO	5'	6'		3'			G
Factory Rd	2811003	✓	NO	5-14-18	NO	5'7"	6'6"		3'			G
Meadow Brook	NG15	✓	NO	5-14-18	NO	5'8	6'7"		3'			G
Nauvao	NG15	✓	NO	5-14-18	NO	7'	7'6"		3'			G
Nauvao	NG15	✓	NO	5-14-18	NO	7'2"	7'8"		3'			G
Fern Banks	2813005	✓	NO	5-14-18	NO	5'11"	6'3"		3'			G
Fern Banks	2813004	✓	NO	5-14-18	NO	6'4"	7'		3'			G
Fern Banks	2813003	✓	NO	5-14-18	NO	6'5"	6'11"		3'			G
Fern Banks	2813008	✓	NO	5-14-18	NO	5'7"	6'1"		3'			G
General Comments:								PAGE SUBTOTAL			0.0	

CS = Catch Basin, CH = Drain Chamber, MH = Drain Manhole, DSC = Depth Before Cleaning, DAC = Depth After Cleaning, DOMR = Depth of Material Removed

SOP 3: 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.

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.

SOP 3: Catch Basin Inspection and Cleaning

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. 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.
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 (see “SOP 10: Addressing Illicit Discharges”).
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.

Appendix C

Street and Parking Lot Sweeping Log

<https://www.mapsonline.net/wilmingtonma/ms4>

Appendix D

Inventory of Structural Stormwater Best Management Practices

	LOCATION	YEAR CONSTRUCTED	DESIGN PLAN	ASBUILT PLAN	BMP TYPE
1	LT. BUCK DRIVE	4/22/2014	yes	yes	Pocket Wetland
3	MARION STREET	1/9/2012	yes	yes	Detention Basin
4	CHEYENNE DRIVE	4/8/2016	no	yes	Detention Basin
5	LEONARD LANE	10/19/2010	yes	yes	Detention Basin
6	MINK RUN ROAD	11/30/2000	yes	yes	Detention Pond
7	MILL ROAD	6/3/2008	no	yes	Detention Pond
8	MILL ROAD	6/3/2008	no	yes	Detention Pond
9	MILL ROAD	6/3/2008	no	yes	Detention Pond
10	SEQUOIA DRIVE	12/11/2007	yes	yes	Detention Pond
11	SACHEM CIRCLE	9/15/2004	yes	yes	Retention Area
12	FENWAY STREET	11/31/2002	yes	yes	Detention Pond
13	FENWAY STREET	11/31/2002	yes	yes	Detention Pond
14	FOLEY FARM ROAD	1/27/2004	no	yes	Detention Basin
15	FOLEY FARM ROAD	1/27/2004	no	yes	Detention Basin
16	EMERALD AVENUE	12/19/1997	yes	yes	Retention Basin
17	ISABELLA WAY		yes	no	Retention Area
18	ELIZABETH DRIVE	1/5/1999	yes	yes	Detention Basin
19	PRESIDENTIAL DRIVE		yes	no	Detention Area
20	BIRCH ROAD	11/10/1997	no	yes	Detention Area
21	HIGH STREET		no	no	Detention Area
22	NELSON WAY	9/29/1999	yes	yes	Detention Area
23	SERENOA ROAD	2/4/1999	yes	yes	Detention Basin
24	SERENOA ROAD	2/4/1999	yes	yes	Detention Basin
25	ACORN DRIVE	4/15/1997	yes	yes	Sedimentation Basin
26	WINSTON AVENUE	1/15/2007	no	yes	Detention Pond
27	CRYSTAL ROAD	2/14/1994	yes	yes	Detention Pond
28	CRYSTAL ROAD	2/14/1994	yes	yes	Detention Pond
29	CRYSTAL ROAD	2/14/1994	yes	yes	Detention Pond
30	NOTTINGHAM DRIVE	2/3/1996	yes	yes	Detention Area
31	TACOMA DRIVE	12/11/2001	no	yes	Drainage Easement
32	SENECA LANE	12/11/2001	yes	yes	Drainage Easement
33	SENECA LANE	12/11/2001	yes	yes	Drainage Easement
34	SOMERSET PLACE	1/31/1997	yes	yes	Detention Pond
35	AGOSTINO DRIVE (2)	11/10/1995	yes	yes	Detention Pond
36	CASTLE DRIVE	2/7/1997	no	yes	Detention Pond
37	CHEROKEE LANE	9/24/1998	yes	yes	Detention Basin
38	NAVAJO DRIVE	11/7/2005	yes	yes	Detention Pond
39	FIORENZA DRIVE	7/3/2012	yes	yes	Detention Pond
40	FIORENZA DRIVE	7/3/2012	yes	yes	Detention Pond
41	FIORENZA DRIVE	7/3/2012	yes	yes	Detention Pond
42	FIORENZA DRIVE	7/3/2012	yes	yes	Detention Pond
43	SARAFINAS WAY	10/20/1994	yes	yes	Detention Pond
44	LESLIE (BEECH) STREET	11/21/2011	no	yes	Detention Pond
45	HENRY L DRIVE	11/6/1992	yes	yes	Recharge Area
46	AMHERST ROAD	1/17/1994	yes	yes	Retention Pond
47	MARCH ROAD		no	no	Detention Pond
48	TOWPATH DRIVE	10/26/1992	yes	yes	Detention Area
49	ASHWOOD AVENUE	7/12/1996	yes	yes	Detention Area
50	ASHWOOD AVENUE	7/12/1996	yes	yes	Detention Area
51	COTTONWOOD CIRCLE		yes	no	Detention Area
52	BLUEBERRY LANE		no	no	Detention Area
53	TREASURE HILL ROAD		yes	no	Recharge Basin
54	TREASURE HILL ROAD		yes	no	Recharge Basin
55	EARLE'S ROW	7/20/1992	yes	yes	Drainage Easement
56	OX BOW DRIVE	1/31/1992	yes	yes	Drainage Easement
57	PATCH'S POND LANE	3/6/1990	yes	yes	Drainage Easement
58	GLORIA WAY	8/24/1987	yes	yes	Drainage Easement
59	RESEARCH DRIVE	11/7/1988	yes	yes	Drainage Easement
60	RESEARCH DRIVE	11/7/1988	yes	yes	Drainage Easement
61	BALLARDVALE ST	5/8/1997	no	yes	Detention Basin
62	APACHE WAY	9/22/1997	yes	yes	Drainage Easement
63	FIORENZA DRIVE	7/3/2012	yes	yes	Detention Pond
64	JONSPIN ROAD	1/15/1993	yes	yes	Drainage Easement
65	CARDINAL COURT	3/8/2005	yes	yes	Detention Pond
66	POULIOT PLACE	3/8/2005	yes	yes(draft)	Detention Pond
67	POULIOT PLACE	3/8/2005	yes	yes(draft)	Detention Pond
68	MC DONALD ROAD		yes	no	Detention Pond
69	LEXINGTON STREET	1/27/2010	no	yes	
70	CUNNINGHAM STREET		no	no	
71	RIVER STREET		no	no	
72	CHEYENNE DRIVE	4/8/2016	yes	yes	Detention Basin

Date of Inspection: 12/05/2018

Current Weather: cloudy 33°

Field Inspectors (s): HL

Facility Type: Dry Basin

Built:

Location : Cheyenne Drive

Number	Items Inspected	Checked Yes/No	Maintenance Needed Yes / No	Description/Action Needed Yes /No	Inspection Frequency Yes/No	Maintenance Follow-up Date Completed	Initials
	Maintenance Access	Yes	no	detension pond behind #5 cheyenne Drive			
				Access from #5 Cheyenne Drive from the right side.			
	Inlet Pipe	yes	no	RCP inlet pipe.			
				maintenance is not require			
	detention area	yes	no	top, bottom and side slope is well maintenance by residence			
				no maintenance require			
	Outlet structure	no	no	Concrete structure with weir opening			
				great condition , no maintenance require			

Appendix E

Structural Stormwater BMP Inspection Procedures

SOP 9: 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

Appendix F

Salt Reduction Program

Salt Reduction Program

Winter Maintenance: Develop and implement procedures for use and storage of salt and sand, minimize use of salt and prohibit snow from being directly disposed into waters of the US.

The Wilmington Department of Public Works has implemented a Salt Reduction Program as part of our snow and ice operation. Starting in FY12, the DPW greatly reduced the use of sand for snow and ice operations, and effectively eliminated its use by FY14. The current use of sand is now restricted to extreme circumstances where traction on hills is required or for use as an absorbant material during car accident fluid cleanup.

During FY12, the town also began using liquid Magnesium Chloride (MgCl) to pre-wet salt in most storm applications in order to increase the salt's de-icing efficiency and reduce salt lost to due to road bounce and scatter. This, in combination with a three-year migration over to variable speed controls on the salt spreaders, have translated into an approximate 10% to 20% reduction in salt use based on number of storm event responses.

The DPW staff was trained on salt reduction practices, most recently on December 21, 2018, by Operations Manager Jamie Magaldi and Operations Supervisor Jerry Lawrenson. The presentation topics included why salt is pre-wetted, why we need to reduce salt use (for water quality), how much salt is lost when we overuse and don't pre-wet, benefits of being proactive when anti-icing, toxicity of magnesium chloride, PPE use for the salt and magnesium chloride, corrosivity of salt, and how wet salt works faster than dry salt.

The Town maintains 2 existing salt sheds located on Federal Street in Wilmington. Both sheds are wood sided structures with roofs and lockable doors to prevent the stored salt from coming in contact with rain and snow. During salt deliveries, salt is quickly moved into the sheds by DPW staff prior to precipitation events coming in contact with the stockpiled salt. The salt shed is bermed around the perimeter with wood chips to help prevent migration of stormwater runoff, and this berm is continually added to using wood chips from the Tree Division's daily operations. Furthermore, MgCl is stored in an enclosed tank located on the salt shed property. Workers fill their sander saddle tanks with MgCl directly from the tank and at no point is the liquid exposed to stormwater runoff.