Town of Ayer

Stormwater Management Program (SWMP)

EPA NPDES Permit No. MAR04-1179

June 2019, Last Revised September 2020

Ayer Department of Public Works

25 Brook Street

Ayer, MA 01432

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June 28, 2019

MEMO TO FILE

Re: 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 the **DPW Superintendent and Town Engineer** have responsibility for the operation of the MS4 and are 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 **Massachusetts** for the **Town of Ayer**. 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."

SIGNATORY per Part B.11 of Appendix B

Robert A. Pontbriand 6/28/2019

Robert Pontbriand
Town Manager

Certification

Authorized Representative (Optional): All reports, including SWPPPs, inspection reports, annual reports, monitoring reports, reports on training and other information required by this permit must be signed by a person described in Appendix B, Subsection 11.A or by a duly authorized representative of that person in accordance with Appendix B, Subsection 11.B. If there is an authorized representative to sign MS4 reports, there must be a signed and dated written authorization.
The authorization letter is:

☒ Attached to this document (document name listed below)

Authorization Letter

☒ Publicly available at the website below

https://www.ayer.ma.us/stormwater-department

"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."

Printed Name: Dan Van Schaikwyk, Town Engineer

Signature: 

Date: 06/28/19

Click Here for Revisions

Certification

Authorized Representative (Optional): All reports, including SWPPPs, inspection reports, annual reports, monitoring reports, reports on training and other information required by this permit must be signed by a person described in Appendix B, Subsection 11.A or by a duly authorized representative of that person in accordance with Appendix B, Subsection 11.B. If there is an authorized representative to sign MS4 reports, there must be a signed and dated written authorization.
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Printed Name

Signature _____ Date

Revisions

Printed Name Dan Van Schalkwyk

Signature _____ Date 06/23/2020

Printed Name Dan Van Schalkwyk

Signature _____ Date 09/30/2020

Click Here for Revisions

Background

Stormwater Regulation

The Stormwater Phase II Final Rule was promulgated in 1999 and was the next step after the 1987 Phase I Rule in EPA's effort to preserve, protect, and improve the Nation's water resources from polluted stormwater runoff. The Phase II program expands the Phase I program by requiring additional operators of MS4s in urbanized areas and operators of small construction sites, through the use of NPDES permits, to implement programs and practices to control polluted stormwater runoff. Phase II is intended to further reduce adverse impacts to water quality and aquatic habitat by instituting the use of controls on the unregulated sources of stormwater discharges that have the greatest likelihood of causing continued environmental degradation. Under the Phase II rule all MS4s with stormwater discharges from Census designated Urbanized Area are required to seek NPDES permit coverage for those stormwater discharges.

Permit Program Background

On May 1, 2003, EPA Region 1 issued its Final General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (2003 small MS4 permit) consistent with the Phase II rule. The 2003 small MS4 permit covered "traditional" (i.e., cities and towns) and "non-traditional" (i.e., Federal and state agencies) MS4 Operators located in the states of Massachusetts and New Hampshire. This permit expired on May 1, 2008 but remained in effect until operators were authorized under the 2016 MS4 general permit, which became effective on July 1, 2018.

Stormwater Management Program (SWMP)

The SWMP describes and details the activities and measures that will be implemented to meet the terms and conditions of the permit. The SWMP accurately describes the permittees plans and activities. The document should be updated and/or modified during the permit term as the permittee's activities are modified, changed or updated to meet permit conditions during the permit term. The main elements of the stormwater management program are (1) a public education program in order to affect public behavior causing stormwater pollution, (2) an opportunity for the public to participate and provide comments on the stormwater program (3) a program to effectively find and eliminate illicit discharges within the MS4 (4) a program to effectively control construction site stormwater discharges to the MS4 (5) a program to ensure that stormwater from development projects entering the MS4 is adequately controlled by the construction of stormwater controls, and (6) a good housekeeping program to ensure that stormwater pollution sources on municipal properties and from municipal operations are minimized.

Town Specific MS4 Background (optional)

The Town of Ayer is approximately 9 square miles with a population of 7,427 (2010 Census). The Town is comprised of several ponds and waterbodies. The Town has two water treatment plants and water distribution and a wastewater treatment plant and sewer collection system which encompass approximately 95% of users. The Town has a mix of industrial, commercial, and residential.

The Town of Ayer obtained coverage under the 2003 MS4 Permit. The MS4 Program is administered by the Department of Public Works (DPW).

Small MS4 Authorization

The NOI was submitted on Sep 28, 2018

The NOI can be found at the following (document name or web address):

https://www.epa.gov/npdes-permits/regulated-ms4-massachusetts-communities

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Authorization to Discharge was granted on Jun 4, 2019

The Authorization Letter can be found (document name or web address):

https://www.epa.gov/npdes-permits/regulated-ms4-massachusetts-communities

Stormwater Management Program Team

SWMP Team Coordinator

Name	Mark Wetzel	Title	Superintendent
Department	Public Works		
Phone Number	978-772-8240	Email	mwetzel@ayer.ma.us
Responsibilities	Overall stewardship of Ayer's MS4, site inspections, reviews stormwater management plans		

SWMP Team

Name	Dan Van Schalkwyk	Title	Town Engineer
Department	Public Works		
Phone Number	978-772-8240	Email	dvanschalkwyk@ayer.ma.us
Responsibilities	Overall stewardship of Ayer's MS4, site inspections, reviews stormwater management plans		

Name	Jo-Anne Crystoff	Title	Conservation Adminstrator
Department	Conservation Commission		
Phone Number	978-772-8249	Email	concom@ayer.ma.us
Responsibilities	Site inspections, MS4 implementation assistance		

Name		Title	
Department	Public Works - Highway Department		
Phone Number	978-772-8240	Email	djaspersen@ayer.ma.us
Responsibilities	Site inspections, MS4 maintenance		

Name		Title	GIS Intern
Department	Public Works		
Phone Number	978-772-8240	Email	
Responsibilities	MS4 mapping		

Name	Mark Archambault	Title	Town Planner
Department	Planning		
Phone Number	978-772-8218	Email	
Responsibilities	Assists Stormwater Authority implementing Stormwater Bylaw		

Name	Planning Board	Title	
Department			
Phone Number	978-772-8218	Email	
Responsibilities	Designated Stormwater Authority per Ayer NPDES Phase II Stormwater Bylaw		

Add SWMP Member

Receiving Waters

The following table lists all receiving waters, impairments and number of outfalls discharging to each waterbody segment.

OR

The information can be found in the following document or at the following web address:

Waterbody segment that receives flow from the MS4	Number of outfalls into receiving water segment	Chloride	Chlorophyll-a	Dissolved Oxygen/ DO Saturation	Nitrogen	Oil & Grease/ PAH	Phosphorus	Solids/ TSS/ Turbidity	E. coli	Enterococcus	Other pollutant(s) causing impairments
Flannagan Pond	15	☐	☐	☐	☐	☐	☐	☐	☐	☐	Non-native aquatic plants Curly-leaf Pondweed Fanwort
Tributary to Flannagan Pond	5	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Sandy Pond	6	☐	☐	☐	☐	☐	☐	☐	☐	☐	Non-native aquatic plants Fanwort
Long Pond	4	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Tributary to Long Pond	7	☐	☐	☐	☐	☐	☐	☐	☐	☐	
School House Pond	4	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Tributary to School House Pond	8	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Tributary to Nashua River (Segment MA81-05)	8	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Tributary to Nashua River (Segment MA81-06)	3	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Bowers Brook	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Willow Brook	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Pine Meadow Pond	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Tributary to Balch Pond	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	
James Brook	6	☐	☐	☒	☐	☐	☐	☐	☒	☐	

Tributary to James Brook	21	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Nonacoicus Brook	3	☐	☐	☒	☐	☐	☐	☐	☐	☐	

Waterbody segment that receives flow from the MS4	**Number of outfalls into receiving water segment**	**Chloride**	**Chlorophyll-a**	**Dissolved Oxygen/ DO Saturation**	**Nitrogen**	**Oil & Grease/ PAH**	**Phosphorus**	**Solids/ TSS/ Turbidity**	**E. coli**	**Enterococcus**	**Other pollutant(s) causing impairments**
Tributary to Nonacoicus Brook	9	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Grove Pond	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	Non-native aquatic plants, aquatic plants (macrophytes), Mercury in Fish Tissue, Arsenic, DEHP (Di-sec-octyl phthalate), Polycyclic Aromatic Hydrocarbons (PAHs) (Aquatic Ecosystems), Sediment Bioassays - Chronic Toxicity Freshwater, Curly-leaf Pondweed, Fanwort, Water Chestnut
Tributary to Grove Pond	6	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Bennetts Brook	6	☐	☐	☐	☐	☐	☐	☐	☒	☐	
Tributary to Bennetts Brook	10	☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
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Eligibility: Endangered Species and Historic Properties

*Reminder: The proper consultations and updates to the SWMP must be conducted for construction projects related to your permit compliance where Construction General Permit (CGP) coverage, which requires its own endangered species and history preservation determination, is NOT being obtained.

Attachments:

- ☒ The results of Appendix C U.S. Fish and Wildlife Service endangered species screening determination
- ☒ The results of the Appendix D historic property screening investigations
- ☐ If applicable, any documents from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO), or other Tribal representative to mitigate effects

These attachments are required within one year of the permit effective date and are:

- ☐ Attached to this document (document names listed below)
- ☐ Publicly available at the website listed below

Under what criterion did permittee determine eligibility for ESA?

☐ Criterion A ☐ Criterion B ☒ Criterion C

Under what criterion did permittee determine eligibility for Historic Properties?

☒ Criterion A ☐ Criterion B ☐ Criterion C ☐ Criterion D (NH only)

Below add any additional measures for structural controls that you're required to do through consultation with U.S. Fish and Wildlife Service (if applicable):

N/A

Below add any additional measures taken to avoid or minimize adverse impacts on places listed, or eligible for listing, on the NRHP, including any conditions imposed by the SHPO or THPO (if applicable):

N/A

MCM 1
Public Education and Outreach
Permit Part 2.3.2

Objective: The permittee shall implement an education program that includes educational goals based on stormwater issues of significance within the MS4 area. The ultimate objective of a public education program is to increase knowledge and change behavior of the public so that the pollutants in stormwater are reduced.

Examples and Templates:
EPA's Stormwater Education Toolbox
MassDEP's Stormwater Outreach Materials

Other templates relevant to MCM 1 can be found here: https://www.epa.gov/npdes-permits/stormwater-tools-new-england#peo

BMP: Resident Message 1 of Permit Term

BMP Number (Optional) **1**

Document Name and/or Web Address: NOI

Description:

Web Page - Distribute educational announcement related to effects of lawn care on water quality to web page, eblast, and social media

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Create one announcement, track social media activity and pond water quality monitoring

Message Date(s): 2020

BMP: Business Message 1 of Permit Term

BMP Number (Optional) **2**

Document Name and/or Web Address: NOI

Description:

Brochures/Pamphlets - Stormwater educational pamphlets related to grease shall be distributed to restaurant owners

Targeted Audience: Businesses, institutions and commercial facilities

Responsible Department/Parties: DPW

Measurable Goal(s):

Distribute one pamphlet, inspect storm drainage near restaurants for related pollutants

Message Date(s): 2019

BMP: Developer Message 1 of Permit Term

BMP Number (Optional) **3**

Document Name and/or Web Address: NOI

Description:

Brochures/Pamphlets - Distribute pamphlet to active developments regarding NPDES requirements for construction sites

Targeted Audience: Developers (construction)

Responsible Department/Parties: DPW

Measurable Goal(s):

Distribute one pamphlet, inspect active developments for compliance

Message Date(s): 2019

BMP: Industrial Facilities Message 1 of Permit Term

BMP Number (Optional) **4**

Document Name and/or Web Address: NOI

Description:

Meeting - Host meeting. Present material on NPDES Permit requirements for Town and private stewards

Targeted Audience: Industrial facilities

Responsible Department/Parties: DPW

Measurable Goal(s):

Host one meeting, track around report submittals and inspect sites for stewardship.

Message Date(s): 2023

BMP: Resident Message 2 of Permit Term

BMP Number (Optional) **5**

Document Name and/or Web Address: NOI

Description:

Brochures/Pamphlets - Benefits of onsite infiltration of stormwater including rain gardens and how to create your own

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Track pamphlets taken/distributed, track rain gardens installed by private owners by asking for notification.

Message Date(s): 2022

BMP: Business Message 2 of Permit Term

BMP Number (Optional) **6**

Document Name and/or Web Address: NOI

Description:

Web Page - Create notification related to O&M of private drainage

Targeted Audience: Businesses, institutions and commercial facilities

Responsible Department/Parties: DPW

Measurable Goal(s):

Create one notification and distribute via web page, eblast, and social media, track social media activity. Contact 3 audience members to discuss message and their implementation.

Message Date(s): 2021

BMP: Developer Message 2 of Permit Term

BMP Number (Optional) **7**

Document Name and/or Web Address: NOI

Description:

Web Page - Create hyperlinks to NPDES CGP, and Town Stormwater bylaws information on website

Targeted Audience: Developers (construction)

Responsible Department/Parties: DPW

Measurable Goal(s):

Create hyperlinks on stormwater web page, planning board web page, and other related pages. Ask developers

if received and helpful.

Message Date(s): 2021

BMP: Industrial Facilities Message 2 of Permit Term

BMP Number (Optional) **8**

Document Name and/or Web Address: NOI

Description:

Brochures/Pamphlets - Distribute pamphlet to major industries regarding proper maintenance of parking facilities

Targeted Audience: Industrial facilities

Responsible Department/Parties: DPW

Measurable Goal(s):

Create one pamphlet, distribute copies to major industries. Speak to 3 industries if this is helpful and has items that can be implemented.

Message Date(s): 2020

BMP: Pet Waste in Impaired Water Areas

BMP Number (Optional) **9**

Document Name and/or Web Address: TBD

Description:

Message Regarding Pet Waste in applicable impaired water areas (See TMDL and Water Quality Limited Waters section of the SWMP)

Targeted Audience: Residents

Responsible Department/Parties: DPW/Conservation

Measurable Goal(s):

Annual message completed. Inspect areas for pet waste before and after notice.

Message Date(s):

BMP: Educational Materials with Dog License

BMP Number (Optional) **10**

Document Name and/or Web Address: TBD

Description:

Disseminate educational materials to dog owners at the time of issuance or renewal of dog license in accordance with Appendix H Part III

Targeted Audience: Residents

Responsible Department/Parties: DPW/Town Clerk

Measurable Goal(s):

Completed by end of Year 1.

Message Date(s): Per license renewal or issuance

BMP: Educational Materials to Septic Systems Owners

BMP Number (Optional) **11**

Document Name and/or Web Address: TBD

Description:

Disseminate educational materials to septic system owners in bacteria impaired water areas in accordance with Appendix H Part III

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Annual materials distributed

Message Date(s):

BMP: Grass Clipping and Fertilizer Use/Disposal

BMP Number (Optional) **12**

Document Name and/or Web Address: TBD

Description:

Message Regarding proper use and disposal of grass clippings and encourages the proper use of slow-release and phosphorus-free fertilizer in applicable impaired water areas (See TMDL and Water Quality Limited Waters section of the SWMP)

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Message sent every April/May

Message Date(s):

BMP: Leaf Waste

BMP Number (Optional) _____

Document Name and/or Web Address: TBD

Description:

Distribute an annual message in the Fall (August/September/October) encouraging the proper disposal of leaf litter in the areas with Phosphorus impaired waters (See TMDL and Water Quality Limited Waters section of the SWMP)

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Annual message completed

Message Date(s):

Add BMP

MCM 2
Public Involvement and Participation
Permit Part 2.3.3

Objective: The permittee shall provide opportunities to engage the public to participate in the review and implementation of the permittee's SWMP.

BMP: Public Review of Stormwater Management Program

BMP Number (Optional) **1**

Location of Plan and/or Web Address: https://www.ayer.ma.us/stormwater-department

Responsible Department/Parties: DPW/Information Technology

Measurable Goal(s):

Stormwater Management Plan is publicly available.

BMP: Public Participation in Stormwater Management Program Development

BMP Number (Optional) **2**

Description:

SWMP Review

Responsible Department/Parties: DPW

Measurable Goal(s):

Annual public input provided.

BMP: Public Participation

BMP Number (Optional) **3**

Document Name and/or Web Address: NOI

Description:

Cleanups - Roadside/General

Responsible Department/Parties: Recycling Committee

Measurable Goal(s):

Perform annual roadside cleanup called "A Cleaner Ayer"

BMP: Public Participation

BMP Number (Optional) **4**

Document Name and/or Web Address: NOI

Description:

Hotline/webline - reporting problems/violations

Responsible Department/Parties: DPW

Measurable Goal(s):

Maintain the existing stormwater hotline

BMP: Public Participation

BMP Number (Optional) **5**

Document Name and/or Web Address: NOI

Description:

Household haz. waste/used oil collection

Responsible Department/Parties: Recycling Committee

Measurable Goal(s):

Continue to promote Devens Regional Household Hazardous Products Collection Program and track the number of users/pounds of waste. Note the Ayer transfer station accepts used oil

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BMP: Public Participation

BMP Number (Optional) **6**

Document Name and/or Web Address: NOI

Description:

Mercury Waste Collection for Residents

Responsible Department/Parties: Recycling Committee/DPW

Measurable Goal(s):

Continue to promote mercury waste collection boxes through posters and DPW web page

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BMP: Public Participation

BMP Number (Optional) **7**

Document Name and/or Web Address: NOI

Description:

Stormwater Committee/Task Force

Responsible Department/Parties: Stormwater Committee

Measurable Goal(s):

Review and update bylaws.

BMP: Public Participation

BMP Number (Optional) **8**

Document Name and/or Web Address: NOI

Description:

Public Meeting - Stormwater

Responsible Department/Parties: DPW

Measurable Goal(s):

One meeting annually to keep public up-to-date with progress of the Town's stormwater program

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BMP: [BMP name here]

BMP Number (Optional)

Document Name and/or Web Address:

MCM 3
Illicit Discharge Detection and Elimination (IDDE) Program

Permit Part 2.3.4

Objective: The permittee shall implement an IDDE program to systematically find and eliminate illicit sources of non-stormwater discharges to its municipal separate storm sewer system and implement procedures to prevent such discharges.

Examples and Templates:
IDDE Program Template and SOPs

Other templates relevant to IDDE can be found here: https://www.epa.gov/npdes-permits/stormwater-tools-new-england#idde

BMP: IDDE Legal Authority

BMP Number (Optional) _____ **Completed** (by May 1, 2008) ☐

Ordinances Link or Reference: https://www.ayer.ma.us/town-bylaws#anchor_xlviii

Department Responsible for Enforcement: DPW

BMP: Sanitary Sewer Overflow (SSO) Inventory

BMP Number (Optional) _____ **Completed** (by year 1) ☐

Document Name and/or Web Address: WWTP NPDES Permit SSO Reporting

Description:

SSOs are reported by the Ayer Wastewater Division and records are kept in accordance with the WWTP NPDES Discharge Permit and MassDEP/EPA SSO requirements. SSOs will be reported in the Annual Report for this NPDES Permit.

Responsible Department/Parties: DPW

Measurable Goal(s):

Annually track and report the following SSO information: the location; a clear statement of whether the discharge entered a surface water directly or entered the MS4; date(s) and time(s) of each known SSO occurrence; estimated volume(s) of the occurence; description of the occurrence indicating known or suspected cause(s); mitigation and corrective measures completed with dates implemented; and mitigation and corrective measures planned with implementation schedules. Update inventory as needed.

SSO Reporting:

In the event of an overflow or bypass, a notification must be reported within 24 hours by phone to MassDEP, EPA, and other relevant parties. Follow up the verbal notification with a written report following MassDEP's Sanitary Sewer Overflow (SSO)/Bypass notification form within 5 calendar days of the time you become aware of the overflow, bypass, or backup.

The MassDEP contacts are:	The EPA contacts are:
Northeast Region (978) 694-3215 205B Lowell Street Wilmington, MA 01887 Central Region (508) 792-7650 8 New Bond Street Worcester, MA 01606 Southeast Region (508) 946-2750 20 Riverside Drive Lakeville, MA 02347 Western Region (413) 784-1100 436 Dwight Street Springfield, MA 01103 24-hour Emergency Line 1-888-304-1133	EPA New England (617) 918-1510 5 Post Office Square Boston, MA 02109

BMP: Map of Storm Sewer System

BMP Number (Optional) _____ **Phase I Completed** (by year 2) ☒ **Phase II Completed** (by year 10) ☐

Document Location and/or Web Address: https://www.ayer.ma.us/stormwater-department

Description:

Create map and update during IDDE program completion

Responsible Department/Parties: DPW

Measurable Goal(s):

Map 100% of outfalls and receving waters, open channel conveyances, interconnections with other MS4s and other storm sewer systems, municipally-owned stormwater treatment structures, waterbodies identified by name and indication of all use impairments, and initial catchment delineations within 2 years of the permit's effective date. Map 100% of outfall spatial locations, pipes, manholes, catch basins, refined catchment delineations, municipal sanitary sewer system (if available), and municipal combined sewer system (if applicable) within 10 years of the permit's effective date.

BMP: IDDE Program

BMP Number (Optional) _____ **Written Document Completed** (by year 1) ☐

Document Name and/or Web Address: Ayer IDDE Program

Description:

Create written IDDE program. Implement catchment investigations according to program and permit conditions. Conduct dry weather screening in accordance with outfall screening procedure and permit conditions. Conduct wet weather screening in accordance with outfall screening procedure. Conduct ongoing dry weather and wet weather screening (as necessary).

Responsible Department/Parties: DPW

Measurable Goal(s):

Conduct 100% of outfall screening on High and Low Priority Outfalls within 3 years of the permit's effective date. Complete catchment investigations for 100% of the Problem Outfalls within 7 years of the permit's effective date. Complete 100% of all catchment investigations within 10 years of the permit's effective date.

The outfall/interconnection inventory and initial ranking and the dry weather outfall and interconnection screening and sampling results can be found:

Ayer DPW

BMP: Employee Training

BMP Number (Optional) _____

Description:

Train employees on IDDE implementation

Responsible Department/Parties: DPW

Measurable Goal(s):

Training occurs annually.

BMP: Outfall Ranking for Imparied Waters

BMP Number (Optional) _____ **Completed** ☐

Document Name and/or Web Address: IDDE Plan

Description:

Rank outfalls to the impaired receiving waters (listed in TMDLs and Water Quality Limited Waters section of the SWMP) as high priority for IDDE implementation in the initial outfall ranking.

Responsible Department/Parties: DPW

Measurable Goal(s):

Outfalls ranked as high priority in initial outfall ranking.

Add BMP

MCM 4
Construction Site Stormwater Runoff Control
Permit Part 2.3.5

Objective: The objective of an effective construction stormwater runoff control program is to minimize or eliminate erosion and maintain sediment on site so that it is not transported in stormwater and allowed to discharge to a water of the U.S. through the permittee's MS4.

Examples and Templates:
Examples and templates relevant to MCM 4, including model ordinances and site inspection templates, can be found here: https://www.epa.gov/npdes-permits/stormwater-tools-new-england#csrc

BMP: Sediment and Erosion Control Ordinance

BMP Number (Optional) _____ **Completed** (by May 1, 2008) ☐

Ordinances Link or Reference: https://www.ayer.ma.us/town-bylaws#anchor_xlvii

Department Responsible for Enforcement: Planning Board

BMP: Site Plan Review Procedures

BMP Number (Optional) _____ **Written procedures completed** (by year 1) ☐

Document Name and/or Web Address: TBD

Description:

Complete written procedures of site plan review and begin implementation.

Responsible Department/Parties: DPW/Planning

Measurable Goal(s):

Conduct site plan review of 100% of projects according to the procedures outlined above.

BMP: Site Inspections and Enforcement of Sediment and Erosion Control Measures Procedures

BMP Number (Optional) _____ **Completed** (by year 1) ☒

Document Name and/or Web Address: Stormwater Regulations for NPDES Phase II Bylaw

Description:

Complete written procedures of site inspections and enforcement procedures.

Responsible Department/Parties: DPW

Measurable Goal(s):

Inspect 100% of construction sites as outlined in the above document and take enforcement actions as needed.

BMP: Waste Control (IDDE Bylaw)

BMP Number (Optional) _____ **Completed** ☒

Document Name and/or Web Address: https://www.ayer.ma.us/town-bylaws#anchor_xlviii

Description:

Adoption of requirements to control wastes, including but not limited to, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes

Responsible Department/Parties: DPW

Measurable Goal(s):

Town has adopted a IDDE Bylaw

BMP: Town Bylaw Review and Update

BMP Number (Optional) _____ **Completed** ☐

Document Name and/or Web Address: TBD

Description:

Town shall review its current NPDES Phase II Stormwater and IDDE Bylaws to determine if any revisions are required. Note a revision is required per Appendix H related to Nashua River (Segment MA81-05) with phosphorus impairment.

Responsible Department/Parties: DPW/Planning

Measurable Goal(s):

Review and, if necessary, revise bylaws at Fall Town Meeting in calendar year 2019.

Add BMP

MCM 5
Post Construction Stormwater Management in New Development and Redevelopment

Permit Part 2.3.6

Objective: The objective of an effective post construction stormwater management program is to reduce the discharge of pollutants found in stormwater to the MS4 through the retention or treatment of stormwater after construction on new or redeveloped sites and to ensure proper maintenance of installed stormwater controls.

Examples and Templates:
Examples and templates relevant to MCM 5, including model ordinances and bylaw review templates and guidance can be found here: https://www.epa.gov/npdes-permits/stormwater-tools-new-england#pcsm

BMP: Post-Construction Ordinance

BMP Number (Optional) _____ **Completed** (by year 2) ☐

Town Ordinances Link or Reference: TBD

Department Responsible for Enforcement: TBD

BMP: Street Design and Parking Lot Guidelines Report

BMP Number (Optional) _____ **Completed** (by year 4) ☐

Document Name and/or Web Address: TBD

Description:

Develop a report assessing requirements that affect the creation of impervious cover. The assessment will help determine if changes to design standards for streets and parking lots can be modified to support low impact design options.

Responsible Department/Parties: DPW/Planning

Measurable Goal(s):

Recommendations are implemented by year 4 with progress reported annually.

BMP: Green Infrastructure Report

BMP Number (Optional) _____ **Completed** (by year 4) ☐

Document Name and/or Web Address:

Description:

Develop a report assessing existing local regulations to determine the feasibility of making green infrastructure practices allowable when appropriate site conditions exist.

Responsible Department/Parties: DPW/Planning

Measurable Goal(s):

Recommendations are implemented by year 4 with progress reported annually.

BMP: List of Municipal Retrofit Opportunities

BMP Number (Optional) _____ **Completed** (by year 4) ☐

Document Name and/or Web Address: TBD

Description:

Identify at least 5 permittee-owned properties that could be modified or retrofitted with BMPs to reduce impervious areas and update annually.

Responsible Department/Parties: DPW/Planning/Building

Measurable Goal(s):

The list is completed by year 4 and updated as needed.

BMP: As-built Plans for On-Site Stormwater Control

BMP Number (Optional) _____ **Completed** ☐

Document Name and/or Web Address: TBD

Description:

Create procedures to require submission of as-built drawings and ensure long term operation and maintenance.

Responsible Department/Parties: DPW/Planning/Building

Measurable Goal(s):

Require submission of as-built plans for Site Plan Review, Subdivisions, and Projects that apply under the Stormwater Bylaw. Conduct site inspection, review reports, and conduct enforcement for long-term operation and maintenance.

BMP: Stormwater Management in Impaired Water Areas of New and Redevelopment

BMP Number (Optional) _____ **Completed** ☐

Document Name and/or Web Address: TBD

Description:

Stormwater management systems designed on commercial and industrial land use area draining to the water quality limited water body (see TMDL and Water Quality Limited Water Bodies section of SWMP for target areas) shall incorporate designs that allow for shutdown and containment where appropriate to isolate the system in the event of an emergency spill or other unexpected event.

Responsible Department/Parties: DPW/Planning

Measurable Goal(s):

DPW and Town Planner determine how to incorporate into Town review procedures and/or bylaw(s) and implement the requirement

---

BMP: Nitrogen Reduction in Impaired Water Areas of New and Redevelopment

BMP Number (Optional) _____ **Completed** ☐

Document Name and/or Web Address: TBD

Description:

Retrofit inventory and priority ranking under 2.3.6.1.b. shall include consideration of BMPs to reduce nitrogen discharges (Nashua River (Segment MA81-05) target area)

Responsible Department/Parties: DPW

Measurable Goal(s):

Complete retrofit inventory and priority ranking.

BMP: Infiltration BMPs in Impaired Water Areas of New and Redevelopment

BMP Number (Optional) _____ **Completed** ☐

Document Name and/or Web Address: TBD

Description:

Retrofit inventory and priority ranking under 2.3.6.1.b. shall include consideration of BMPs that infiltrate stormwater where feasible for phosphorus impaired area (Nashua River (Segment MA81-05) target area)

Responsible Department/Parties: DPW

Measurable Goal(s):

Completed inventory and priority ranking by year 4

BMP: Structural BMPs in Impaired Water Areas of New and Redevelopment

BMP Number (Optional) _____ **Completed** ☐

Document Name and/or Web Address: TBD

Description:

Evaluate all permittee-owned properties identified as presenting retrofit opportunities or areas for structural BMP installation under Permit part 2.3.6.d.ii or identified in the Phosphorus Source Identification Report that are within the drainage area of the impaired water or its tributaries (Nashua River (Segment MA81-05) for phosphorus impairment.

Also, complete a listing of planned structural BMPs and a plan and schedule for implementation.

Responsible Department/Parties: DPW

Measurable Goal(s):

Complete by year 5

BMP: Structural BMP

BMP Number (Optional) _____ **Completed** ☐

Document Name and/or Web Address:

Description:

Responsible Department/Parties:

Measurable Goal(s):

Add BMP

MCM 6
Good Housekeeping and Pollution Prevention for Permittee Owned Operations

Permit Part 2.3.7

Objective: The permittee shall implement an operations and maintenance program for permittee-owned operations that has a goal of preventing or reducing pollutant runoff and protecting water quality from all permittee-owned operations.

Examples and Templates:
Examples and templates relevant to MCM 6, including SOP templates for catch basin cleaning, street sweeping, vehicle maintenance, parks and open space management, winter deicing, and Stormwater Pollutoin Prevention Plans can be found here: https://www.epa.gov/npdes-permits/stormwater-tools-new-england#gh

PERMITTEE OWNED FACILITIES

BMP: Parks and Open Spaces Operations and Maintenance Procedures

BMP Number (Optional) _____ **Written Document Completed** (by year 2) ☐

Document Name and/or Web Address: TBD

Description:

Inventory and create written O&M procedures including all requirements contained in 2.3.7.a.ii for parks and open spaces

Responsible Department/Parties: DPW/Parks/Building/Facilities/Fire/Police/Library/Conservation

Measurable Goal(s):

Implement the SOP listed above on 100% of the parks and open spaces. SOP shall be developed by Responsible Deptartments within 2 years of the permit effective date. DPW shall lead the creation of SOP.

Properties List (Optional)**:**

BMP: Buildings and Facilities Operations and Maintenance Procedures

BMP Number (Optional) _____ **Written Document Completed** (by year 2) ☐

Document Name and/or Web Address: TBD

Description:

Inventory and create written O&M procedures including all requirements contained in 2.3.7.a.ii for buildings and facilities

Responsible Department/Parties: DPW/Parks/Facilities/Conservation

Measurable Goal(s):

Implement the SOP listed above on 100% of buildings and facilities. Identify work completed in association with SOP in annual report.

Properties List (Optional)**:**

BMP: Vehicles and Equipment Operations and Maintenance Procedures

BMP Number (Optional) _____ **Written Document Completed** (by year 2) ☐

Document Name and/or Web Address: TBD

Description:

Inventory and create written O&M procedures including all requirements contained in 2.3.7.a.ii for vehicles and equipment

Responsible Department/Parties: DPW/Parks/Facilities/Conservation

Measurable Goal(s):

Implement the SOP listed above for 100% of vehicles and equipment according to the above document. Identify work completed in association with SOP in Annual Report.

Properties List (Optional)**:**

INFRASTRUCTURE

BMP: Infrastructure Operations and Maintenance Procedures

BMP Number (Optional) _____ **Written Procedure Completed** (by year 2) ☐

Document Name and/or Web Address: TBD

Description:

Establish and implement program for repair and rehabilitation of MS4 infrastructure.

Responsible Department/Parties: DPW

Measurable Goal(s):

DPW to complete written procedure. Infrastructure is maintained to ensure proper function in accordance with the procedures in the written program.

BMP: Catch Basin Cleaning Program

BMP Number (Optional) _____ **Written Procedure Completed** (by year 1) ☐

Document Name and/or Web Address: TBD

Description:

Establish schedule for catch basin cleaning such that each catch basin is no more than 50% full and clean catch basins on that schedule.

Responsible Department/Parties: DPW

Measurable Goal(s):

All catch basins are cleaned in accordance to the document above such that no catch basin is more than 50% full at any given time. DPW to create written procedure by end of Year 1.

BMP: Street Sweeping Program

BMP Number (Optional) _____ **Written Procedure Completed** (by year 1) ☐

Document Name and/or Web Address: TBD

Description:

Sweep all streets and permitee-owned parking lots in accordance with permit conditions.

Responsible Department/Parties: DPW

Measurable Goal(s):

Annually sweep 100% of all streets and 50% of all municipal parking lots in accordance with the schedule listed above.

BMP: Winter Road Maintenance Program

BMP Number (Optional) _____ **Written Procedure Completed** (by year 1) ☐

Document Name and/or Web Address: TBD

Description:

Establish and implement a program to minimize the use of road salt.

Responsible Department/Parties: DPW

Measurable Goal(s):

Evaluate at least one salt/chloride alternative for use in the municipality.

BMP: Stormwater Treatment Structures Inspection and Maintenance Procedures

BMP Number (Optional) _____ **Completed** (by year 1) ☐

Document Name and/or Web Address: TBD

Description:

Establish and implement inspection and maintenance procedures and frequencies.

Responsible Department/Parties: DPW/Conservation

Measurable Goal(s):

Inspect and maintain 100% of treatment structures to ensure proper function.

BMP: SWPPP

BMP Number (Optional) _____ **Completed** (by year 2) ☐

Document Name and/or Web Address: TBD

Description:

Create SWPPPs for maintenance garages, transfer stations, and other waste-handling facilities.

Responsible Department/Parties: DPW

Measurable Goal(s):

Develop and implement SWPPPs for 100% of facilities.

BMP: Additional Street Sweeping in Target Areas

BMP Number (Optional) _____ **Completed** ☐

Document Name and/or Web Address: TBD

Description:

Increase street sweeping frequency of all municipal owned streets and parking lots to a schedule to target areas with potential for high pollutant loads (target areas listed in TMDL and Water Quality Limited Bodies section of the SWMP)

Responsible Department/Parties: DPW

Measurable Goal(s):

Create schedule and implement increased street sweeping in the target areas

---

BMP: Additional Catch Basin Cleaning in Target Areas

BMP Number (Optional) _____ **Completed** ☐

Document Name and/or Web Address: TBD

Description:

Inspect and maintain catch basins to ensure that no sump shall be more than 50 percent full in target areas with potential for high pollutant loads (target areas listed in TMDL and Water Quality Limited Bodies section of the SWMP)

Responsible Department/Parties: DPW

Measurable Goal(s):

Complete increased inspection and maintenance of specified catch basins.

BMP: Management of Grass Cuttings and Leaf Litter

BMP Number (Optional) _____ **Completed** ☐

Document Name and/or Web Address: TBD

Description:

Establish procedures to properly manage grass cuttings and leaf litter on permittee property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces

Responsible Department/Parties: DPW

Measurable Goal(s):

Establish and implement procedures by end of Year 2

Add BMP

Annual Evaluation

Year 1 Annual Report

Document Name and/or Web Address:

Year 2 Annual Report

Document Name and/or Web Address:

Year 3 Annual Report

Document Name and/or Web Address:

Year 4 Annual Report

Document Name and/or Web Address:

Year 5 Annual Report

Document Name and/or Web Address:

Year X Annual Report

Document Name and/or Web Address:

Add a Year

TMDLs and Water Quality Limited Waters

Select the applicable Impairment(s) and/or TMDL(s).

Impairment(s)

☒ Bacteria/Pathogens ☐ Chloride ☐ Nitrogen ☒ Phosphorus

☒ Solids/oil/grease (hydrocarbons)/metals

TMDL(s)

In State:

☐ Assabet River Phosphorus ☐ Bacteria and Pathogen ☐ Cape Cod Nitrogen

☐ Charles River Watershed Phosphorus ☐ Lake and Pond Phosphorus

Out of State:

☐ Bacteria and Pathogen ☐ Metals ☐ Nitrogen ☐ Phosphorus

Clear Impairments and TMDLs

Bacteria/Pathogens

Combination of Impaired Waters Requirements and TMDL Requirements as Applicable

Applicable Receiving Waterbody(ies)	**TMDL Name** (if applicable)	**Add/Delete Row**
James Brook, Bennetts Brook, Nashua River (Segment MA81-05)	N/A	+ -

Annual Requirements Beginning Year 1

Rank outfalls to these receiving waters as high priority for IDDE implementation in the initial outfall ranking

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 3 - IDDE, BMP: Outfall Ranking for Imparied Waters

Public Education and Outreach

(Public education messages can be combined with other public education requirements as applicable (see Appendix H and F for more information))

Annual message encouraging the proper management of pet waste, including noting any existing ordinances where appropriate

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 1 - Public Education, BMP: Pet Waste in Impaired Water Areas

---

Permittee or its agents disseminate educational material to dog owners at the time of issuance or renewal of dog license, or other appropriate time

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 1 - Public Education, BMP: Educational Materials with Dog License

---

Provide information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 1 - Public Education, BMP: Educational Materials to Septic Systems Owners

Solids, Oil and Grease (Hydrocarbons), or Metals

Combination of Impaired Requirements and TMDL Requirements as Applicable

Applicable Receiving Waterbody(ies)	**TMDL Name** (if applicable)	**Add/Delete Row**
Grove Pond	N/A	+ -

Annual Requirements Beginning Year 1

Rank outfalls to these receiving waters as high priority for IDDE implementation in the initial outfall ranking

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 3 - IDDE, BMP: Outfall Ranking for Imparied Waters

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

---

Increase street sweeping frequency of all municipal owned streets and parking lots to a schedule to target areas with potential for high pollutant loads

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 6 - Good Housekeeping, BMP: Additional Street Sweeping in Target Areas

---

Prioritize inspection and maintenance for catch basins to ensure that no sump shall be more than 50 percent full; Clean catch basins more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 6 - Good Housekeeping, BMP: Additional Catch Basin Cleaning in Target Areas

Requirements Due by Year 2

Stormwater Management in New Development and Redevelopment

Stormwater management systems designed on commercial and industrial land use area draining to the water quality limited water body shall incorporate designs that allow for shutdown and containment where appropriate to isolate the system in the event of an emergency spill or other unexpected event

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 5 - Post Construction Stormwater Management in New Development and Redevelopment, BMP: Stormwater Management in Impaired Water Areas of New and Redevelopment

Phosphorus

Combination of Impaired Waters Requirements and TMDL Requirements as Applicable

Applicable Receiving Waterbody(ies)	TMDL Name (if applicable)	Add/Delete Row
Nashua River (Segment MA81-05)	N/A	+ -

Annual Requirements Beginning Year 1

Rank outfalls to these receiving waters as high priority for IDDE implementation in the initial outfall ranking

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 3 - IDDE, BMP: Outfall Ranking for Imparied Waters

Public Education and Outreach

(Public education messages can be combined with other public education requirements as applicable (see Appendix H and F for more information))

Distribute an annual message in the spring(April/May) that encourages the proper use and disposal of grass clippings and encourages the proper use of slow-release and phosphorus-free fertilizers

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 1 - Public Education, BMP: Grass Clipping and Fertilizer Use/Disposal

---

Distribute an annual message in the summer (June/July) encouraging the proper management of pet waste, including noting any existing ordinances where appropriate

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 1 - Public Education, BMP: Pet Waste in Impaired Water Areas

---

Distribute an annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 1 - Public Education, BMP: Leaf Waste

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

---

Increase street sweeping frequency of all municipal owned streets and parking lots subject to Permit part 2.3.7.a.iii.(c) to a minimum of two times per year (spring and fall)

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 6 - Good Housekeeping, BMP: Additional Street Sweeping in Target Areas

---

Establish procedures to properly manage grass cuttings and leaf litter on permittee property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 6 - Good Housekeeping, BMP: Management of Grass Cuttings and Leaf Litter

Stormwater Management in New Development and Redevelopment

Retrofit inventory and priority ranking under 2.3.6.1.b. shall include consideration of BMPs to reduce nitrogen discharges

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 5 - Post Construction Stormwater Management in New Development and Redevelopment, BMP: Nitrogen Reduction in Impaired Water Areas of New and Redevelopment

Nitrogen Reduction Tracking BMP

Any structural BMPs listed in Table 3 of Attachment 1 to Appendix H already existing or installed in the regulated area by the permittee or its agents shall be tracked and the permittee shall estimate the phosphorus removal by the BMP consistent with Attachment 1 to Appendix H.

The BMP type, total area treated by the BMP, the design storage volume of the BMP and the estimated phosphorus removed in pass per year by the BMP is found in the following document or website and is updated yearly at a minimum:

SWMP

Requirements Due by Year 2

Stormwater Management in New Development and Redevelopment

The requirement for adoption/amendment of the permittee's ordinance or other regulatory mechanism shall include a requirement that new development and redevelopment stormwater management BMPs be optimized for phosphorus removal

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 4 - Construction Site Stormwater Runoff Control, BMP: Town Bylaw Review and Update

Requirements Due by Year 4

Complete a Phosphorus Source Identification Report

The document name (if attached) and/or web address is/are:

TBD

Stormwater Management in New Development and Redevelopment

Retrofit inventory and priority ranking under 2.3.6.1.b. shall include consideration of BMPs that infiltrate stormwater where feasible

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 5 - Post Construction Stormwater Management in New Development and Redevelopment, BMP: Infiltration BMPs in Impaired Water Areas of New and Redevelopment

Requirements Due by Year 5

Potential Structural BMPs

Evaluate all permittee-owned properties identified as presenting retrofit opportunities or areas for structural BMP installation under Permit part 2.3.6.d.ii or identified in the Phosphorus Source Identification Report that are within the drainage area of the impaired water or its tributaries

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 5 - Post Construction Stormwater Management in New Development and Redevelopment, BMP: Structural BMPs in Impaired Water Areas of New and Redevelopment

---

Complete a listing of planned structural BMPs and a plan and schedule for implementation

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

MCM 5 - Post Construction Stormwater Management in New Development and Redevelopment, BMP: Structural BMPs in Impaired Water Areas of New and Redevelopment

Attachments

MS4 Stormwater Map

Town of AYER Public Works

The map is created from a subset of data from the Ayer Geographic Information System (GIS) database. The Town of Ayer makes no claims, no representations, and no warranties, express or implied, concerning the validity (express or implied), the reliability or the accuracy of the GIS data and GIS data products furnished by the Town, including the implied validity of any uses of such data.

N
W E
S

Nashua River
James Brook
Long Pond
Sandy Pond
Flannagan Pond
Spectacle Pond
Plow Shop Pond
Grove Pond
Nonnacoicus Brook
Washburn River
Nonnacoicus Road

DEP Wetlands

- WETLAND ARCS
- WETLAND POLYGONS
  - BOG
  - DEEP MARSH
  - SHALLOW MARSH
  - MEADOW OR FEN
  - SHRUB SWAMP
  - WOODED SWAMP
- OPEN WATER

0 0.125 0.25 0.5 0.75 1 Miles

TOWN OF AYER, MASSACHUSETTS
STORMWATER MS4 MAP

November 2020

S:\GIS\Ayer GIS Mapping Files\GIS\Systemwide Map - Stormwater.mxd

Legend

- Catch Basin (Private Owner)
- Culvert (Private Owner)
- Manhole (Private Owner)
- Outfall (Private Owner)
- Vortex (Private Owner)
- Catch Basin
- Culvert Inlet/Outlet
- Manhole
- Outfall
- Vortex
- Culvert
- Drain Pipe (Private Owner)
- Drain Pipe
- Open Channel Conveyance
- Private BMP Steward
- Stormwater Basin (Publicly Owned or Maintained)
- Stormwater Basin (Privately Owned or Maintained)
- Town Owned Bioretention/ Rain Gardens
- Initial Catchment Delineations

Impaired Waters (303d Category)

- 2-Attaining Some Uses; Other Uses Not Assessed
- 3-No Uses Assessed
- 4A-Impaired-TMDL is Completed
- 4C-Impairment Not Caused by a Pollutant
- 5-Impaired-TMDL Required

Impaired Rivers (303d Category)

- 2-Attaining Some Uses; Other Uses Not Assessed
- 3-No Uses Assessed
- 4A-Impaired-TMDL is Completed
- 4C-Impairment Not Caused by a Pollutant
- 5-Impaired-TMDL Required

Endangered Species Information

Town of AYER Public Works

IPaC **U.S. Fish & Wildlife Service**

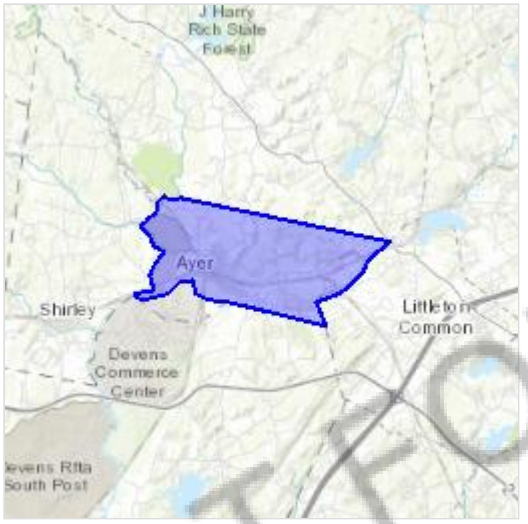
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Middlesex and Worcester counties, Massachusetts



Local office

New England Ecological Services Field Office

(603) 223-2541
(603) 223-0104

70 Commercial Street, Suite 300
Concord, NH 03301-5094

http://www.fws.gov/newengland

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Flowering Plants

NAME	STATUS
Small Whorled Pogonia Isotria medeoloides No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1890	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE

TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

Bald Eagle *Haliaeetus leucocephalus*
Breeds Oct 15 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1626

Black-billed Cuckoo *Coccyzus erythropthalmus*
Breeds May 15 to Oct 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9399

Bobolink *Dolichonyx oryzivorus*
Breeds May 20 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Canada Warbler *Cardellina canadensis*
Breeds May 20 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Prairie Warbler *Dendroica discolor*
Breeds May 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Red-headed Woodpecker *Melanerpes erythrocephalus*
Breeds May 10 to Sep 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Rusty Blackbird Euphagus carolinus
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds elsewhere

Wood Thrush Hylocichla mustelina
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 10 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

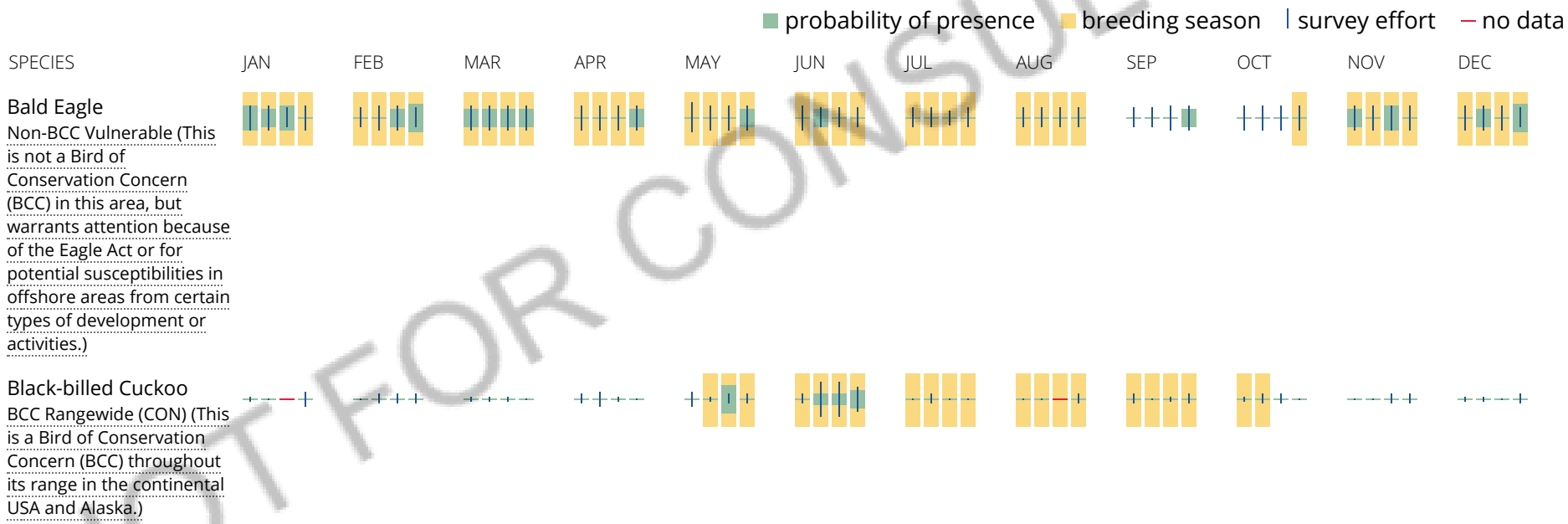
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

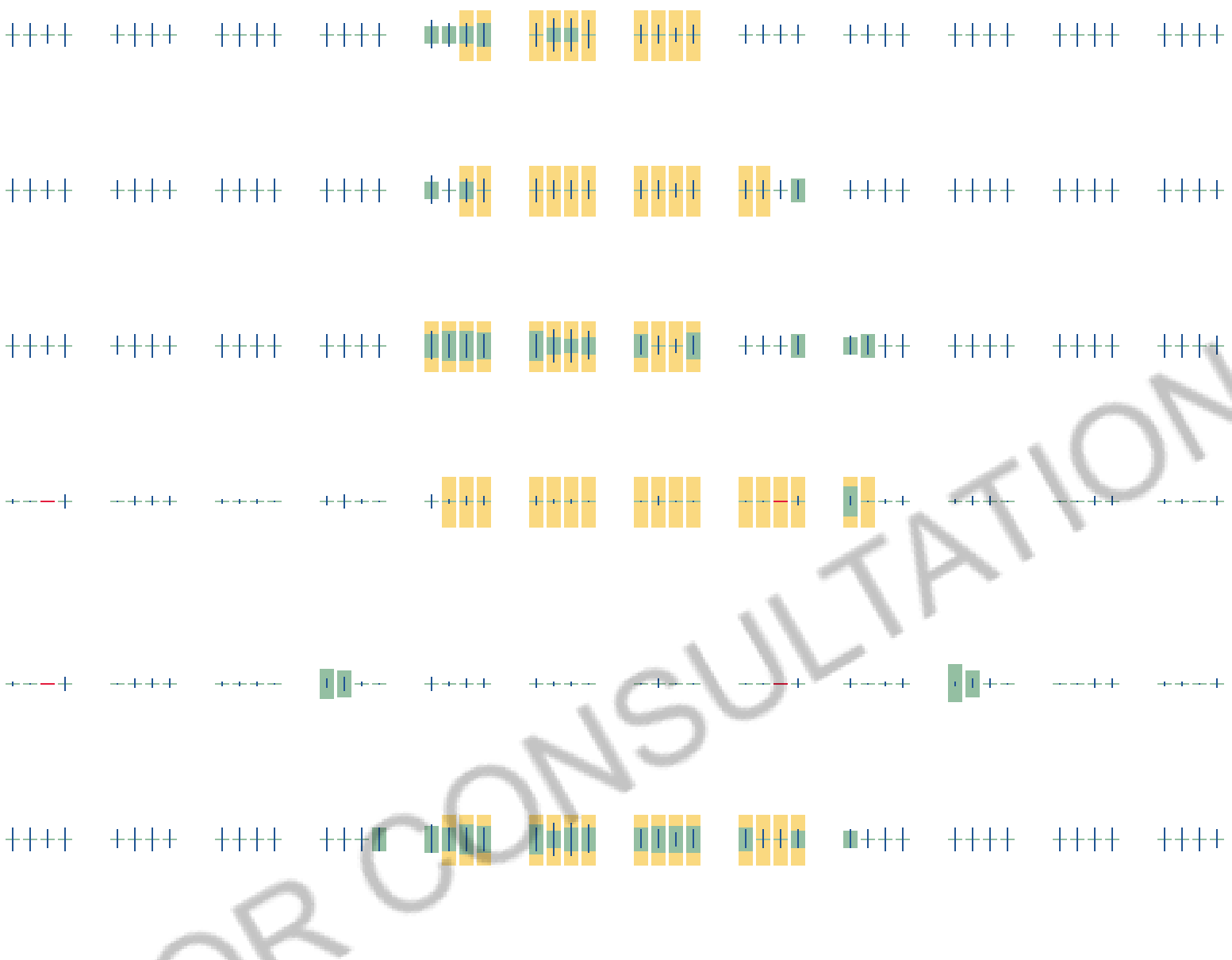
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Bobolink
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Canada Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Prairie Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Red-headed Woodpecker
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Rusty Blackbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Wood Thrush
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure.

To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and

helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

This location overlaps the following National Wildlife Refuge lands:

LAND	ACRES
Oxbow National Wildlife Refuge	1,676.16 acres

(978) 443-4661
(978) 443-2898

MAILING ADDRESS
C/o Eastern Massachusetts Nwr Complex
73 Weir Hill Road
Sudbury, MA 01766-1420

PHYSICAL ADDRESS
C/o Eastern Massachuestts Nwr Complex
73 Weir Hill Road
Sudbury, MA 01766-1420

https://www.fws.gov/refuges/profiles/index.cfm?id=53512

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

- PEM1E
- PEM1Ex
- PEM1Eh
- PEM1/SS1E
- PEM1C
- PEM1Cx
- PEM1Ed
- PEM5F

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1E
- PSS1E
- PFO1/4E
- PSS1/3E
- PSS1/EM1E

PFO1A
PFO1B
PSS3Ba
PSS1/3Ba
PSS1F
PFO1/4B
PSS1Eh
PFO1C

FRESHWATER POND

PUBHh
PUBH
PUBHx

LAKE

L1UBHh
L1UBH

RIVERINE

R2UBH
R2UBHx
R5UBH
R4SBA
R4SBC

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Standard Operating Procedures

Town of AYER Public Works

SOP 1: DRY WEATHER OUTFALL INSPECTION

Introduction

Outfalls from an engineered storm drain system can be in the form of pipes or ditches. Under current and pending regulations, it is important to inspect and document water quality from these outfalls under both dry weather and wet weather conditions. SOP 2, "Wet Weather Outfall Inspection", covers the objectives of that type of inspection. This SOP discusses the dry weather inspection objectives, and how they differ from wet weather inspection objectives.

During a dry weather period, it is anticipated that minimal flow from stormwater outfalls will be observed. Therefore, dry weather inspections aim to characterize any/all flow observed during a dry weather period and identify potential source(s) of an illicit discharge through qualitative testing; further described in SOP 13, "Water Quality Screening in the Field".

Objectives of Dry Weather Inspections

A dry weather period is a time interval during which less than 0.1 inch of rain is observed across a minimum of 72 hours. Unlike wet weather sampling, dry weather inspections are not intended to capture a "first flush" of stormwater discharge, rather they are intended to identify any/all discharges from a stormwater outfall during a period without recorded rainfall. The objective of inspections during a dry weather period is to characterize observed discharges and facilitate detection of illicit discharges.

Visual Condition Assessment

The attached Dry Weather Outfall Inspection Survey is a tool to assist in documenting observations related to the both quantitative and qualitative characteristics of any/all flows conveyed by the structure during a dry period.

For any visual observation discharge from a stormwater outfall, an investigation into the pollution source should occur, but the following are often true:

1. Foam: indicator of upstream vehicle washing activities, or an illicit discharge.
2. Oil sheen: result of a leak or spill.
3. Cloudiness: indicator of suspended solids such as dust, ash, powdered chemicals and ground up materials.
4. Color or odor: Indicator of raw materials, chemicals, or sewage.
5. Excessive sediment: indicator of disturbed earth of other unpaved areas lacking adequate erosion control measures.
6. Sanitary waste and optical enhancers (fluorescent dyes added to laundry detergent): indicators of illicit discharge.

7. Orange staining: indicator of high mineral concentrations.

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 oil will remain intact and move in a swirl pattern; a sheen caused by bacteria will separate and appear "blocky". Bacterial or naturally occurring sheens are usually silver or relatively dull in color and will break up into a number of small patches of sheen. The cause may be presence of iron, decomposition of organic material or presence of certain bacteria. Bacterial sheen is not a pollutant but should be noted.

Many of these observations are indicators of an illicit discharge. Examples of illicit discharges include: cross-connections of sewer services to engineered storm drain systems; leaking septic systems; intentional discharge of pollutants to catch basins; combined sewer overflows; connected floor drains; and sump pumps connected to the system (under some circumstances). Additional guidelines for illicit discharge investigations are included in SOP 10, "Locating Illicit Discharges". If dry weather flow is present at the outfall, and the flow does not appear to be an obvious illicit discharge (e.g. flow is clear, odorless, etc.) attempt to identify the source of flow (e.g. intermittent stream, wetlands drainage, etc.) and document the discharge for future comparison.

Although many of the observations are indicators of illicit discharge it should be noted that several of these indicators may also occur naturally. Orange staining may be the result of naturally occurring iron, and thus unrelated to pollution. Foam can be formed when the physical characteristics of water are altered by the presence of organic materials. Foam is typically found in waters with high organic content such as bog lakes, streams that originate from bog lakes, productive lakes, wetlands, or woody areas. To determine the difference between natural foam and foam cause by pollution, consider the following:

1. Wind direction or turbulence: natural foam occurrences on the beach coincide with onshore winds. Often, foam can be found along a shoreline and/or on open waters during windy days. Natural occurrences in rivers can be found downstream of a turbulent site.
2. Proximity to a potential pollution source: some entities including the textile industry, paper production facilities, oil industries, and fire fighting activities work with materials that cause foaming in water. If these materials are released to a water body in large quantities, they can cause foaming. Also, the presence of silt in water, such as from a construction site can cause foam.
3. Feeling: natural foam is typically persistent, light, not slimy to the touch.
4. Presence of decomposing plants or organic material in the water.

Optical enhancers, fluorescent dyes added to laundry detergent, are typically detected through the use of clean, white cotton pads placed within the discharge for several days, dried then viewed under a UV light. If the cotton pad displays fluorescent patches, optical enhancers are present. Optical enhancers are occasionally visible as a bluish-purple haze on the water surface; however the testing method should be used to confirm the presence of optical enhancers.

The Dry Weather Outfall Inspection Survey includes fields where these and other specific observations can be noted. The inspector shall indicate the presence of a specific water quality indicator or parameter by marking "Yes". If "Yes" is marked, provide additional details in the comments section. If the indictor in question is not present, mark "No".

Within the comments section, provide additional information with regard to recorded precipitation totals, or more detailed descriptions of observations made during the inspection and corrective actions taken.

Measuring Water Quality

Based on the results of the Visual Condition Assessment, it may be necessary to collect additional data about water quality. Water quality samples can be in the form of screening using field test kits and instrumentation, or by discrete analytical samples processed by a laboratory.

Information on selecting and using field test kits and instrumentation is included in SOP 13, "Water Quality Screening in the Field." The Inspection Survey also provides values for what can be considered an appropriate benchmark for a variety of parameters that can be evaluated in the field.

If the results of screening using field test kits indicate that the outfall's water quality exceeds the benchmarks provided, collection of discrete analytical samples should be considered.

Analytical Sample Collection

Sample collection methods may vary based on specific outfall limitations, but shall follow test procedures outlined in 40 CFR 136. A discrete manual or grab sample can classify water at a distinct point in time. These samples are easily collected and used primarily when the water quality of the discharge is expected to be homogeneous, or unchanging, in nature. A flow-weighted composite sample will classify water quality over a measured period of time. These samples are used when the water quality of the discharge is expected to be heterogeneous, or fluctuating, in nature. Grab samples are more common for dry weather outfall inspections due to the time-sensitive nature of the process.

Protocols for collecting a grab sample shall include the following:

1. Do not eat, drink or smoke during sample collection and processing.
2. Do not collect or process samples near a running vehicle.
3. Do not park vehicles in the immediate sample collection area, including both running and non-running vehicles.
4. Always wear clean, powder-free nitrile gloves when handling sample containers and lids.
5. Never touch the inside surface of a sample container or lid, even with gloved hands.
6. Never allow the inner surface of a sample container or lid to be contacted by any material other than the sample water.
7. Collect samples while facing upstream and so as not to disturb water or sediments in the outfall pipe or ditch.

8. Do not overfill sample containers, and do not dump out any liquid in them. Liquids are often added to sample containers intentionally by the analytical laboratory as a preservative or for pH adjustment.
9. Slowly lower the bottle into the water to avoid bottom disturbance and stirring up sediment.
10. Do not allow any object or material to fall into or contact the collected water sample.
11. Do not allow rainwater to drip from rain gear or other surfaces into sample containers.
12. Replace and tighten sample container lids immediately after sample collection.
13. Accurately label the sample with the time and location.
14. Document on the Wet Weather Outfall Inspection Survey that analytical samples were collected, specify parameters, and note the sample time on the Inspection Survey. This creates a reference point for samples.

Analytical Sample Quality Control and Assurance

Upon completion of successful sample collection, the samples must be sent or delivered to a MassDEP-approved laboratory for analytical testing. Quality control and assurance are important to ensuring accurate analytical test results.

Sample preservation is required to prevent contaminate degradation between sampling and analysis, and should be completed in accordance with 40 CFR 136.3.

Maximum acceptable holding times are also specified for each analytical method in 40 CFR 136.3. Holding time is defined as the period of time between sample collection and extraction for analysis of the sample at the laboratory. Holding time is important because prompt laboratory analysis allows the laboratory to review the data and if analytical problems are found, re-analyze the affected samples within the holding times.

Chain of custody forms are designed to provide sample submittal information and document transfers of sample custody. The forms are typically provided by the laboratory and must be completed by the field sampling personnel for each sample submitted to the lab for analysis. The document must be signed by both the person releasing the sample and the person receiving the sample every time the sample changes hands. The sampling personnel shall keep one copy of the form and send the remaining copies to the laboratory with the samples. Custody seals, which are dated, signed and affixed to the sample container, may be used if the samples are shipped in a cooler via courier or commercial overnight shipping.

Attachments

1. Dry Weather Outfall Inspection Survey

Related Standard Operating Procedures

1. SOP 2, Wet Weather Outfall Inspection
2. SOP 10, Locating Illicit Discharges
3. SOP 13, Water Quality Screening in the Field

Outfall ID: _____ **Town:** _____

Inspector: _____ **Date:** _____

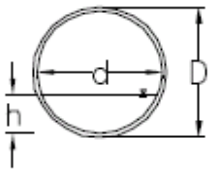
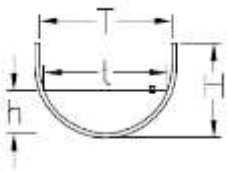
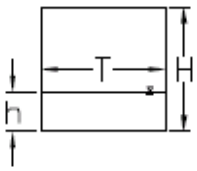
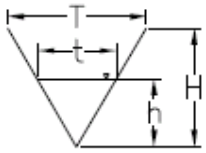
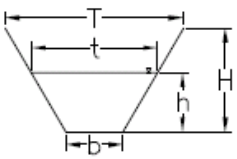
Street Name _____

Last rainfall event _____

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☐	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☐ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☐ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☐ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☐ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= _____	Swale Width (in): T= _____	Yes ☐ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☐

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):	**Circle All Materials Present:**
Odor: Yes ☐ No ☐ **Optical enhancers suspected?** Yes ☐ No ☐ **Has channelization occurred?** Yes ☐ No ☐ **Has scouring occurred below the outlet?** Yes ☐ No ☐	Rip rap / Excessive sediment / Foam / Sanitary Waste / Orange Staining Sheen: Bacterial / Sheen: Petroleum / Floatables / Algae / Excessive Vegetation
Required Maintenance: Tree Work, Ditch Work, Structural Corrosion, N/A, Remove Trash/Debris, Blocked Pipe, Erosion at Structure, Other	
Comments:	

SOP 2: WET WEATHER OUTFALL INSPECTION

Introduction

Outfalls from an engineered storm drain system can be in the form of pipes or ditches. Under current and pending regulations, it is important to inspect and document water quality from these outfalls under both dry weather and wet weather conditions. SOP 1, "Dry Weather Outfall Inspection", covers the objectives of that type of inspection. This SOP discusses wet weather inspection objectives and how they differ from dry weather inspection objectives. The primary difference is that wet weather inspection aims to describe and evaluate the first flush of stormwater discharged from an outfall during a storm, representing the maximum pollutant load managed by receiving water.

Definition of Wet Weather

A storm is considered a representative wet weather event if greater than 0.1 inch of rain falls and occurs at least 72 hours after the previously measurable (greater than 0.1 inch of rainfall) storm event. In some watersheds, based on the amount of impervious surface present, increased discharge from an outfall may not result from 0.1 inch of rain. An understanding of how outfalls respond to different events will develop as the inspection process proceeds over several months, allowing the inspectors to refine an approach for inspections.

Ideally, the evaluation and any samples collected should occur within the first 30 minutes of discharge to reflect the first flush or maximum pollutant load.

Typical practice is to prepare for a wet weather inspection event when weather forecasts show a 40% chance of rain or greater. If the inspector intends to collect analytical samples, coordination with the laboratory for bottleware and for sample drop-off needs to occur in advance.

Visual Condition Assessment

The attached Wet Weather Outfall Inspection Survey should be used to document observations related to 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

For any visual observation of pollution in a stormwater outfall discharge, an investigation into the pollution source should occur, but the following are often true:

1. Foam: indicator of upstream vehicle washing activities, or an illicit discharge.
2. Oil sheen: result of a leak or spill.

3. Cloudiness: indicator of suspended solids such as dust, ash, powdered chemicals and ground up materials.
4. Color or odor: Indicator of raw materials, chemicals, or sewage.
5. Excessive sediment: indicator or disturbed earth of other unpaved areas lacking adequate erosion control measures.
6. Sanitary waste and optical enhancers (fluorescent dyes added to laundry detergent): indicators of illicit discharge.
7. Orange staining: indicator of high mineral concentrations.

Many of these observations are indicators of an illicit discharge. Examples of illicit discharges include: cross-connections of sewer services to engineered storm drain systems; leaking septic systems; intentional discharge of pollutants to catch basins; combined sewer overflows; connected floor drains; and sump pumps connected to the system (under some circumstances). Additional guidelines for illicit discharge investigations are included in SOP 10, "Locating Illicit Discharges".

Although many of the observations are indicators of illicit discharge it should be noted that several of these indicators may also occur naturally. Orange staining may be the result of naturally occurring iron, and thus unrelated to pollution. Foam can be formed when the physical characteristics of water are altered by the presence of organic materials. Foam is typically found in waters with high organic content such as bog lakes, streams that originate from bog lakes, productive lakes, wetlands, or woody areas. To determine the difference between natural foam and foam cause by pollution, consider the following:

1. Wind direction or turbulence: natural foam occurrences on the beach coincide with onshore winds. Often, foam can be found along a shoreline and/or on open waters during windy days. Natural occurrences in rivers can be found downstream of a turbulent site.
2. Proximity to a potential pollution source: some entities including the textile industry, paper production facilities, oil industries, and fire fighting activities work with materials that cause foaming in water. If these materials are released to a water body in large quantities, they can cause foaming. Also, the presence of silt in water, such as from a construction site can cause foam.
3. Feeling: natural foam is typically persistent, light, not slimy to the touch.
4. Presence of decomposing plants or organic material in the water.

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 oil will remain intact and move in a swirl pattern; a sheen caused by bacteria will separate and appear "blocky". Bacterial or naturally occurring sheens are usually silver or relatively dull in color and will break up into a number of small patches of sheen. The cause may be presence of iron, decomposition of organic material or presence of certain bacteria. Bacterial sheen is not a pollutant but should be noted.

Optical enhancers, fluorescent dyes added to laundry detergent, are typically detected through the use of clean, white cotton pads placed within the discharge for several days, dried then viewed under a UV light. If the cotton pad displays fluorescent patches, optical enhancers are present. Optical enhancers are occasionally visible as a bluish-purple haze on the water surface; however the testing method should be used to confirm the presence of optical enhancers.

The Wet Weather Outfall Inspection Survey includes fields where these and other specific observations can be noted. The inspector shall indicate the presence of a specific water quality indicator or parameter by marking "Yes". If "Yes" is marked, provide additional details in the comments section. If the indictor in question is not present mark "No".

Within the comments section, provide additional information with regard to recorded precipitation totals, or more detailed descriptions of observations made during the inspection and corrective actions taken.

Measuring Water Quality

Based on the results of the Visual Condition Assessment, it may be necessary to collect additional data about water quality. Water quality samples can be in the form of screening using field test kits or by discrete analytical samples processed by a laboratory.

Information on how to use field test kits is included in SOP 13, "Water Quality Screening with Field Test Kits", and the Wet Weather Outfall Inspection Survey includes fields to document the results of such screening. The Inspection Survey also provides values for what can be considered an appropriate benchmark for a variety of parameters that can be evaluated with field test kits.

If the results of screening using field test kits indicate that the outfall's water quality exceeds the benchmarks provided, collection of discrete analytical samples should be considered.

Analytical Sample Collection

Sample collection methods may vary based on specific outfall limitations but shall follow test procedures outlined in 40 CFR 136. A discrete manual or grab sample can classify water at a distinct point in time. These samples are easily collected and used primarily when the water quality of the discharge is expected to be homogeneous, or unchanging, in nature. A flow-weighted composite sample will classify water quality over a measured period of time. These samples are used when the water quality of the discharge is expected to be heterogeneous, or fluctuating, in nature. Grab samples are more common for wet weather outfall inspections due to the time-sensitive nature of the process.

Protocols for collecting a grab sample shall include the following:

1. Do not eat, drink or smoke during sample collection and processing.
2. Do not collect or process samples near a running vehicle.
3. Do not park vehicles in the immediate sample collection area, including both running and non-running vehicles.
4. Always wear clean, powder-free nitrile gloves when handling sample containers and lids.
5. Never touch the inside surface of a sample container or lid, even with gloved hands.
6. Never allow the inner surface of a sample container or lid to be contacted by any material other than the sample water.
7. Collect samples while facing upstream and so as not to disturb water or sediments in the outfall pipe or ditch.

8. Do not overfill sample containers, and do not dump out any liquid in them. Liquids are often added to sample containers intentionally by the analytical laboratory as a preservative or for pH adjustment.
9. Slowly lower the bottle into the water to avoid bottom disturbance and stirring up sediment.
10. Do not allow any object or material to fall into or contact the collected water sample.
11. Do not allow rainwater to drip from rain gear or other surfaces into sample containers.
12. Replace and tighten sample container lids immediately after sample collection.
13. Accurately label the sample with the time and location.
14. Document on the Wet Weather Outfall Inspection Survey that analytical samples were collected, specify parameters, and note the sample time on the Inspection Survey. This creates a reference point for samples.

Analytical Sample Quality Control and Assurance

Upon completion of successful sample collection, the samples must be sent or delivered to a MassDEP-approved laboratory for analytical testing. Quality control and assurance are important to ensuring accurate analytical test results.

Sample preservation is required to prevent contaminant degradation between sampling and analysis and should be completed in accordance with 40 CFR 136.3.

Maximum acceptable holding times are also specified for each analytical method in 40 CFR 136.3. Holding time is defined as the period of time between sample collection and extraction for analysis of the sample at the laboratory. Holding time is important because prompt laboratory analysis allows the laboratory to review the data and if analytical problems are found, re-analyze the affected samples within the holding times.

Chain of custody forms are designed to provide sample submittal information and document transfers of sample custody. The forms are typically provided by the laboratory and must be completed by the field sampling personnel for each sample submitted to the lab for analysis. The document must be signed by both the person releasing the sample and the person receiving the sample every time the sample changes hands. The sampling personnel shall keep one copy of the form and send the remaining copies to the laboratory with the samples. Custody seals, which are dated, signed and affixed to the sample container, may be used if the samples are shipped in a cooler via courier or commercial overnight shipping.

Attachments

1. Wet Weather Outfall Inspection Survey

Related Standard Operating Procedures

1. SOP 1, Dry Weather Outfall Inspection
2. SOP 10, Locating Illicit Discharges
3. SOP 13, Water Quality Screening in the Field

Outfall I.D.: _____ **Date:** _____

Inspector: _____

Time of Inspection: _____

Street Name _____

Last rainfall event _____

WET WEATHER OUTFALL INSPECTION SURVEY

Visual Inspection:	**Yes**	**No**	**Comments (Include probable source of observed contamination):**
Color	☐	☐	
Odor	☐	☐	
Turbidity	☐	☐	
Excessive Sediment	☐	☐	
Sanitary Waste	☐	☐	
Pet Waste	☐	☐	
Floatable Solids	☐	☐	
Oil Sheen	☐	☐	
Bacterial Sheen	☐	☐	
Foam	☐	☐	
Algae	☐	☐	
Orange Staining	☐	☐	
Excessive Vegetation	☐	☐	
Optical Enhancers	☐	☐	
Other _____			

Sample Parameters	**Analytical Test Method**	**Benchmark***	**Field Screening Result**	**Full Analytical?**
Ammonia[1]	EPA 350.2/SM4500-NH3C	>50.0 mg/L		☐ Yes ☐ No
Specific Conductance[1]	SM 2510B	>2,000		☐ Yes ☐ No
Detergents & Surfactants[2]	EPA 425.1/SM5540C	> 0.25 mg/L		☐ Yes ☐ No
Fluoride[2]	EPA 300.0	>0.25 mg/L		☐ Yes ☐ No
pH[1]	EPA 150.1/SM 4500H	<5		☐ Yes ☐ No
Potassium[1]	EPA 200.7	>20 mg/L		☐ Yes ☐ No
Comments:				

[1] – *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*, Center for Watershed Protection and Robert Pitt of University of Alabama, 2004, p. 134, Table 45.

[2] – *Appendix I – Field Measurements, Benchmarks and Instrumentation*, Draft Massachusetts North Coastal Small MS4 General Permit, 2009.

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 (older catch basins may not have a sump). Catch basin cleaning reduces foul odors, prevents clogs in the storm drain system, and reduces the loading of trash, suspended solids, nutrients, bacteria, and other pollutants to receiving waters. The goal of this written Standard Operating Procedure (SOP) is to provide guidance to municipal employees on catch basin inspection and cleaning to reduce the discharge of pollutants from the MS4. 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.

This SOP can also be used for inspection of catch basins or manholes for the purpose of conducting catchment investigations as part of the municipality's Illicit Discharge Detection and Elimination program.

The Ayer DPW performs routine inspections, cleaning, and maintenance of the approximately 920 catch basins that are located within the MS4 regulated area. The Ayer DPW will include an optimization plan for catch basin cleaning and inspection in its annual report.

The Ayer DPW hires a Contractor to clean all of its catch basins each Spring. The DPW Highway Division employee directs the Contractor to each catch basin. The DPW employee and/or Contractor inspect each catch basin.

The Ayer DPW will implement the following catch basin inspection and cleaning procedures to reduce the discharge of pollutants from the MS4:

Procedures

Inspection and Cleaning Frequency

- Each catch basin should be cleaned and inspected at least annually.
- Catch basins near construction activities (roadway construction, residential, commercial, or industrial development or redevelopment) or high-use areas should be inspected and cleaned more frequently if inspection finds excessive sediments or debris loadings.
- Catch basins should be cleaned to ensure that they are no more than 50 percent full[1] at any time. Establish inspection and maintenance frequencies needed to meet this "50 percent" goal. If a catch basin sump is more than 50 percent full during two consecutive inspections, document the findings, investigate the contributing drainage area for sources of excessive sediment loading, and, if possible, address the contributing sources. If no contributing sources are found, increase the inspection and cleaning frequencies of the sump.
- Street sweeping performed 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 they need to be cleaned. Reference SOP 16: Streets and Parking Lots for information on appropriate street sweeping frequencies. Street sweeping schedules should also be adjusted based on catch basin inspection findings, with more frequent sweepings for areas with higher catch basin loads.

[1] 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

- In accordance with Impaired Water requirements, the Town of Ayer will prioritize catch basin cleaning and inspection in catchments with impairments when creating their optimization schedule to ensure that these catch basins are no more than 50% full and reduce stormwater pollution to Impaired Waterbodies.

Inspection and Cleaning Procedures

Catch basin inspection and cleaning procedures should address both the grate opening and the catch basin structure, including the sump and any inlet and outlet pipes. Document any and all observations about the condition of the catch

basin structure and water quality (an inspection form is available in Survey 123). Collect data on the condition of the physical basin structure, its frame, and the grate, as well as on the quality of stormwater conveyed by the structure. Observations like those below can indicate sources of pollution within the storm drain system:

- Oil sheen
- Discoloration
- Trash and debris

Both oil and bacteria can create a sheen on the water's surface. The source of a sheen can be differentiating by disturbing it (e.g., with a pole). A sheen caused by oil will remain intact and move in a swirl pattern, while a sheen caused by bacteria will separate and appear "blocky." The bacteria that cause this sheen are naturally occurring iron bacteria – they are not considered a pollutant but should be noted. Other types of bacteria, such as fecal bacteria, are considered pollutants and their discovery should be recorded.

Observations like those below 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

In general, adhere to the following procedures when inspecting and cleaning catch basins. Record the findings in the log in the attachments:

1. Implement appropriate traffic safety procedures (e.g., traffic cones) prior to and during the catch basin inspection and cleaning process.
2. Work upstream to downstream in a given drainage network.
3. Clean sediment and trash off of the grate.
4. Visually inspect the outside of the grate.
5. Remove the grate and visually inspect the inside of the catch basin to determine cleaning needs.
6. Inspect the catch basin for structural integrity.
7. Determine the most appropriate equipment and method for cleaning the basin:
    a. Manually use a shovel to remove accumulated sediments.
    b. Use a bucket loader to remove accumulated sediments.
    c. Use a high pressure washer to clean any remaining material out of the catch basin while capturing the slurry with a vacuum.
    d. If necessary, after the catch basin is cleaned, use the rodder of the vacuum truck to clean the downstream pipe and pull back sediment that might have entered it.
8. If contamination is suspected, chemical analysis will be required to determine if the materials comply with the Massachusetts Department of Environmental Protection (MassDEP) Hazardous Waste Regulations, 310 CMR 30.000 (https://www.mass.gov/files/documents/2016/08/xl/310cmr30_7883_54357.pdf). The 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.

Handling and Disposal of Catch Basin Cleanings

- Transport catch basin cleanings to the storage pile at the Ayer Brush Dump.
- Properly dispose of collected sediments and catch basin cleanings (solid material, such as leaves, sand, and twigs removed from stormwater collection systems during cleaning operations).
- Cleanings from stormwater-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 properly to prevent pollution.
- Catch basin cleanings must be handled and disposed in accordance with compliance with the applicable MassDEP regulations, policies, and guidance (https://www.mass.gov/files/documents/2018/03/09/catch-basins.pdf).

Documentation and Reporting

The following information should be documented and included in the municipality's annual report – use the catch basin inspection log provided in the attachments to document the information to include in the report (alternatively, obtain records of volume of debris removed to include in the report):

- Metrics and other information used to reach the determination that the established plan for cleaning and maintenance is optimal for the MS4 (include in the SWMP and first 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.
- A Catch Basin Deficiency Report shall be completed where changes have occurred since the previous inspection or significant issues are observed. A Catch Basin Inspection Form and Log (Survey 123) shall be completed where a catch basin has never been inspected.

Employee Training

- Employees who perform catch basin cleaning and inspection are trained once times per year 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.

Attachments

1. Catch Basin Inspection Form and Log (Survey 123)
2. Catch Basin Deficiency Report

Related Standard Operating Procedures

1. SOP 16: Streets and Parking Lots

TOWN OF AYER
DEPARTMENT OF PUBLIC WORKS
CATCH BASIN DEFICIENCY REPORT

Date: _____

Location: (note CB ID or nearest intersection, street address, pole number, etc.)

_____

Volume, circle one:

>50% sump or <50% sump depth?

Problems:

O Broken Cover

O Broken Frame

O Damaged Pavement

O Loose Brickwork in Basin

O Litter of Debris in Basin

O Animal Feces in Basin

O Chemical Odor in Basin

O Unusually Colored Liquid in Basin

O Damaged or Misplaced Hood in Basin

O Damaged Pipe in Basin

O Other, Please Describe

_____

_____

_____

_____

Inspector _____

SOP 4: Spill Response and Cleanup

Introduction

Municipalities are responsible for any contaminant spill or release that occurs on property that they own or operate. Particular areas of concern include any facilities that use or store chemicals, fuel oil, or hazardous waste, including schools, garages, and landfills. Implementation of proper spill response and cleanup procedures can help to mitigate the effects of a contaminant release. The goal of this written Standard Operating Procedure (SOP) is to provide guidance to municipal employees to help reduce the discharge of pollutants from the MS4 as a result of spills or releases.

The Town of Ayer undertakes various precautions with spill response and cleanup procedures. The Town has developed SWPPPs for several facilities in accordance with the MS4 permit and also has a SWPPP under the MSGP for the Wastewater Treatment Plant. Each SWPPP contains spill response and cleanup procedures which may include information on containment, spill kit materials, and procedures for spill response.

Procedures

The Town of Ayer will implement the following spill response and cleanup procedures to reduce the discharge of pollutants from the MS4:

Responding to a Spill

Employees should be trained in proper spill response specific to the materials used at their site and appropriate personal protective equipment (PPE). In the event of a spill, follow these spill response and cleanup procedures:

- If the facility has a Stormwater Pollution Prevention Plan (SWPPP), notify a member of the facility's Pollution Prevention Team, the facility supervisor, and/or the facility safety officer (fill out the attached spill response contact list). If not, continue to follow the procedures outlined below.
- Assess the contaminant release site for potential safety issues and for direction of flow.
- Complete the following:
    - Stop the contaminant release.
    - Contain the contaminant release through the use of spill containment berms or absorbents.
    - Protect all drains and/or catch basins with the use of absorbents, booms, berms or drain covers.
    - Clean up the spill.
    - Dispose of all contaminated products in accordance with applicable federal, state and local regulations.
        i. Soil contaminated with petroleum should be handled and disposed of as described in MassDEP policy WCS-94-400, Interim Remediation Waste Management Policy for Petroleum Contaminated Soils (https://www.mass.gov/files/documents/2016/08/mq/94-400.pdf).
        ii. Products saturated with petroleum products or other hazardous chemicals require special handling and disposal by licensed transporters. Licensed transporters will pick up spill contaminated materials for recycling or disposal. Save the shipping records for at least three years.

iii. Waste oil contaminated industrial wipes and sorptive minerals:
    1. Perform the "one drop" test to ensure absorbents do not contain enough oil to be considered hazardous, as described in the MassDEP Waste Oil Management Guide (https://www.mass.gov/files/documents/2018/12/18/oilwiper.pdf).
    2. Wring absorbents through a paint filter. If doing so does not generate one drop of oil, the materials are not hazardous.
    3. If absorbents pass the "one drop" test they may be discarded in the trash unless contaminated with another hazardous waste.
        a. It is acceptable to mix the following fluids and handle them as waste oil:
            i. Waste motor oil
            ii. Hydraulic fluid
            iii. Power steering fluid
            iv. Transmission fluid
            v. Brake fluid
            vi. Gear oil
        b. **Do not mix** the following materials with waste oil. Store each separately:
            i. Gasoline
            ii. Antifreeze
            iii. Brake and carburetor cleaners
            iv. Cleaning solvents
            v. Other hazardous wastes
    4. If absorbents do not pass the "one drop" test they should be placed in separate metal containers with tight fitting lids, labeled "Oily Waste Absorbents Only."

- If you need assistance containing and/or cleaning up the spill, or preventing it from discharging to a surface water (or an engineered storm drain system), contact your local fire department using the number listed below. **In the case of an emergency call 911**.
    - AYER FIRE DEPARTMENT: 978-772-8231
- Contact the MassDEP 24-hour spill reporting notification line, toll-free at **(888)-304-1133**;
    - The following scenarios **are exempt** from MassDEP reporting requirements (see the MassDEP factsheet on oil and hazardous materials handling for more information: https://www.mass.gov/files/documents/2016/08/xm/spillmgm.pdf).
        i. Spills that are less than 10 gallons of petroleum and do not impact a water body
        ii. Spills that are less than one pound of hazardous chemicals and do not present an imminent health or safety hazard
        iii. Fuel spills from passenger vehicle accidents
        iv. Spills within a vault or building with a watertight floor and walls that completely contain all released chemicals

Reporting a Spill

When contacting emergency response personnel or a regulatory agency, or when reporting the contaminant release, be prepared to provide the following information:

1. Your name and the phone number you are calling from.
2. The exact address and location of the contaminant release.
3. Specifics of release, including:
    a. What was released;
    b. How much was released, which may include:
        i. Pounds
        ii. Gallons
        iii. Number of containers
4. Where was the release sent/what was contaminated, addressing:
    a. Pavement
    b. Soil
    c. Drains
    d. Catch basins
    e. Water bodies
    f. Public streets
    g. Public sidewalks
5. The concentration of the released contaminant.
6. What/who caused the release.
7. Is the release being contained and/or cleaned up or is the response complete.
8. Type and amount of petroleum stored on site, if any.
9. Characteristics of contaminant container, including:
    a. Tanks
    b. Pipes
    c. Valves

Maintenance and Prevention Guidance

Prevention of spills is preferable to even the best response and cleanup. To mitigate the effects of a contaminant release, provide proper maintenance and inspection at each facility. To protect against contaminant release, adhere to the following guidance:

- Ensure all employees are properly trained to respond in the case of a spill, understand the nature and properties of the contaminant, and understand the spill control materials and personnel safety equipment. Maintain training records of current personnel on site and retain training records of former personnel for at least three years from the date last worked at the facility.
- Provide yearly maintenance and inspection at all municipal facilities, paying attention to underground storage tanks. Maintain maintenance and inspection records on site.
- Implement good management practices where chemicals and hazardous wastes are stored:
    a. Ensure storage in closed containers inside a building and on an impervious surface wherever possible.
    b. If storage cannot be provided inside, ensure secondary containment for 110 percent of the maximum volume of the storage container.
    c. Locate storage areas near maintenance areas to decrease the distance required for transfer.
    d. Provide accurate labels, Material Safety Data Sheets (MSDS) information, and warnings for all stored materials.
    e. Regularly inspect storage areas for leaks.
    f. Ensure secure storage locations, preventing access by untrained or unauthorized persons.

g. Maintain accurate records of stored materials.

- Replace traditional hazardous materials such as pesticides and cleansers with non-hazardous products such as bio-lubricants which can reduce response costs in the case of a spill.

Maintain appropriately stocked spill response kits at each facilities and locations where oil, chemicals, or other hazardous materials are handled and stored.

Employee Training

- Employees who perform work with potential stormwater pollutants ##NUMBER times per year on proper spill procedures.
- Employees are also trained on stormwater pollution prevention and illicit discharge detection and elimination (IDDE) procedures.
- If services are contracted, the contractor should be given a copy of this and any applicable SOPs to ensure compliance with MS4 regulations.

Attachments

1. Spill Response and Cleanup Contact List

Spill Response and Cleanup Contact List

Contact	Phone Number	Date and Time Contacted
Safety Officer: Chief William Murray	**(978)-772-8200**	
Facility Supervisor: Chuck Shultz	**(978)-833-2301**	
Fire Department: Chief Robert Pedrazzi	**(978)-772-8231**	
MassDEP 24-Hour Spill Reporting	**(888)-304-1133**	
MassDEP Central Regional Office	**(508) 792-7650**	
Hazardous Waste Compliance Assistance Line	**(617) 292-5898**	
Household Hazardous Products Hotline	**(800) 343-3420**	
Massachusetts Department of Fire Services	**(978) 567-3100 or (413) 587-3181**	
Licensed Site Professionals Association (Wakefield, MA) Licensed Site Professionals Board	**(781) 876-8915** **(617) 556-1091**	

SOP 5: 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.

This SOP assumes that the municipality has legal authority (i.e., a bylaw or ordinance) in place, per the requirements of the 2003 Massachusetts MS4 Permit, to require sediment and erosion control at construction sites. This legal authority must 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." The legal authority must also give inspectors the authority to enter the site.

A municipal stormwater Construction Site Inspection program should include or address 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 2012 Construction General Permit, which is true if the the project disturbs one or more acres, total. The 2012 Construction General Permit replaces the 2008 Construction General Permit , which expired on February 15, 2012. Operators of sites that required coverage under the USEPA's 2008 Construction General Permit but continue to be active should have submitted a new Notice of Intent (NOI) under the 2012 Permit.

If the site requires this coverage, the inspector shall visit the USEPA Region 1 eNOI website (http://cfpub.epa.gov/npdes/stormwater/cgpenoi.cfm or http://cfpub.epa.gov/npdes/stormwater/noi/noisearch.cfm) to determine if the contractor filed for coverage under the 2012 and/or 2008 Construction General Permits, respectively. 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 2012 Construction General Permit has been approved by USEPA. The inspector may choose to print instructions on how to file an NOI and meet with the contractor to review these. 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 2012 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 2012 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 2012 Construction General Permit and/or other document, as required by the municipality's legal authority, can be achieved.

Attachments

1. Construction Site Stormwater Inspection Report

Related Standard Operating Procedures

1. SOP 9, Inspecting Constructed Best Management Practices

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 ☐	

(continued)

	BMP Description	Installed and Operating Properly?	Corrective Action Needed
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 ☐	

CMRSWC

(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.

SOP 6: 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 SOP 5, "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.
8. Easements and service routes shall be maintained, to enable maintenance equipment to access BMPs for regular cleaning.

Related Standard Operating Procedures

1. SOP 5, Construction Site Inspection
2. SOP 9, Inspection of Constructed Best Management Practices

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.

SOP 7: Fuel and Oil Handling

Introduction

Spills, leaks, and overfilling can occur during handling of fuels and petroleum-based materials, representing a potential source of stormwater pollution, even in small volumes. The goal of this written Standard Operating Procedure (SOP) is to provide guidance to municipal employees on a variety of ways by which fuels and petroleum-based materials can be delivered, as well as steps to be taken when petroleum products (such as waste oil) are loaded onto vehicles for offsite disposal or recycling. Delivery, unloading, and loading of waste oils are hereafter referred to as "handling." Attached is a fuel delivery form checklist.

The Town of Ayer undertakes various procedures and precautions in handling fuel and oil. Currently, the Ayer DPW receives fuel deliveries from its vendor, Dennis K. Burke, to the gasoline and diesel AST located at the DPW main location at 25 Brook Street. The driver checks in with the DPW prior to filling the AST. The driver fills the ASTs according to his Standard Procedure. A spill kit consisting of absorbent materials for minor spills is located adjacent to the fuel dispenser.

It should be noted that the AST is approximately 3000-gallon diesel and 3000-gallon gasoline, with a total of 6,000-gallons. The AST utilizes an Armor Cast Containment System which has an approximate containment capacity of 7,900-gallons. The tank is monitored via a Veeder Root system and potential leaks or spills would most likely be detected prior to any discharge from containment vault. However, a catastrophic tank failure, or major spill during a transfer operation, would travel beyond the tank vault onto the surrounding paved area. Overland flow would be to the surrounding grassland and on-site catch basins that flow into an unnamed wetland associated with Nonacoicus Brook and underground wet wells. The unnamed wetland is approximately 200 feet away to the south.

Procedures

The Town of Ayer will implement the following fuel and oil handling procedures to help reduce the discharge of pollutants from the MS4:

General Guidelines

For all manners of fuel and oil handling described below, a member of the facility's Pollution Prevention Team (if the facility has a SWPPP) or another knowledgeable person familiar with the facility should be present during handling procedures. This person should ensure that the following are observed:

- There is no smoking while fuel handling is in process or underway.
- Sources of flame are kept away while fuel handling is being completed. This includes smoking, lighting matches, carrying any flame, or carrying a lighted cigar, pipe, or cigarette.
- The delivery vehicle's hand brake is set and wheels are chocked while the activity is being completed.
- Catch basins and drain manholes are adequately protected.
- No tools are to be used that could damage fuel or oil containers or the delivery vehicle.
- No flammable liquid should be unloaded from any motor vehicle while the engine is operating, unless the engine of the motor vehicle is required to be used for the operation of a pump.
- Ensure that local traffic does not interfere with fuel transfer operations. If it does, make appropriate accommodations.

- The attending persons should watch for any leaks or spills:
    - Any small leaks or spills should be immediately stopped, and spilled materials absorbed and disposed of properly. Follow the procedures in SOP 4: Spill Response and Cleanup.
    - In the event of a large spill or one that discharges to surface waters or an engineered storm drain system, the facility representative should activate the facility's Stormwater Pollution Prevention Plan (SWPPP) and report the incident as specified in the document.

Delivery by Bulk (Tanker) Truck

Procedures for the delivery of bulk fuel should include the following:

- The truck driver should check in with the facility upon arrival.
- The facility representative should ensure that the appropriate spill cleanup and response equipment and personal protective equipment are readily available and easily accessible. Refer to SOP 4: Spill Response and Cleanup for examples of spill cleanup and response materials.
- The facility representative should check to ensure that the amount of delivery does not exceed the available capacity of the tank.
    - A level gauge can be used to verify the level in the tank.
    - If a level gauge is not functioning or is not present on the tank, the tank should be stick tested prior to filling.
- The truck driver and the facility representative should both remain with the vehicle during the delivery process.
- The truck driver and the facility representative should inspect all visible lines, connections, and valves for leaks.
- When delivery is complete and the hoses are removed, buckets should be placed underneath connection points to catch drippings.
- The delivery vehicle should be inspected prior to departure to ensure that the hose is disconnected from the tank.
- The facility representative should inspect the fuel tank to verify that no leaks have occurred, or that any leaked or spilled material has been cleaned and disposed of properly.
- The facility representative should gauge tank levels to ensure that the proper amount of fuel is delivered, and collect a receipt from the truck driver.

Delivery of Drummed Materials

Drummed materials may include motor oil, hydraulic fluid, transmission fluid, or waste oil from another facility (as approved). Procedures for the delivery of drummed materials should include the following:

- The truck driver should check in with the facility upon arrival.
- The facility representative should ensure that the appropriate spill cleanup and response equipment and personal protective equipment are readily available and easily accessible Refer to SOP 4: Spill Response and Cleanup for examples of spill cleanup and response materials. The facility representative should closely examine the shipment for damaged drums.
    - If damaged drums are found, they should be closely inspected for leaks or punctures.
    - Breached drums should be removed to a dry, well-ventilated area and the contents transferred to other suitable containers.
    - Drums should be disposed of in accordance with all applicable regulations.

- Drummed materials should not be unloaded outdoors during wet weather events.
- The truck driver and the facility representative should both remain with the vehicle during the delivery process.
- Drums should be handled and unloaded carefully to prevent damage.
- Upon completion of unloading, the facility representative should inspect the unloading point and the drums to verify that no leaks have occurred, that any leaked or spilled material has been cleaned up and disposed of properly, and that the unloaded drums are not leaking.
- The facility representative should check to ensure that the proper amount of fuel or other material is delivered, and collect a receipt from the truck driver.

Removal of Waste Oil from the Facility

When waste oil or similar oil products need to be removed from the premises, only haulers certified to transport waste oil should be utilized. Procedures should include the following:

- The disposal truck driver should check in with the facility upon arrival.
- The facility representative should ensure that the appropriate spill cleanup and response equipment and personal protective equipment are readily available and easily accessible. Refer to SOP 4: Spill Response and Cleanup for examples of spill cleanup and response materials. The truck driver and the facility representative should both remain with the vehicle during the tank draining process.
- When draining is complete and the hoses are removed, buckets should be placed underneath connection points to catch drippings.
- The facility representative should inspect the loading point and the tank to verify that no leaks have occurred, or that any leaked or spilled material has been cleaned up and disposed of properly.
- The facility representative should collect a receipt from the truck driver.
- When draining bulk oil tanks:
    - The facility representative should verify that the volume of waste oil in the tank does not exceed the available capacity of the disposal hauler's vehicle.
    - The disposal hauler vehicle should be inspected prior to departure to ensure that the hose is disconnected from the tank.

Employee Training

- Employees who handle or deliver fuel and/or oil are trained once per year on proper procedures.
- 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.

Attachments

1. Fuel Delivery Checklist

Related Standard Operating Procedures

- SOP 4: Spill Response and Cleanup

FUEL DELIVERY FORM

TOWN OF _____

Date: _____

Time of Arrival: _____

Time of Departure: _____

Truck Number: _____

Name of Truck Driver: _____

Name of Town Employee: _____

BEFORE UNLOADING:

Is all spill response equipment and personal protective equipment in place?

Yes ☐ **No** ☐

In the case of bulk fuel delivery, does tank capacity exceed the amount of delivery?

Yes ☐ **No** ☐ **N/A** ☐

In the case of drum fuel delivery, are all drums free of leaks and punctures?

Yes ☐ **No** ☐ **N/A** ☐

COMMENCE UNLOADING. REMAIN WITH VEHICLE AT ALL TIMES.

AFTER UNLOADING IS COMPLETE:

Have all fuel containers, including the vehicle, been inspected for leaks?

Yes ☐ **No** ☐

Has the ground at the unloading point been inspected for evidence of leaks?

Yes ☐ **No** ☐

If there are any leaks or spills, has the material been properly cleaned?

Yes ☐ **No** ☐

Has the correct amount of fuel been delivered?

Yes ☐ **No** ☐

Has a receipt been collected?

Yes ☐ **No** ☐

DELIVERY IS COMPLETE.

SOP 9: Inspection and Maintenance of Structural Stormwater Best Management Practices (BMPs)

Introduction

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. Structural BMPs are permanent site features designed to treat stormwater before infiltrating it to the subsurface or discharging it to a surface water body. Regular inspection and maintenance of structural stormwater BMPs is critical for these engineered systems to function as designed (e.g., provide benefits to water quality, groundwater recharge, and peak flow attenuation).

This Standard Operating Procedure (SOP) provides general inspection and maintenance frequencies and procedures for eight common structural stormwater 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 the stormwater BMP Operation and Maintenance guidance contained in the Handbook. 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.

The Ayer DPW is responsible for inspection and maintenance of structural stormwater BMPs and other stormwater infrastructure in the Town of Ayer. A list of existing structural stormwater BMPs is included in the attachments, along with inspection and maintenance checklists for each type of BMP.

Structural stormwater BMPs will be inspected annually at a minimum. Inspection checklists for each type of structural BMP are provided in the attachments.

Procedures

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.
2. Exfiltration bioretention area: Areas that are configured to recharge groundwater in addition to acting as a filter.

Inspection and 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 the recharge and water quality treatment of ground water.

Constructed Stormwater Wetlands

Constructed stormwater wetlands maximize 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 and Maintenance

Regular inspection and maintenance are important for the health of constructed stormwater wetlands. They help identify the need for replacement of vegetation and media, detect potentially harmful invasive species, and ensure the overall health of the wetland.

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

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 reducing 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 and 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 – these materials 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 and 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 stormwater 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 and Maintenance

If properly maintained, sand and organic filters have a long life. Maintenance requirements of the filters 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 the sand should be replaced.

Maintenance Schedule: Sand and Organic 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. If properly designed and maintained, wet basins can add fire protection, wildlife habitats, and aesthetic values to a property.

Inspection and 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 and 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 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. High failure rates, however, often occur due to improper siting, inadequate pretreatment, poor design, and lack of maintenance.

Inspection and 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

Stormwater Treatment Unit (Hydrodynamic Separator)

A hydrodynamic separator is designed to efficiently capture and retain sediment as well as floating trash, debris, and oils. The concentration of metals and other constituents associated with the sediment or floating pollutants may also be reduced.

Inspection and Maintenance

Regular maintenance is required to have consistent system performance. Inspection is typically conducted a minimum of twice per year but since pollutant transport and deposition varies from site to site, a site-specific maintenance frequency should be established during the first two or three years of operation. The following are typical inspection and maintenance requirements for hydrodynamic separators, however, each specific manufacturer's inspection and maintenance requirements shall take precedence:

• Inspect the internal components and note whether there are any broken or missing parts. In the unlikely event that internal parts are broken or missing.
• Note whether the inlet or outlet pipe is blocked or obstructed.
• Observe, quantify, and record the accumulation of floating trash and debris in the baffled chambers around the vortex tubes. The significance of accumulated floating trash and debris is a matter of judgment. A long-handled net may be used to retrieve the bulk of trash and debris at the time of inspection if full maintenance due to accumulation of oils or sediment is not yet warranted.
• Observe, quantify, and record the accumulation of oils in the baffled chambers around the vortex tubes. If sorbent pads have been used to absorb free oil and grease, observe and record their condition.
Unless the sorbent pads are tethered to the internal baffles, spent pads may be netted and replaced at the time of inspection. The significance of accumulated floating oils is a matter of judgment. However, if there is evidence of an oil or fuel spill, immediate maintenance is warranted.
• Finally, observe, quantify, and record the accumulation of sediment in the sediment storage sump. A calibrated dipstick, tape measure, or sludge sampler may be used to determine the amount of accumulated sediment. The depth of sediment may be determined by calculating the difference between the measurement from the rim of the hydrodynamic separator to the top of the accumulated sediment and the measurement from the rim of the hydrodynamic separator to the bottom of the hydrodynamic separator structure. Finding the top of the accumulated sediment takes some practice and a light touch, but increasing resistance as the measuring device is lowered toward the bottom of the unit indicates the top of the accumulated sediment.
Maintenance should be scheduled if any of the following conditions are identified during the inspection:
• Internal components are broken or missing.
• Inlet or outlet piping is obstructed.
• The accumulation of floating trash and debris that cannot be retrieved with a net and/or oil in the baffled chambers around the vortex tubes is significant.
• Accumulated sediment is greater than half of the sump depth.

Maintenance Schedule: Hydrodynamic Separator

Activity	Time of Year	Frequency
Inspection	Spring and fall	Bi-annually
Maintenance	--	Maintenance is required based on inspection results.

Employee Training

- Employees who perform inspection or maintenance on structural BMPs are trained once per year on proper procedures.
- If services are contracted, the contractor should be given a copy of this and any applicable SOPs to ensure compliance with MS4 regulations.

Attachments

1. Structural BMP Inventory
2. Structural BMP Inspection and Maintenance Checklists

Inventory of Structural Stormwater Best Management Practices (BMPs)
Ayer, Massachusetts

BMP ID or Description	Location	BMP Type	Inspection Frequency	Date of Last Inspection	Additional Notes
DPW Rain Garden	Ayer DPW	Rain Garden	See SOP	September 2020	Satisfactory
Pirone Park Rain Garden	Pirone Park	Bioretention Cell	See SOP	September 2020	Satisfactory
Hydrodynamic Separator	Oak Ridge Drive at Pine Ridge Drive	Hydrodynamic Separator	See SOP	September 2020	Satisfactory
Hydrodynamic Separator	Littleton Road at Hickory Way	Hydrodynamic Separator	See SOP	September 2020	Satisfactory
Infiltration Basin	Ayer Municipal Landfill	Infiltration Basin	See SOP	September 2020	Maintenance Required
Infiltration Basins	Patriot Way	Infiltration Basin	See SOP	September 2020	Maintenance Required
Infiltration Basin	Amandrey Way	Infiltration Basin	See SOP	September 2020	Maintenance Required
Infiltration Basin	Ayer Dog Park	Infiltration Basins	See SOP	September 2020	Satisfactory
Infiltration Basins	Mountain Laurel Road	Infiltration Basins	See SOP	September 2020	Satisfactory
Infiltration Basin	Winterberry Lane	Infiltration Basin	See SOP	September 2020	Maintenance Required
Infiltration Basin	Hibiscus Lane	Infiltration Basin	See SOP	September 2020	Maintenance Required
Infiltration Basin	Ayer Water Dept	Infiltration Basin	See SOP	September 2020	Satisfactory
Infiltration Basin	Washington Street at Groton Harvard Road	Infiltration Basin	See SOP	September 2020	Maintenance Required
Infiltration Basin	Nashua Street Extension	Infiltration Basin	See SOP	September 2020	Satisfactory

Note: The DPW is currently reviewing private vs. public owned drainage. The list of BMPs may change.

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 ☐	

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/INFILTRATION/DETENTION 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 / Infiltration / Detention (circle one)		
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 basin at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Preventative maintenance	Bi-Annually	Y ☐ N ☐	
Mow/rake and remove woody growth in buffer area, side slopes and basin bottom	Bi-Annually	Y ☐ N ☐	
Remove trash, debris and organic matter	Bi-Annually	Y ☐ N ☐	
Inspect and clean pretreatment/outlet devices	Every other month and after every major storm event	Y ☐ N ☐	

INSPECTION OF HYDRODYNAMIC SEPARATOR

Oldcastle® Stormwater Solutions

Dual Vortex Separator Inspection and Maintenance Log

DVS Model _____ **Inspection Date** _____

Location _____

Condition of Internal Components ☐ Good ☐ Damaged ☐ Missing	Notes:
Inlet or Outlet Blockage or Obstruction ☐ Yes ☐ No	Notes:
Floating Trash and Debris ☐ Significant ☐ Not Significant	Notes:
Floating Oils ☐ Significant ☐ Not Significant ☐ Spill	Notes:
Sediment Depth ☐ Inches of Sediment: _____	Notes:
Maintenance Requirement ☐ **Yes – Schedule Maintenance** ☐ **No – Schedule Re-Inspection**	

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	

SOP 10: LOCATING ILLICIT DISCHARGES

Introduction

An "illicit discharge" is any discharge to an engineered storm drain system that is not composed entirely of stormwater unless the discharge is defined as an allowable non-stormwater discharge under the 2003 Massachusetts MS4 Permit. Illicit discharges may enter the engineered storm drain system through direct or indirect connections, such as: cross-connections of sewer services to engineered storm drain systems; leaking septic systems; intentional discharge of pollutants to catch basins; combined sewer overflows; connected floor drains; and sump pumps connected to the system (under some circumstances). Illicit discharges can contribute high levels of pollutants, such as heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to receiving streams.

Illicit discharges can be located by several methods, including routine dry weather outfall inspections and catch basin inspections, which are described in detail in SOP 1, "Dry Weather Outfall Inspection" and SOP 3, "Catch Basin Inspection and Cleaning", respectively, as well as from citizen reports.

This SOP assumes that the municipality has legal authority (i.e., a bylaw or ordinance) in place, per the requirements of the 2003 Massachusetts MS4 Permit, to prohibit the connection of non-stormwater discharges into the storm drain system. The authority or department for addressing illicit discharge reports would be clearly identified in the municipality's legal authority. In Massachusetts, this is typically a combination of the Board of Health, the Department of Public Works (or Highway Department), and the local sanitary sewer department or commission. In some communities, the Conservation Commission may also play a role. This SOP refers to "appropriate authority" generically to reflect differences in how municipalities have identified these roles.

Identifying Illicit Discharges

The following are often indicators of an illicit discharge from stormwater outfall:

1. Foam: indicator of upstream vehicle washing activities, or an illicit discharge.
2. Oil sheen: result of a leak or spill.
3. Cloudiness: indicator of suspended solids such as dust, ash, powdered chemicals and ground up materials.
4. Color or odor: Indicator of raw materials, chemicals, or sewage.
5. Excessive sediment: indicator of disturbed earth of other unpaved areas lacking adequate erosion control measures.
6. Sanitary waste and optical enhancers (fluorescent dyes added to laundry detergent): indicator of the cross-connection of a sewer service.
7. Orange staining: indicator of high mineral concentrations.

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 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.

Citizen Call in Reports

Reports by residents and other users of a water body can be effective tools in identifying the presence of illicit discharges. Many communities have set up phone hotlines for this purpose, or have provided guidance to local police departments and dispatch centers to manage data reported in this manner. Municipal employees and the general public should receive education to help identify the signs of illicit discharges and should be informed how to report such incidents.

When a call is received about a suspected illicit discharge, the attached IDDE Incident Tracking Sheet shall be used to document appropriate information. Subsequent steps for taking action to trace, document, and eliminate the illicit discharge are described in the following sections.

Potential illicit discharges reported by citizens should be reviewed on an annual basis to locate patterns of illicit discharges, identify high-priority catchments, and evaluate the call-in inspection program.

Tracing Illicit Discharges

Whenever an illicit discharge is suspected, regardless of how it was identified, the attached IDDE Incident Tracking Sheet should be utilized. The Incident Tracking Sheet shall be provided to the appropriate authority (i.e., Board of Health, Department of Public Works, etc.), which shall promptly investigate the reported incident.

If the presence of an illicit discharge is confirmed by the authority, but its source is unidentified, additional procedures to determine the source of the illicit discharge should be completed.

1. Review and consider information collected when illicit discharge was initially identified, for example, the time of day and the weather conditions for the previous 72 hours. Also consider and review past reports or investigations of similar illicit discharges in the area.
2. Obtain storm drain mapping for the area of the reported illicit discharge. If possible, use a tracking system that can be linked to your system map, such as GIS.
3. Document current conditions at the location of the observed illicit discharge point, including odors, water appearance, estimated flow, presence of floatables, and other pertinent information. Photograph relevant evidence.
4. If there continues to be evidence of the illicit discharge, collect water quality data using the methods described in SOP 13, "Water Quality Screening in the Field". This may include using field test kits or instrumentation, or collecting analytical samples for full laboratory analysis.
5. Move upstream from the point of observation to identify the source of the discharge, using the system mapping to determine infrastructure, tributary pipes, and drainage areas that contribute. At each point, survey the general area and surrounding properties to identify potential sources of the illicit discharge. Document observations at each point on the IDDE Incident Tracking Sheet as well as with photographs.
6. Continue this process until the illicit discharge is no longer observed, which will define the boundaries of the likely source. For example if the illicit discharge is present in catch basin 137

but not the next upstream catch basin, 138, the source of the illicit discharge is between these two structures.

If the source of the illicit discharge could not be determined by this survey, consider using dye testing, smoke testing, or closed-circuit television inspection (CCTV) to locate the illicit discharge.

Dye Testing

Dye testing is used to confirm a suspected illicit connection to a storm drain system. Prior to testing, permission to access the site should be obtained. Dye is discharged into the suspected fixture, and nearby storm drain structures and sanitary sewer manholes observed for presence of the dye. Each fixture, such as sinks, toilets, and sump pumps, should be tested separately. A third-party contractor may be required to perform this testing activity.

Smoke Testing

Smoke testing is a useful method of locating the source of illicit discharges when there is no obvious potential source. Smoke testing is an appropriate tracing technique for short sections of pipe and for pipes with small diameters. Smoke added to the storm drain system will emerge in connected locations. A third-party contractor may be required to perform this testing activity.

Closed Circuit Television Inspection (CCTV)

Televised video inspection can be used to locate illicit connections and infiltration from sanitary sewers. In CCTV, cameras are used to record the interior of the storm drain pipes. They can be manually pushed with a stiff cable or guided remotely on treads or wheels. A third-party contractor may be required to perform this testing activity.

If the source is located, follow steps for removing the illicit discharge. Document repairs, new sanitary sewer connections, and other corrective actions required to accomplish this objective. If the source still cannot be located, add the pipe segment to a future inspection program.

This process is demonstrated visually on the last page of this SOP.

Removing Illicit Discharges

Proper removal of an illicit discharge will ensure it does not recur. Refer to Table SOP 10-1, attached for, for examples of the notification process.

In any scenario, conduct a follow up inspection to confirm that the illicit discharge has been removed. Suspend access to the storm drain system if an “imminent and substantial danger” exists or if there is a threat of serious physical harm to humans or the environment.

Attachments

1. Illicit Discharge Incident Tracking Sheet

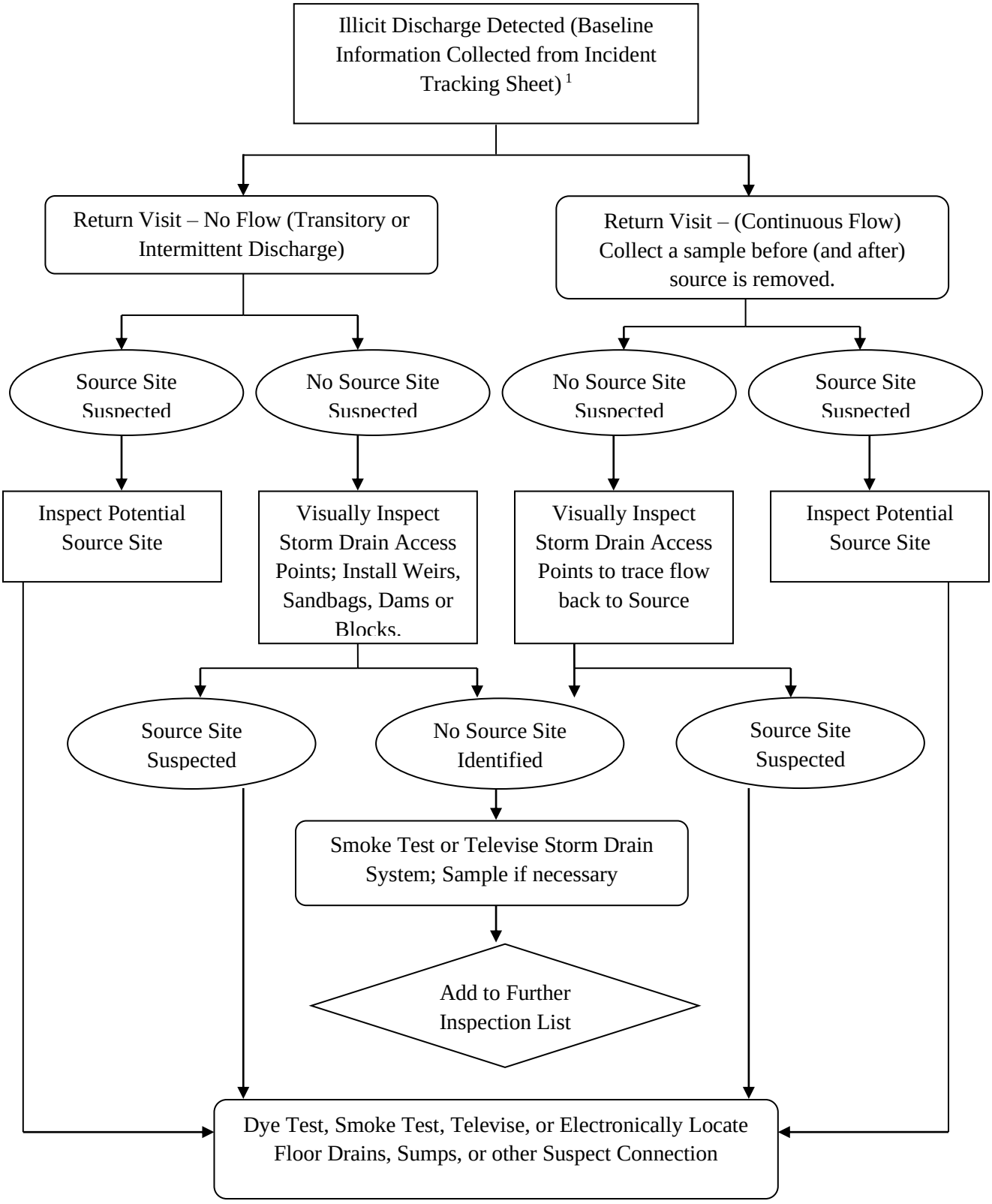
Related Standard Operating Procedures

1. SOP 1: Dry Weather Outfall Inspection
2. SOP 2: Wet Weather Outfall Inspection
3. SOP 3: Catch Basin Inspection
4. SOP 13: Using Field Test Kits For Outfall Screening
5. SOP 15: Private Drainage Connections

Table SOP 10-1

Notification and Removal Procedures for Illicit Discharges into the Municipal Separate Storm Sewer System

Financially Responsible	Source Identified	Enforcement Authority	Procedure to Follow
Private Property Owner	One-time illicit discharge (e.g. spill, dumping, etc.)	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Contact Owner • Issue Notice of Violation • Issue fine
Private Property Owner	Intermittent or continuous illicit discharge from legal connection	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Contact Owner • Issue Notice of Violation • Determine schedule for removal • Confirm removal
Private Property Owner	Intermittent or continuous illicit discharge from illegal connection or indirect (e.g. infiltration or failed septic)	Plumbing Inspector or ordinance enforcement authority	• Notify plumbing inspector
Municipal	Intermittent or continuous illicit discharge from illegal connection or indirect (e.g. failed sewer line)	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Issue work order • Schedule removal • Remove connection • Confirm removal
Exempt 3rd Party	Any	USEPA	• Notify exempt third party and USEPA of illicit discharge



[1] – *Guidelines and Standard Operating Procedures: Illicit Discharge Detection and Elimination and Pollution Prevention/Good Housekeeping for Stormwater Phase II Communities in New Hampshire*, New Hampshire Estuary Project, 2006, p. 25, Figure 2-1.

Illicit Discharge Incident Tracking Sheet

Incident ID:				
Responder Information (for Citizen-Reported issues)				
Call Taken By:		Call Date:		
Call Time:		Precipitation (inches) in past 24-48 hours:		
Observer Information				
Date and Time of Observation:		Observed During Regular Maintenance or Inspections? ☐ Yes ☐ No		
Caller Contact Information (optional) or Municipal Employee Information:				
Observation Location: (complete one or more below)				
Latitude and Longitude:				
Stream Address or Outfall #:				
Closest Street Address:				
Nearby Landmark:				
Primary Location Description	**Secondary Location Description:**			
☐Stream Corridor (In or adjacent to stream)	☐Outfall	☐In-stream Flow	☐Along Banks	
☐Upland Area (Land not adjacent to stream)	☐Near Storm Drain	☐Near other water source (stormwater pond, wetland, ect.):		
Narrative description of location:				
Upland Problem Indicator Description				
☐Dumping	☐Oil/Solvents/Chemicals	☐Sewage		
☐Detergent, suds, etc.	☐Other:_____			
Stream Corridor Problem Indicator Description				
Odor	☐None	☐Sewage	☐Rancid/Sour	☐Petroleum (gas)
	☐Sulfide (rotten eggs); natural gas	☐Other: Describe in "Narrative" section		
Appearance	☐"Normal"	☐Oil Sheen	☐Cloudy	☐Foam
	☐Optical enhancers	☐ Discolored		
	☐Other: Describe in "Narrative" section			
Floatables	☐None	☐Sewage (toilet paper, etc)	☐Algae	☐Trash or debris
	☐Other: Describe in "Narrative" section			
Narrative description of problem indicators:				
Suspected Source (name, personal or vehicle description, license plate #, address, etc.):				

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SOP 11: OIL/WATER SEPARATOR (OWS) MAINTENANCE

Oil/water separators (OWS), also known as gas/oil separators, are structural devices intended to provide pretreatment of floor drain water from industrial and garage facilities. An OWS allows oils (and substances lighter than water) to be intercepted and be removed for disposal before entering the sanitary sewer system. Substances heavier than water settle into sludge at the bottom of the unit. The remaining water passes through the unit into the sanitary sewer system.

OWS units are generally required where petroleum-based products, wastes containing petroleum, or oily and/or flammable materials are used, produced, or stored. OWS units should not be used to manage stormwater or flow from vehicle washing facilities. High flow rates through an OWS will reduce the structure's ability to separate materials. Detergents and solvents can emulsify oil and grease, allowing the particles to enter the sewer, so these should not be disposed of in drains entering the OWS.

General OWS Maintenance Requirements

1. Each OWS at a facility may receive different materials in different quantities, so the cleanout schedule may not be the same for every OWS at a facility.
2. Employees performing inspections of an OWS must be properly trained and be familiar with the maintenance of that specific structure, since function can vary based on design. Third-party firms may be utilized to perform quarterly inspections.
3. Do not drain petroleum, oil, or lubricants directly to an OWS. The structures are designed to manage these materials at low and medium concentrations in sanitary sewage, not as slug loads.
4. Do not drain antifreeze, degreasers, detergents, fuels, alcohols, solvents, coolant, or paint to the OWS.
5. Separator compartment covers should be tightly sealed to ensure floor drainage only enters the first compartment of the OWS.
6. Drains should be kept free of debris and sediment to the maximum extent practicable.
7. Spill cleanup materials should be maintained in the area served by the OWS. For more information on spill cleanup and response materials, refer to SOP 4, "Spill Response and Cleanup Procedures".

OWS Inspection Procedures

Daily inspection of an OWS should include a visual examination of the area served by the OWS for evidence of spills or leaks.

Weekly inspections of an OWS should include the following:

1. Visually examine the area served by the OWS for evidence of spills or leaks.
2. Inspect the point of discharge (i.e., sewer manhole) for evidence of petroleum bypassing the OWS.
3. Inspect drains for any signs of unauthorized substances entering the OWS.
4. Examine the OWS for signs of leaks or any malfunction.

Quarterly inspections of an OWS should include the following:

1. Complete tasks noted as appropriate for daily and weekly inspection.
2. Complete the Quarterly OWS Inspection Checklist, attached, during the inspection.
3. Take the following measurements to benchmark function of the OWS:
    A. Distance from rim of access cover to bottom of structure
    B. Distance from rim of access cover to top of sludge layer
    C. Depth of sludge layer (C = A – B)
    D. Distance from rim of access cover to the oil/water interface
    E. Distance from rim of access cover to the top of the liquid surface
    F. Depth of oil layer (F = D – E)

OWS Cleaning Procedures

Cleaning of the OWS is required when there has been a spill to the OWS that exceeds ten gallons of oil, one gallon of detergent or solvent, or any material prohibited by the owner of the sanitary sewer. Cleaning is also required when the levels of accumulated sludge and/or oil meet the manufacturer's recommended levels for cleaning. This will vary based on the manufacturer of the OWS. If the manufacturer's recommendations are unknown, the following guidelines are appropriate for determining when to clean:

1. When sludge accumulates to 25% of the wetted height of the separator compartment; or
2. When oil accumulates to 5% of the wetted height of the separator compartment; or
3. When 75% of the retention capacity of the OWS is filled.

Cleaning should be performed a minimum of once per year. When cleaning is required, it shall be performed by licensed OWS maintenance companies. Materials removed from the OWS must be disposed of in accordance with Massachusetts Hazardous Waste Regulations, 310 CMR 30.00.

Documentation of Cleaning and Service

The operator of the premises where the OWS is located shall maintain a log describing the date and type of all inspections, service and maintenance performed in connection with the Separator. Documentation shall include the identity of the inspector (or the identity of the person or entity that performed the service and/or maintenance). Records shall also document the amount of residue removed from the OWS each time it was cleaned, and how removed materials were disposed. This documentation shall be maintained for a minimum of six years.

Attachments

1. Quarterly OWS Inspection Checklist

Related Standard Operating Procedures

1. SOP 4, Spill Response and Cleanup Procedures

OIL/WATER SEPARATOR (OWS)
QUARTERLY INSPECTION CHECKLIST

Facility: _____

OWS Location: _____

Inspected By: _____

Date: _____

Visual Inspection	Are there any signs of spills or leaks in the general area?	**Yes** ☐ **No** ☐
	Is there any evidence of petroleum bypassing the OWS?	**Yes** ☐ **No** ☐
	Are there any unauthorized substances entering the OWS?	**Yes** ☐ **No** ☐
	Does the OWS exhibit any signs of leaks or malfunctions?	**Yes** ☐ **No** ☐

If you answered "Yes" to any of the above questions, further inspection, repair, and/or cleaning may be necessary.

Measurements	A	Distance from rim of access cover to bottom of structure	
	B	Distance from rim of access cover to top of sludge layer	
	C = A - B	Depth of sludge layer	
	D	Distance from rim of access cover to the oil/water interface	
	E	Distance from rim of access cover to the top of the liquid surface	
	F = D - E	Depth of oil layer	

If the values for "C" and/or "F" are greater than those in the manufacturer's recommendations, the OWS must be cleaned by a licensed OWS maintenance company.

SOP 12: Storage and Use of Pesticides and Fertilizer

Introduction

The use and improper storage of pesticides, herbicides, and fertilizers can contribute to the discharge of nutrients and toxic compounds to the municipal storm drainage system and surface waters. The goal of this Standard Operating Procedure (SOP) is to provide guidance on municipal employees on proper handling and storage of pesticides, herbicides, and fertilizers to prevent the discharge of pollutants from the MS4.

The Town does not use or store herbicides or pesticides. The Town of Ayer does not store any fertilizer. The Ayer Parks Department uses fertilizer on occasion in the infield of the ball fields or for new grass and purchase the fertilizer for that occasion. The Town does not use herbicides or pesticides. The Town contracts a company known as Turf Logic to come out and fertilize the Town Hall, Fire Station, Police Station, and Library. Turf Logic will apply their own fertilizer and take any unused amounts with them at the end of the application.

Procedures

Below are procedures for the storage and use of fertilizers, pesticides, and herbicides by municipal employees. In this section, the term "pesticide" include products used as herbicides. Refer to SOP 4: Spill Response and Cleanup and SOP 17: Hazardous Materials Storage and Handling for information on and handling spills and hazardous materials.

Storage

- Store pesticides and fertilizers in high, dry locations in accordance with the manufacturer's specifications.
- Store in cool, well-ventilated, and insulated areas to protect against temperature extremes.
- Store in areas that have been constructed in accordance with local fire codes for storing flammable or combustible materials.
    - Flammable products should be stored separately from non-flammable products, preferably in a fire-proof cabinet.
    - Small quantities (less than 500 lbs. or 220 gallons) of pesticides can be stored in cabinets constructed of double-walled 18-gauge sheet metal.
    - Large quantities (greater than 500 lbs. or 220 gallons) of pesticides can be stored in a prefabricated Hazardous Material Storage building or in a purpose-built storage facility. It is not anticipated that many municipal facilities will store quantities in excess of 500 lbs. or 220 gallons of pesticides.
    - Building walls should have a two-hour fire rating and be impervious to the stored materials.
    - Floors should be watertight, impervious, and provide spill containment.
- Store materials in an enclosed area or in covered, impervious containment, such as a locked cabinet. The cabinet should be located in a first story room or one that has direct access to the outdoors. Storage areas should be equipped with easily accessible spill cleanup materials and portable firefighting equipment. Regularly inspect storage areas for leaks and spills. Emergency eyewash stations and emergency drench showers should be located near the storage area.

- For pesticides, storage cabinets should be kept locked and the door to the storage area should contain a weather proof sign that warns of the existence and danger of the pesticides inside. The door should be kept locked. The sign should be visible at a distance of 25 feet and should read as follows:

DANGER
PESTICIDE STORAGE AREA
ALL UNAUTHORIZED PERSONS KEEP OUT
KEEP DOORS LOCKED WHEN NOT IN USE

  The sign should be posted in both English and any other language used by maintenance workers.
- Pesticides should not be stored in the same place as ammonium nitrate fertilizer.
- Separate pesticides and fertilizers from other chemical storage and other flammable materials.
- Label all containers with date of purchase. Clearly label all secondary containers. Use older materials first.
- Order for delivery as close to the time of use as possible to reduce the amount of chemicals stored at the facility.
- Order only the amount of materials needed in order to minimize excess or obsolete materials, which require storage and disposal.
- Never leave unlabeled or unstable pesticides and fertilizers in uncontrolled locations.
- Maintain a current written inventory of all pesticides and fertilizers at the storage site.
- Ensure that contaminated waste materials are kept in designated containers and stored in labeled, designated, covered, and contained areas.
- Dispose of excess or obsolete pesticides/fertilizers and associated waste materials in accordance with the manufacturer's specification and all applicable regulations.

Use and Application of Fertilizers

- All fertilizer products manufactured or distributed in the State of Massachusetts must be registered with the Department of Agricultural Resources.
- Perform soil testing before choosing a fertilizer. The quantity of available nutrients already present in the soil will determine the type and amount of fertilizer that is recommended. The soil test will also determine the soil pH, humic matter, texture, and exchangeable acidity, which will indicate whether pH adjustment is required for fertilizer to work efficiently. A soil test should be completed at each facility, as soil type can vary widely within a single community.
    - Soil tests are recommended every 3-4 years for turf and plantings (more frequently for problem or newly planted areas) and every year for soil where phosphorus-containing fertilizers are used. Soil pH tests should be conducted every year for all sites.
    - When collecting soil samples, take multiple samples for each target area at a four-inch depth; mix the samples together in a container and properly label the sample with property information and site use type. Separately sample areas that have discoloration, abnormal plant growth, or other problems. Take the sample at approximately the same time every year. If the area has been fertilized, wait eight weeks after fertilizing to test the soil to ensure nutrients have been absorbed.

- When selecting the optimal type of fertilizer to use on an area, consider the soil test results, type of turf, and type of turf use. Slow-use fertilizer should be used for turf grass.
- Calibrate application equipment regularly to ensure proper application and loading rates.
- Mix fertilizers using clean application equipment under cover in an area where accidental spills will not enter surface water or groundwater and will not contaminate the soil.
- Fertilizers should only be applied by properly trained personnel.
- Never apply fertilizers in quantities exceeding the manufacturer's instructions. Instead, apply small amounts throughout the growing season.
- Time fertilizer application methods for maximum plant uptake, usually in the fall and spring (e.g., between April 15 and October 15). When applying at the beginning and end of planting season, take into consideration the slower uptake rate of fertilizer by plants and adjust the fertilizer application accordingly.
- Never apply fertilizer during a drought, when the soil is dry or frozen, when it is raining, or immediately before expected rain.
- Fertilizer should be applied when the ground temperature is above 55° F.
- Apply fertilizers in amounts appropriate for the type of vegetation to minimize losses to surface water and groundwater. Use the results of the soil test to determine optimal fertilizer timing and application rates.
- Where applicable, till fertilizers into the soil rather than dumping or broadcasting (proper application techniques will depend on the type of soil and vegetation).
- Do not hose down paved areas after fertilizer application if drainage will enter into an engineered storm drain system or drainage ditch.
- Limit irrigation after fertilizer application to prevent runoff (approximately ½ inch of water per application for a week following application).
- Turn off irrigation systems during periods of adequate rainfall.
- Do not over-apply fertilizer in late fall to "use it up" before winter. The effectiveness of fertilizer does not reduce when stored.
- If phosphorus fertilizer is used when re-seeding, mix the phosphorus into the root zone. Do not apply directly to the soil surface.
- Avoid combined products such as "weed and feed," which do not target specific problems at the appropriate time.

Use and Application of Pesticides and Herbicides

The State of Massachusetts has a stringent program for registration of pesticides and certification of those authorized to apply them. Once a pesticide has been approved for use by the USEPA, it must be registered by the Massachusetts Pesticide Board Subcommittee prior to being distributed, purchased, or used in Massachusetts. Pesticide classification in Massachusetts is based on the potential adverse effects the pesticide may have on humans or the environment. "Restricted Use" pesticides can only be sold by Licensed Dealers to Certified Applicators, while "State Limited Use" pesticides may be restricted to use by certain individuals or require written permission from the Department of Agricultural Resources prior to use. Legal application of pesticides must be performed by an individual licensed or certified by the Massachusetts Department of Agricultural Resources. A Commercial Applicator License is required for applying general use pesticides, and a Commercial Applicator Certification is required for applying restricted and state limited use products.

Use and Application of Pesticides

- Pesticides should only be applied by licensed or certified applicators.
- Calibrate application equipment regularly to ensure proper application and loading rates.
- Ensure that pesticide application equipment is capable of immediate shutoff in case of emergency.
- Conduct spray applications according to specific label directions and applicable local regulations.
- Never apply pesticides in quantities exceeding the manufacturer's instructions.
- Apply pesticides at the life stage when the pest is most vulnerable.
- Never apply pesticides if it is raining or immediately before expected rain.
- Establish setback distances from pavement, storm drains, and waterbodies, which act as buffers from pesticide application, with disease-resistant plants and minimal mowing.
- Do not apply pesticides within 100 feet of open waters or of drainage channels.
- Spot treat infected areas instead of the entire location.
- Mix pesticides and clean application equipment under cover in an area where accidental spills will not enter surface water or groundwater and will not contaminate soil.
- Do not hose down paved areas after pesticide application to a storm drain or drainage ditch.
- Recycle rinsate from equipment cleaning back into product.
- Choose the least toxic pesticide that is still capable of reducing the infestation to acceptable levels.
- Use alternatives to pesticides, such as manual weed control, biological controls, and Integrated Pest Management strategies (learn more at: https://www.mass.gov/files/documents/2016/08/wk/ipm-kit-for-bldg-mgrs.pdf).
- For the use of herbicides, reduce seed release of weeds by timing cutting and pesticide application at seed set. Select vegetation and landscaping that is low-maintenance in order to tolerate low levels of weeds without interfering with aesthetics.

Employee Training

- Employees who handle pesticides, fertilizers, and herbicides are trained once per year on proper handling and storage procedures.
- 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

- SOP 4: Spill Response and Cleanup
- SOP 17: Hazardous Materials Storage and Handling

SOP 13: WATER QUALITY SCREENING IN THE FIELD

Introduction

Outfalls from an engineered storm drain system can be in the form of pipes or ditches. Under current and pending regulations, it is important to inspect and document water quality within the MS4 system under both dry weather and wet weather conditions. SOP 1, "Dry Weather Outfall Inspection" and SOP 2, "Wet Weather Outfall Inspection", cover the objectives of these activities and how water quality parameters can be collected during both types of inspections. SOP 3, "Catch Basin Inspection and Cleaning", describes how this operations and maintenance activity can serve as an additional opportunity to collect water quality data.

SOP 2 included detailed information on how to collect discrete analytical samples to be processed by a laboratory. In contrast, this SOP addresses screening-level measurements than can be collected at outfalls, catch basins, receiving waters, or other water bodies. The measurements can be collected with field test kits or with portable meters.

Water quality screening data collected in this manner can feed into an illicit discharge detection and elimination investigation, like the process described in SOP 10, "Locating Illicit Discharges".

Visual Condition Assessment

SOP 1, SOP 2, and SOP 3 describe a Visual Condition Assessment to collect observations related to the quality of stormwater conveyed by an engineered storm drain system. These observations may include such visual evidence and/or potential pollutants as:

- Foaming (detergents)
- Discoloration
- Evidence of sanitary waste
- Optical enhancers (fluorescent dyes added to laundry detergent); and
- Turbidity

If a Visual Condition Assessment indicates the presence of these pollutants, it may be necessary to quantify the extent of each, and gather data on other parameters that cannot be visually observed but can be measured using field kits or meters. These parameters include:

- Ammonia
- Chloride (present in treated drinking water but not groundwater)
- Conductivity
- Fluoride
- Hardness
- pH

- Potassium

Field Kits and Sampling Methods Available

In recent drafts of new MS4 Permits, U.S. EPA Region 1 has identified several test kits that are acceptable for use in the field, and other regulatory agencies have also completed similar reviews. The following table shows field test kits and portable meters that can be used for screening parameters.

Table SOP 13-1
Field Measurements, Test Kits, and Instrumentation

Analyte or Parameter	Instrumentation (Portable meter)	Field Test Kit
Ammonia	CHEMetrics™ V-2000 Colorimeter Hach™ DR/890 Colorimeter Hach™ Pocket Colorimeter™ II	CHEMetrics™ K-1410 CHEMetrics™ K-1510 (series) Hach™ NI-SA Hach™ Ammonia Test Strips
Bacteria	Bacteria field test kits require 24-hour window	
Boron	N/A	Hanna™ HI 38074 Taylor™ K-1541
Chloride	CHEMetrics™ V-2000 Colorimeter Hach™ Pocket Colorimeter™ II LaMotte™ DC1200 Colorimeter	CHEMetrics™ K-2002 through K-2070 Hach™ CDS-DT Hach™ Chloride QuanTab® Test Strips
Color		Hach™ ColorDisc
Conductivity	CHEMetrics™ I-1200	N/A
Detergents (Surfactants)	CHEMetrics™ I-2017	CHEMetrics™ K-9400 and K-9404 Hach™ DE-2
Fluoride	CHEMetrics™ V-2000 Colorimeter Hach™ Pocket Colorimeter™ II	N/A
Hardness	N/A	CHEMetrics™ K-1705 and K-1710 CHEMetrics™ K-4502 through K-4530 Hach™ HA-DT Hach™ Hardness Test Strips
Optical enhancers	Field tests still under development	
pH	CHEMetrics™ I-1000	Hach™ 17J through 17N Hach™ pH Test Strips
Potassium	Horiba™ Cardy C-131	LaMotte™ 3138 KIW
Turbidity	CHEMetrics™ I-1300	N/A

Each field test kit will include instructions specific to that test kit, and most kits are available in configurations that detect different ranges of the parameter. For example, the CHEMetrics™ detergents kit K-9400 shown above detects concentrations of 0 to 3 milligrams per liter (mg/L) while the K-9404 kit detects concentrations of 0 to 1,400 mg/L.

The table below shows values identified by the U.S. EPA and the Center for Watershed Protection as typical screening values for select parameters. These represent the typical concentration (or value) of each parameter expected to be found in stormwater. Screening values that exceed these benchmarks may be indicative of pollution and/or illicit discharges.

Table SOP 13-2
Benchmark Field Measurements for Select Parameters

Analyte or Parameter	Benchmark
Ammonia	>50.0 mg/L
Conductivity	>2,000
Detergents (Surfactants)	> 0.25 mg/L
Fluoride	>0.25 mg/L
pH	<5
Potassium	>20 mg/L

If and when water quality screening samples, whether using field test kits or portable meters, exceed these benchmark concentrations, the inspector should consider collecting analytical samples for laboratory analysis.

Advantages and Disadvantages of Field Testing

Field test kits can be convenient for use as a screening tool, initial purchase costs are low (typically $0.50 to $5.00 for the kits included in Table SOP 13-1), and the costs are far less than full analyses at a laboratory. However, some disadvantages of this screening method include:

- Limited shelf life
- Labor cost associated with inspector's time
- Generation of wastes, including glass vials and used reagent
- Steps and processes for each kit can vary widely, resulting in errors
- Trained staff are required in order to effectively utilize kits
- Not all kits are accepted by all regulatory agencies
- Limited useful detection range

Portable instrumentation such as the colorimeters shown in Table SOP 13-1 have the benefit of providing accurate readings, measure to low detection limits, and can be purchased pre-programmed to measure concentrations of most parameters required. Disadvantages of portable instrumentation include:

- High initial purchase cost
- Requirement for ongoing calibration and maintenance
- Individual probes require periodic replacement
- Specific storage requirements to maintain calibration
- Trained staff are required in order to effectively utilize meters

Related Standard Operating Procedures

1. SOP 1, Dry Weather Outfall Inspection
2. SOP 2, Wet Weather Outfall Inspection
3. SOP 3, Catch Basin Cleaning and Inspection
4. SOP 10, Locating Illicit Discharges

WATER QUALITY SCREENING FORM

Outfall I.D.			
Outfall 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 ☐			
Most Recent Storm Event			

FIELD WATER QUALITY SCREENING RESULTS

Sample Parameter	Field Test Kit or Portable Instrument Meter	Benchmark	Field Screening Result	Full Analytical Required?
Ammonia[1]		> 50.0 mg/L		☐ Yes ☐ No
Boron[1]		> 0.35 mg/L		☐ Yes ☐ No
Chloride[2]		230 mg/L		☐ Yes ☐ No
Color[1]		> 500 units		☐ Yes ☐ No
Specific Conductance[1]		> 2,000 µS/cm		☐ Yes ☐ No
Detergents & Surfactants[3]		> 0.25 mg/L		☐ Yes ☐ No
Fluoride[3]		> 0.25 mg/L		☐ Yes ☐ No
Hardness[1]		< 10 mg/L or > 2,000 mg/L		☐ Yes ☐ No
pH[1]		< 5		☐ Yes ☐ No
Potassium[1]		> 20 mg/L		☐ Yes ☐ No
Turbidity[1]		> 1,000 NTU		☐ Yes ☐ No

[1] – *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*, Center for Watershed Protection and Robert Pitt of University of Alabama, 2004, p. 134, Table 45.

[2] –*Env-Ws 1703.21 Water Quality Criteria for Toxic Substances*, State of New Hampshire Department Surface Water Quality Regulations.

[3] – *Appendix I – Field Measurements, Benchmarks and Instrumentation*, Draft Massachusetts North Coastal Small MS4 General Permit, 2009.

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FULL ANALYTICAL TESTING WATER QUALITY RESULTS

Sample Parameter	Analytical Test Method	Sample Collection (Time/Date)	Testing Lab	Analytical Testing Result
Ammonia	EPA 350.2/SM4500-NH3C			
Bacteria	E coli: 1103.1; 1603 Enterococcus: 1106.1; 1600			
Boron	EPA 212.3			
Chloride	EPA 9251			
Color	EPA 110.2			
Specific Conductance	SM 2510B			
Detergents & Surfactants	EPA 425.1/SM5540C			
Fluoride	EPA 300.0			
Hardness	EPA 130.1/SM 2340B			
Optical Enhancers	N/A*			
pH	EPA 150.1/SM 4500H			
Potassium	EPA 200.7			
Turbidity	SM 2130B			

*- There is presently no USEPA Standard Method for analysis of optical enhancers. Typically, sample pads are described as with "Present" or "Not Present" for fluorescing dye when exposed to UV light or a fluorometer.

SOP 14: MUNICIPAL VEHICLE WASHING PROCEDURES

Introduction

Vehicle washing activities can result in the discharge of nutrients, sediment, petroleum products, and other contaminants to a surface water body or to an engineered drainage system.

Consistent with the 2003 USEPA NPDES Phase II Small Municipal Separate Storm Sewer System (MS4) Permit, municipal vehicle washing activities should not discharge pollutants to the MS4 system.

Outdoor Vehicle Washing Procedures

Outdoor washing of municipal vehicles should be avoided unless wash water is contained in a tight tank or similar structure. Where no alternate wash system is available, and full containment of wash water cannot be achieved, the following procedures shall be followed:

1. Avoid discharge of any wash water directly to a surface water (e.g., stream, pond, drainage swale, etc.)
2. Minimize use of water to the extent practical.
3. Where use of detergent cannot be avoided, use products that do not contain regulated contaminants. Use of a biodegradable, phosphate-free detergent is preferred.
4. Do not use solvents except in dedicated solvent parts washer systems or in areas not connected to a sanitary sewer.
5. Do not power wash, steam clean or perform engine cleaning or undercarriage cleaning.
6. Grassy and pervious (porous) surfaces may be used to promote direct infiltration of wash water, providing treatment before recharging groundwater and minimizing runoff to an adjacent stormwater system. Pervious surfaces or other infiltration-based systems shall not be used within wellhead protection areas or within other protected resources.
7. Impervious surfaces discharging to engineered storm drain systems shall not discharge directly to a surface water unless treatment is provided. Treatment can include a compost-filled sock designed specifically for removal of petroleum and nutrients, such as the Filtrexx™ FilterSoxx product, or equal. The treatment device shall be positioned such that all drainage must flow through the device, preventing bypassing or short-circuiting.
8. All adjacent engineered storm drain system catch basins shall have a sump. These structures shall be cleaned periodically (refer to SOP 3, “Catch Basin Inspection and Cleaning”).
9. Solids and particulate accumulation from the washing area shall be completed through periodic sweeping and/or cleaning.
10. Maintain absorbent pads and drip pans to capture and collect spills or noticeable leaks observed during washing activities. Clean up any spills using the procedures described in SOP 4, “Spill Response and Cleanup Procedures”.

Heavily soiled vehicles or vehicles dirtied from salting or snow removal efforts shall not be washed outside, without exception.

Indoor Vehicle Washing Procedures

Indoor vehicle washing procedures shall include the following:

1. Where use of detergent cannot be avoided, use products that do not contain regulated contaminants. Use of a biodegradable, phosphate-free detergent is preferred.
2. Detergents shall not be used in areas where oil/water separators provide pre-treatment of drainage (refer to SOP 11, "Oil/Water Separator Maintenance", for more information).
3. Floor drains shall be connected to a sanitary sewer or tight tank. Floor drains discharging to adjacent surface water bodies or engineered storm drain systems shall be permanently plugged or otherwise abandoned before any vehicle wash activities are completed.
4. Designate separate areas for routine maintenance and vehicle cleaning. This helps prevent contamination of wash water by motor oils, hydraulic lubricants, greases, etc.
5. Dry clean-up methods, such as sweeping and vacuuming, are recommended within garage facilities. Do not wash down floors and work areas with water.
6. Bring smaller vehicles to commercial washing stations.
7. Maintain absorbent pads and drip pans to capture and collect spills or noticeable leaks observed during washing activities. Clean up any spills using the procedures described in SOP 4, "Spill Response and Cleanup Procedures".

Heavy Equipment Washing Procedures

Heavy equipment washing procedures shall include the following:

1. Mud and heavy debris removal shall occur on impervious pavement or within a retention area.
2. Maintain these areas with frequent mechanical removal and proper disposal of spoils.
3. All adjacent engineered storm drain system components shall have a sump. These structures shall be cleaned periodically (refer to SOP 3, "Catch Basin Inspection and Cleaning").
4. Impervious surfaces with engineered storm drain systems shall not discharge directly to a surface water.
5. Floor drains shall be connected to a sanitary sewer or tight tank. Floor drains discharging to adjacent surface water bodies or engineered storm drain systems shall be permanently plugged or otherwise abandoned before any vehicle wash activities are completed.
6. Where use of detergent cannot be avoided, use products that do not contain regulated contaminants. Use of a biodegradable, phosphate-free detergent is preferred.
7. Detergents shall not be used in areas where oil/water separators provide pre-treatment of drainage (refer to SOP 11, "Oil/Water Separator Maintenance", for more information).
8. Maintain absorbent pads and drip pans to capture and collect spills or noticeable leaks observed during washing activities. Clean up any spills using the procedures described in SOP 4, "Spill Response and Cleanup Procedures".

Engine Washing and Steam Washing Procedures

Engine and steam washing procedures shall include the following:

1. Do not wash parts outdoors.
2. Maintain drip pans and smaller containers to contain motor oils, hydraulic lubricants, greases, etc. and to capture and collect spills or noticeable leaks observed during washing activities, to the extent practicable. Clean up any spills using the procedures described in SOP 4, "Spill Response and Cleanup Procedures".
3. Where use of detergent cannot be avoided, use products that do not contain regulated contaminants. Use of a biodegradable, phosphate-free detergent is preferred.
4. Avoid cleaning with solvents except in dedicated solvent parts washer systems. Make use of pressure washing and steam cleaning.
5. Recycle clean solutions and rinse water to the extent practicable.
6. Wash water shall discharge to a tight tank or a sanitary sewer via an oil/water separator. Detergents shall not be used in areas where oil/water separators provide pre-treatment of drainage (refer to SOP 11, "Oil/Water Separator Maintenance", for more information).

Related Standard Operating Procedures

1. SOP 3, Catch Basin Inspection and Cleaning
2. SOP 4, Spill Response and Cleanup Procedures
3. SOP 11, Oil/Water Separator Maintenance

SOP 15: 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.

The municipalities regulated under the 2003 Massachusetts MS4 Permit have approved connection of the above sources to engineered storm drain systems in a variety of ways, ranging from full acceptance to full prohibition of discharges from these sources.

This Standard Operating Procedure intends to provide guidance to the municipalities 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 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, drainlayer permits, and other construction permits as required by the municipality.
9. 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.
10. 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.
11. The applicant agrees to install a backflow preventer, cleanout, and a shutoff device in such places that all fittings are accessible to the municipality.
12. The applicant agrees to install an oil/water separator, if required by the municipality, and provide documentation of maintenance of this device.
13. 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.

14. The applicant agrees to provide record drawings to the municipality documenting the location of the discharge, with ties to permanent structures.
15. The applicant agrees to pay any annual review or inspection fees associated with the discharge.

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 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.
4. The connection would be located within 100 linear feet of a subsurface wastewater disposal system (i.e., septic system).
5. The connection would be located within a public drinking water supply Zone I.
6. 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.
7. 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.
8. The connection jeopardizes public health, safety, or natural resources.
9. The 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.

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):

- 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.

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.

SUMP PUMP INSPECTION

Discharge from sump pumps is not always an allowable non-stormwater discharge. As such, the practice of connecting sump pumps to the engineered storm drain system was not fully addressed by the 2003 Massachusetts MS4 Permit. It is therefore up to the discretion of the municipality to determine whether or not a building owner should be permitted to connect a sump pump to the engineered storm drain system.

All sump pumps that have been approved via permit process to tie into the engineered storm drain system should be inspected annually. The inspector has the right to enter and inspect the premises where the sump pump is located, including any tanks, storage areas, or rooms that may discharge or be caused to discharge to the sump pump. The inspector also has the right to sample or monitor any substances or parameters at any location for purposes of assuring compliance with the Sump Pump 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.

This form shall be used by the inspector to ensure that the sump pump remains in compliance with the current policy.

General Information

Address of Connection			
Make/Model			
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 sump pump 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
Sump pump is used for the discharge of stormwater only	True ☐ False ☐	
The discharge, and liquid in the sump, 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 ☐	

The pump presently utilized is the same as the pump approved by the municipality.	True ☐ False ☐	

(continued)

Condition	Evaluation	Comment
The pump presently utilized is the same as the pump approved by the municipality.	True ☐ False ☐	
Backflow preventer, cleanout, and shutoff device remain operational and easily accessible to municipality	True ☐ False ☐	
Other:		

Review of Compliance with Sump Pump 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 sump pump, including grandfathered sump pumps.

☐	There is inadequate capacity of the drainage system to manage flow from the connection.
☐	Private drainage includes flow from industrial users or sources.
☐	Private drainage includes flow from multiple users, systems, or sources.
☐	The connection is located within 100 linear feet of a subsurface wastewater disposal system, such as a septic system.
☐	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 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 Agreement.

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.

SOP 16: Streets and Parking Lots

Introduction

Regular sweeping of streets and municipally-owned parking lots is important for maintaining clean and safe roadways. It also plays a vital role in keeping pollutants like sand, trash, and leaves out of the MS4. The goal of this written Standard Operating Procedure (SOP) is to provide guidance to municipal employees on street and parking lot sweeping procedures and frequencies to reduce the discharge of pollutants to the storm drainage system and receiving waters. If sweeping 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.

Streets and municipally-owned parking lots are swept by the DPW Highway Division. All streets and lots are swept once annually. Main arterials are swept at least twice annually. Main Street is swept once a week during the summer months. The DPW uses a 2017 Elgin Pelican Streetsweeper.

Procedures

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

Sweeping Frequency

- All streets should be swept and/or cleaned a minimum of once per year in the spring (with the exception of rural uncurbed roads with no catch basins or high speed limited access highways).
- Sweep as soon as possible after snow melt and following winter activities such as sanding to capture sand and debris before it is washed into the storm drainage system.
- Consider more frequent sweeping 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.
- For rural uncurbed roadways with no catch basins and limited access highways, the Town of Ayer will either meet the minimum frequencies above, or develop and implement an inspection, documentation, and targeted sweeping plan outlining reduced frequencies within two (2) years of the effective date of the MS4 Permit, and submit such plan with its year one annual report.
- In accordance with Impaired Water requirements, the Town of Ayer will conduct more frequent sweeping for municipally-owned streets and parking lots. Sweeping will 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) to reduce runoff to Nashua River (Segment MA81-05). The following streets and parking lots will be targeted:
    - West Main Street (west of Verbeck Gate)
- In accordance with Impaired Water requirements, the Town of Ayer will develop a schedule for increased street sweeping frequency to reduce pollutant discharges from areas with high pollutant loads. The following streets and parking lots will be targeted to reduce runoff to Grove Pond:
    - Grove Pond Neighborhood (Grove Street, Fletcher Street, and all streets south of the aforementioned)
    - Pirone Park parking lot and driveway
    - Grove Pond Water Treatment Plant

- The Town of Ayer's annual report will include the street sweeping schedule developed above to target areas with high pollutant loads.

Sweeping Practices

- Street sweeping should be conducted in dry weather. Sweeping should not be conducted during or immediately after rain storms.
- Dry cleaning methods should be used whenever possible, with the exception of very fine water spray for dust control. Avoid wet cleaning or flushing of the pavement.
- When necessary, enact parking bans to facilitate sweeping on busy streets.
- Sweep in a manner that avoids depositing debris into storm drains.
- Sweeping equipment (mechanical, regenerative air, vacuum filter, tandem sweeping) should be selected depending on the level of debris. Brush alignment, sweeper speed, rotation rate, and sweeping pattern should be set to optimal levels to manage debris.
- Routinely inspect and perform maintenance on sweeping equipment to reduce the potential for leaks. See SOP 21: Operations and Maintenance of Municipal Vehicles and Equipment for more information.

Sweepings Reuse and Disposal

- The reuse of sweepings is recommended by MassDEP. If street sweepings are reused (e.g., as anti-skid material or fill in parking lots), they should be properly filtered to remove solid waste, such as paper or trash, in accordance with their intended reuse. All reuse and/or disposal of street sweepings will be managed in accordance with current MassDEP policies and regulations.
- Sweepings intended for reuse can be stored for up to one year in approved temporary storage areas. Storage areas should be protected to prevent erosion and runoff and should be located away from wetland resource areas and buffer zones, surface water, or groundwater.
- Sweepings are classified as solid waste. If not reused, they should be disposed of at solid waste disposal sites.
- For additional information on approved reuses of sweepings and storage/disposal policies, refer to MassDEP policy #BAW-18-001: Reuse and Disposal of Street Sweeping (https://www.mass.gov/files/documents/2018/05/14/street-sweepings.pdf).
- The Town of Ayer does not reuse street sweepings. Street sweepings will be disposed of at an acceptable receiving facility in accordance with applicable laws.

Documentation and Reporting

The following information should be documented and included in each annual report:

- Number of miles cleaned or the volume or mass of material removed (refer to the sweeping log in the attachments).

Employee Training

- Employees who perform street and parking lot sweeping are trained once per year 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.

Attachments

1. Street and Parking Lot Sweeping Log

Related Standard Operating Procedures

1. SOP: Operations and Maintenance of Municipal Vehicles and Equipment

Street Sweeping Log
Ayer, Massachusetts

Date	Operator	Weather Conditions	Streets/Parking Lots Swept	Number of Miles Swept	Volume/Mass of Material Removed	Corrective Action Taken/Recommended

SOP 17: Hazardous Materials Storage and Handling

Introduction

A hazardous material is any biological, chemical, or physical material with properties that make it dangerous or potentially harmful to human health or the environment. Hazardous materials can be released to the environment in a variety of ways. When hazardous materials come into contact with rain or snow, the pollutants are washed into the storm sewer system and to surface waterbodies and/or groundwater. Hazardous materials associated with municipal facilities and their operations include, but are not limited to, oil, gasoline, antifreeze, fertilizers, pesticides, and de-icing agents and additives.

Municipally owned or managed facilities where hazardous materials are commonly stores and handled include:

- Equipment storage and maintenance yards
- Hazardous waste disposal facilities
- Hazardous waste handling and transfer facilities
- Composting facilities
- Materials storage yards
- Municipal buildings and facilities (e.g., schools, libraries, police and fire departments, town offices, municipal pools, and parking garages)
- Public works yards
- Solid waste handling and transfer facilities
- Vehicle storage and maintenance yards
- Water and wastewater facilities

Minimizing or eliminating contact of hazardous materials with stormwater can significantly reduce pollution of receiving waters. Proper hazardous material handling and storage also contributes to employee health, an organized workplace, and efficient operations. The goal of this written Standard Operating Procedure (SOP) is to provide guidance to municipal employees to help prevent stormwater pollution resulting from the handling and storage of hazardous materials. If services are contracted, this SOP should be provided to the contractor. The contract should also specify that the contractor is responsible for compliance with all applicable laws.

The Town of Ayer undertakes various activities in regard to handling and storing hazardous materials.

The municipality has SWPPPs for the wastewater treatment plant, water treatment plant (Grove Pond), Highway Department, and Transfer Station. Spill response at these facilities is in accordance with the SWPPPs. General spills at other locations are completed in accordance with MassDEP regulations.

Procedures

The Town of Ayer will implement the following procedures for handling and storing hazardous materials to reduce the discharge of pollutants to the MS4:

Handling, Loading, and Unloading

- Avoid loading/unloading materials in the rain and/or provide cover.
- Retrace areas where materials have been transferred to identify spills. If spills are found, immediately clean them up. Follow procedures in SOP 4: Spill Response and Cleanup.
- Time delivery and handling of materials during favorable weather conditions whenever possible (e.g., avoid receiving loads of sand during windy weather).
- Inspect containers for material compatibility and structural integrity prior to loading/unloading any raw or waste materials.
- Use dry cleanup methods (e.g., squeegee and dust pan, sweeping, and absorbents as last step) rather than hosing down surfaces.

Material Storage

- Confine material storage indoors whenever possible. Plug or disconnect floor drains that lead to the stormwater system.
- Confine outdoor material storage to designated areas that are covered, on impervious surfaces, away from high traffic areas, and outside of drainage pathways.
- Store containers on pallets or equivalent structures to facilitate leak inspection and to prevent contact with wet floors that can cause corrosion. This technique also reduces incidences of container damage by insects and rodents.
- Store materials and waste in materially compatible containment units.
- Keep hazardous materials in their original containers.
- If materials are not in their original containers, clearly label all storage containers with the name of the chemical, the expiration date, and handling instructions.
- Maintain an inventory of all raw and waste materials to identify leakage. Order new materials only when needed.
- Provide secondary containment for storage tanks and drums with sufficient volume to store 110 percent of the volume of the material.
- Provide sufficient aisle space to allow for routine inspections and access for spill cleanup.
- Inspect storage areas for spills or leaks and containment units for corrosion or other failures.

Waste Treatment, Disposal, and Cleanup

- Adopt a regular schedule for the pick-up and disposal of waste materials.
- Recycle leftover materials whenever possible.
- Substitute nonhazardous or less-hazardous materials for hazardous materials whenever possible.
- Protect empty containers from exposure to stormwater and dispose of them regularly to avoid contamination from container residues.

Employee Training

- Employees who handle and use hazardous materials are trained once per year on these procedures.
- 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. SOP 4: Spill Response and Cleanup

SOP 18: Winter Road Maintenance

Introduction

Winter road maintenance includes snow removal and the use of salt, 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.

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

The Town does not treat the roads with sand. The Town uses ProMelt (a brine solution) is added to 100% sodium chloride (NaCl) to treat the roads. The DPW performs plowing townwide and at specific Town properties. The Highway Division will handle events where little or no plowable snow is anticipated. When significant snowfall is anticipated, the entire DPW (excluding office/administrative staff) and a handful of outside contractors perform with snow plowing. The Town uses its own equipment for plowing and spreading salt. Spreaders are manual control type. Salt and brine are stored under cover.

Procedures

The Town of Ayer will implement 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 according to procedures in SOP: Operations and Maintenance of Municipal Vehicles and Equipment.
- Regularly inspect and maintain equipment to reduce the potential for leaks. See SOP: Operations and Maintenance of Municipal Vehicles and Equipment for more information.

Anti-icing and Deicing

- Minimize the use and optimize the application of sodium chloride and other salt[1] (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.
- Remove as much snow as possible using mechanical means like plowing, blowing, or shoveling before deicing to reduce the need for road salt or other deicing chemicals.
- 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.
- Use alternative deicing materials instead of sodium chloride as appropriate (e.g., calcium magnesium acetate, magnesium chloride, or calcium chloride).
- Avoid mixing road salt and sand. Doing so makes both the salt and sand work less efficiently and leads to over-application.
- 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.
- 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.
- Track the amount of deicer used and maintain records of the application of sand, anti-icing and/or de-icing chemicals to document the reduction of chemicals to meet established goals.

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.
- 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 the facility SWPPP.

[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.

- 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 or containment measures to be implemented in event of a spill.
- 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

- 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 Ayer currently disposes of snow at the DPW Yard in compliance with MS4 regulations.

Reporting

The Town of Ayer will document and include the following information in its annual report:

- Road miles treated
- Type and amount of deicer used
- Equipment calibration records
- Employee training dates

Employee Training

- Employees who perform winter road maintenance are trained once per year 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. SOP 21: Operations and Maintenance of Municipal Vehicles and Equipment

SOP 19: Operations and Maintenance of Parks and Open Spaces

Introduction

Parks and open space operations and maintenance activities commonly involve the operation of equipment such as mowers and tractors; disposal of waste from mowing, planting, weeding, raking, pruning, and trash collection; application of pesticides, herbicides, and fertilizers; cleaning and maintenance of park amenities such as play equipment, restrooms, and structures; and snow removal. These activities have the potential to generate contaminants such as sediments and toxic chemicals that may be picked up by rainwater, thereby entering the storm drainage system and receiving waters. The goal of this written Standard Operating Procedure (SOP) is to provide guidance to municipal employees to reduce the discharge of pollutants from the MS4 and to receiving waters as a result of parks and open space operations and maintenance. 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.

The Town of Ayer performs a variety of operations and maintenance activities at its municipal parks and open spaces.

The Ayer DPW conducts mowing and care of much of the Town's Right-of-Ways, small open areas, and the Ayer Dog Park. The Ayer DPW does not use fertilizers, pesticides, or herbicides. The Ayer Parks Department operates and maintains recreational spaces such as Pirone Park and the Sandy Pond Beach. The Parks Department only uses fertilizers on the infields of ball fields or when growing new grass. The Parks Department does not store any fertilizers and does not use herbicides or pesticides.

Within two years of the effective date of the MS4 Permit, the Town of Ayer will create an inventory of all municipal parks and open spaces and update this inventory annually.

Procedures

The Town of Ayer will implement the following procedures at municipal parks and open spaces to reduce the discharge of pollutants from the MS4:

General

- Repair damage to landscaped or mulch or vegetated bare areas as soon as possible to prevent erosion. If there are areas of erosion or poor vegetation, repair them as soon as possible, especially if they are within 50 feet of a surface water (e.g., pond, lake, or river).
- Remove (sweep or shovel) materials such as soil, mulch, and grass clippings from parking lots, streets, curbs, gutters, sidewalks, and drainage-ways.
- Do not clean up any unidentified or possibly hazardous materials found during maintenance; notify a supervisor immediately.

Maintenance

- Wastewater from power washing signs, structures, or bleachers cannot be discharged into the stormwater system.
- When painting park equipment, use a drop cloth and clean up any spills immediately.
- Do not leave open containers on the ground where they may accidentally tip over.
- Sweep parking lots with a street sweeper and dispose of street sweepings in designated areas (see SOP 16: Streets and Parking Lots).
- Never wash debris from parking lots into the storm drain.

Mowing

- Remove debris and trash from landscaped areas prior to mowing.
- Collect grass clippings and leaves after mowing. Do not blow or wash them into the street, gutter, or storm drains.
- Properly recycle or dispose of organic waste after mowing, weeding, and trimming.
- Reduce mowing frequencies wherever possible by establishing low/no-mow areas in lesser-used spaces.
- Brush off mowers (reels and decks) and tractors over grassy areas or in contained washout areas.
- Leave clippings on grassy areas or dispose of them in the trash or by composting.
- Do not hose off mowers over paved areas that drain into the MS4 or directly to surface waters.
- Follow proper vehicle and equipment maintenance procedures to prevent leaks (see SOP 21: Operations and Maintenance of Municipal Vehicles and Equipment)
- Do not allow grease from mowers to fall onto areas where they can be washed into the stormwater system.

Irrigation

- Repair broken sprinkler heads as soon as possible.
- Only irrigate at a rate that can infiltrate into the soil to limit run-off.
- Avoid irrigating close to impervious surfaces such as parking lots and sidewalks.

Landscaping

- When establishing new plantings, use alternative landscaping materials, such as drought resistant or native plants to reduce the need for irrigation and extensive application of fertilizers and pesticides.
- Follow proper fueling procedures for all equipment to ensure that petroleum products do not enter the stormwater system (see SOP 7: Fuel and Oil Handling Procedures).
- Fertilizers, herbicides, and pesticides should be properly used, stored, and handled (see SOP 12: Storage and Use of Pesticides and Fertilizer).
- Municipalities that discharge into waters with phosphorus or nitrogen Total Maximum Daily Loads (TMDLs) (including the Cape Cod nitrogen and Assabet River phosphorus TMDLs):
    - In accordance with Impaired Water requirements, the Town of Ayer will use slow-release fertilizers in addition to reducing fertilizer use to reduce runoff to Nashua River (Segment MA-81-05). Phosphorus will only be applied in areas where a soil test indicates that it is not present in enough quantities. Phosphorus-free fertilizer options will be considered. Note, the Town does not typically use fertilizer in the catchment of the Nashua River (Segment MA81-05).

- The Town of Ayer discharges into the following waterbody impaired for phosphorus: Nashua River (segment MA81-05). Under MS4 Permit requirements, the Town of Ayer acknowledges that blowing organic waste material (grass cuttings, leaf litter) is strictly prohibited.

Snow Removal

- Store salt or sand for snow removal indoors under a roof or in a covered container and on impervious surfaces.
- See SOP 18: Winter Road Maintenance for more information on proper snow disposal and storage procedures.
- Any damage done to vegetated areas caused by plows or deicing materials should be repaired as early as possible in the spring.

Trash Management

- All waste and recycling containers must be leak-tight with tight-fitting lids or covers.
- Place waste and recycling containers indoors or under a roof or overhang whenever possible.
- Clean and sweep up around outdoor waste containers regularly.
- Arrange for waste and recyclables to be picked up regularly and disposed of at approved disposal facilities.
- Do not wash out waste or recycling containers outdoors or in a parking lot.
- Conduct periodic inspections of waste areas to check for leaks and spills.
- Ensure there are enough trash and recycling containers at appropriate areas.
- Monitor waste and recycling containers at heavily used sites and on holidays to ensure that there is no overflow.

Other Activities

- Provide pet waste stations with bags and trash receptacles where pets are permitted. Post signs describing the proper disposal of pet waste.
- All portable toilets should be staked down in flat, secure locations where they are less likely to be knocked down or blown over. They should be placed in a location that would retain any spillage from washing into the MS4 or receiving waters. Ensure routine maintenance and cleaning of portable toilets.
- Identify undesirable waterfowl congregation areas and take steps to prevent waterfowl droppings from entering the stormwater system or surrounding waterbodies.
    - Take measures to discourage congregation near waterbodies and the storm system (e.g., use strobe lights or reflective tape, establish no-mow zones to reduce available feeding areas, or plant thick vegetation along waterlines). If waterfowl congregation cannot be managed, then isolate the drainage from congregation areas away from the storm system and waterbodies.

Install signage to educate the public on the negative effects of waterfowl feces entering the stormwater system or nearby waterbodies in order to discourage public feeding. Alternatively, enact feeding bans.

Employee Training

- Employees who perform maintenance or other applicable work at municipal parks and open spaces are trained once per year 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.

Attachments

1. Inventory of Municipal Parks and Open Spaces

Related Standard Operating Procedures

- SOP 7: Fuel and Oil Handling Procedures
- SOP 12: Storage and Use of Pesticides and Fertilizer
- SOP 16: Streets and Parking Lots
- SOP 18: Winter Road Maintenance
- SOP 21: Operations and Maintenance of Municipal Vehicles and Equipment

Inventory of Municipal Parks and Open Spaces
Town of Ayer, Massachusetts

Note: List Developed from Ayer Open Space and Recreation Plan (OSRP)

Name of Park/Open Space	Location	Manager/Contact – Name, Position, Department, Phone Number	Potential Stormwater Pollutant Sources (e.g., trash containers, fertilizers, fuel)
Pirone Park (Town Park)	Bligh Street	Jeff Thomas, Ayer Parks Director, Parks and Recreation, 978-772-8217	Trash containers, fertilizers, sediment
Pine Meadow Conservation Area	Groton Harvard Road	Conservation Commission, 978-772-8249	
Sandy Pond Beach (Town Beach)	Sandy Pond Road	Jeff Thomas, Ayer Parks Director, Parks and Recreation, 978-772-8217	Trash Containers, sediment
Ayer Dog Park	Snake Hill Road	Ayer Department of Public Works, 978-772-8240	Pet Waste, Trash containers, sediment

SOP 20: Operations and Maintenance of Municipal Buildings and Facilities

Introduction

Municipal buildings and facilities (schools, municipal offices, police and fire stations, municipal pools, parking garages, etc.) often house various chemicals, such as petroleum products and hazardous materials. As a result, these buildings and facilities are potential sources of pollutant discharges to the storm drainage system. The goal of this written Standard Operating Procedure (SOP) is to provide guidance to municipal employees on the use, storage, and disposal of chemicals and other stormwater pollutants to reduce the discharge of pollutants from the MS4. 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.

The Town of Ayer performs a variety of operations and maintenance activities at its municipally owned and operated buildings.

The Town of Ayer does not store or dispose of any petroleum product. At the police station the emergency generator runs on diesel, which is stored in a tank under the generator within the building. The Town of Ayer undertakes various precautions with spill response and cleanup procedures. The municipality has SWPPPs for the Wastewater treatment plant, Water Treatment Plant, Transfer Station, and Highway Department. The SWPPPs contain spill response and cleanup procedures providing information on containment, spill kit materials, and procedures for spill response. The DPW does not have any dumpsters on the property. The water department and other town buildings disposes of any waste weekly to the Transfer Station during their available business hours. Municipally owned parking lots are swept by the DPW Highway Division. The DPW uses a 2017 Elgin Pelican Streetsweeper.

Within two years of the effective date of the MS4 Permit, the Town of Ayer will create an inventory of all municipal buildings and facilities and update this inventory annually (refer to the attached buildings and facilities inventory sheet).

Procedures

The Town of Ayer will implement the following procedures for municipally owned or operated buildings and facilities to reduce the discharge of pollutants from the MS4:

Handling, Storage, Transfer, and Disposal of Trash and Recyclables

All liquid and solid waste must be disposed of properly. Some of the most common sources of pollution at municipal facilities are a result of littering, improper collection of debris, and improper disposal of solid or liquid waste.

- All waste and recycling receptacles must be leak-tight with tight-fitting lids or covers.
- Keep lids on dumpsters and containers closed at all times unless adding or removing material. If using an open-top roll-off dumpster, cover it and tie it down with a tarp unless adding materials.
- Place waste or recycling receptacles indoors or under a roof or overhang whenever possible.
- Locate dumpsters on a flat, paved surface and install berms or curbs around the storage area to prevent run-on and run-off.

- Do not locate dumpsters over or adjacent to catch basins.
- Prior to transporting waste, trash, or recycling, ensure that containers are not leaking (double bag if needed) and properly secure containers to the vehicle.
- Clean and sweep up around outdoor waste containers regularly.
- Clean up any liquid leaks or spills with dry cleanup methods.
- Arrange for waste or recycling to be picked up regularly and disposed of at approved disposal facilities.
- Never place hazardous materials, liquids, or liquid-containing wastes in a dumpster or recycling or trash container (see SOP 17: Hazardous Materials Storage and Handling).
- Do not wash trash or recycling containers outdoors or in parking lots.
- Conduct periodic inspections of solid and liquid waste storage areas to check for leaks and spills.
- Conduct periodic inspections of work areas to ensure that all wastes are being disposed of properly.
- In dumpster areas, regularly pick up surrounding trash and debris and regularly sweep the area.
- In compactor areas, regularly check the hydraulic fluid hoses and reservoir to ensure that there are no cracks or leaks. Regularly sweep the area.

Building Maintenance

- When power washing buildings and facilities, ensure that the wash water does not flow into the storm system. Containment or filtering systems should be provided.
- Paint and other chemicals should not be applied on the outside of buildings when it is raining or prior to expected rain.
- When sanding, painting, power washing, etc., ensure that sites are properly prepared (e.g., use tarps) and cleaned (e.g., use dry cleaning methods) especially if they are near storm drains. Protect catch basins when maintenance work is conducted upgradient of them.
- When painting, use a drop cloth and clean up any spills immediately.
- Do not leave open containers on the ground where they may accidentally tip over.
- Buildings should be routinely inspected for areas of potential leaks.
- Do not discharge chlorinated pool water into the stormwater system. Water must be properly dechlorinated and tested before it is discharged.
- Streets and parking lots surrounding municipal buildings and facilities should be swept and kept clean to reduce runoff of pollutants and debris to the stormwater system.
- Streets and parking lots around buildings and facilities will be swept in accordance with the procedures in SOP 16: Streets and Parking Lots.

Storage of Petroleum Products and Potential Pollutants

- Floor drains in storage areas should be disconnected from the stormwater system.
- Routinely inspect buildings and facilities for areas of potential leaks.
- For storage and handling procedures of petroleum products and potential pollutants, refer to SOP 17: Hazardous Materials Storage and Handling and SOP 7: Fuel and Oil Handling Procedures.
- For storage and handling procedures for fertilizers, pesticides, and herbicides, refer to SOP 12: Fertilizers, Pesticides, and Herbicides.
- All municipal buildings and facilities should be periodically inspected to address potential pollutant sources (e.g., leaks).

Spill Prevention Plan

- Spill prevention plans such as Spill Prevention Control and Countermeasure (SPCC) Plans should be in place where applicable, based on inventories of material storage and potential pollutants. Coordinate with the local fire department if necessary.
- Spill SOPs are outlined in SOP 4: Spill Response and Cleanup.

Employee Training

- Employees who perform maintenance or other applicable work at municipal buildings and facilities are trained once per year 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.

Attachments

1. Inventory of Municipal Buildings and Facilities

Related Standard Operating Procedures

1. SOP 4: Spill Response and Cleanup
2. SOP 7: Fuel and Oil Handling
3. SOP 12: Storage and Use of Pesticides and Fertilizer
4. SOP 16: Streets and Parking Lots
5. SOP 17: Hazardous Material Storage and Handling

Inventory of Municipal Buildings and Facilities
Town of Ayer, Massachusetts

Name of Building/Facility	Location	Manager/Contact – Name, Position, Department, Phone Number	Potential Stormwater Pollutant Sources (e.g., trash containers, fertilizers, fuel)
Department of Public Works	25 Brook Street	Doug Jasperson, Highway Foreman, Highway Division, 978-772-8240	See SWPPP
Town Hall	1 Main Street	Town of Ayer 978-772-8220	Trash containers, Emergency Generator
Grove Pond and Spectacle Pond Water Treatment Plants	99 Barnum Road & Off Nemco Way	Greg Cormier, Foreman, Water Department, 978-772-8240	Fuel, Waste Oil, Treatment Chemicals
Transfer Station	100 Groton Harvard Road	Andrew Jackson, Foreman, Solid Waste Division, 978-772-8240	See SWPPP
Wastewater Treatment Facility	25 Brook Street	Rick Hudson, Foreman, Wastewater Department, 978-772-8240	See SWPPP
Ayer Police Station	54 Park Street	Chief William A. Murray, Chief of Police, 978-772-8200	Trash containers, Pet Waste

Inventory of Municipal Buildings and Facilities
Town of Ayer, Massachusetts

Name of Building/Facility	Location	Manager/Contact – Name, Position, Department, Phone Number	Potential Stormwater Pollutant Sources (e.g., trash containers, fertilizers, fuel)
Ayer Fire Station	1 West Main Street	Chief Robert J. Pedruzzi, Fire Chief/Emergency Management Director, 978-772-8231	Trash containers, vehicle washwater
Wastewater Pump Stations	Various (18 Stations)	Ayer DPW 978-772-8240	Oils, Wastewater, generators
Ayer Library	26 East Main Street	Tim Silva, Library Director, 978-772-8250	Trash Containers
Pirone Park Concession & Maintenance Buildings	0 Bligh Street	Jeff Thomas, Ayer Parks Director, Parks and Recreation, 978-772-8217	Trash Containers
Sandy Pond Beach House	0 Sandy Pond Road	Jeff Thomas, Ayer Parks Director, Parks and Recreation, 978-772-8217	Trash Containers
Commuter Parking Lot	0 Park Street	Ayer DPW 978-772-8240	Sediments

SOP 21: Operations and Maintenance of Municipal Vehicles and Equipment

Introduction

Regular maintenance of both municipal and contracted vehicles and heavy equipment not only prolongs the life of municipal assets but also helps reduce the potential for leaking of fluids associated with normal wear and tear. Potential pollutants include fuels, oil, antifreeze, brake fluid, solvents, and battery acid. The goal of this written Standard Operating Procedure (SOP) is to provide guidance to municipal employees to help reduce the discharge of pollutants from the MS4 as a result of leaks from vehicles and equipment. If services are contracted with respect to vehicles and equipment, this SOP should be provided to the contractor. The contract should also specify that the contractor is responsible for compliance with all applicable laws.

The Town of Ayer undertakes various procedures in regards to its municipal vehicles and equipment. Each Department is responsible for the proper maintenance of its vehicles. The DPW has a full-time mechanic who maintains the vehicles, including inspection, general maintenance work, and sending out to outside mechanics for more complex work.

Vehicles washing takes place outdoors at the Highway Garage. Runoff discharges to a catch basin which is an oil/water separator.

Within two years of the effective date of the MS4 Permit, the Town of Ayer is required to create an inventory of all municipal vehicles and equipment and update this inventory annually (refer to the attached vehicles and equipment inventory template).

Procedures

The Town of Ayer will implement the following procedures for municipally owned and operated vehicles and equipment to reduce the discharge of pollutants from the MS4:

Vehicle and Equipment Maintenance

Vehicle Storage

- Monitor vehicles and equipment for leaks and use drip pans as needed until repairs can be performed.
- When drip pans are used, avoid overtopping.
- Drain fluids from leaking or wrecked vehicles and parts as soon as possible. Dispose of fluids properly.
- Store and park vehicles on impervious surfaces and/or under cover or indoors whenever possible.

Vehicle Maintenance

- Conduct routine inspections of heavy equipment and vehicles to proactively identify maintenance needs or potential leaks.
- Perform routine preventive maintenance to ensure heavy equipment and vehicles are operating optimally.

- Recycle or dispose of waste properly and promptly.
- Do not dump any liquids or other materials outside, especially near or in storm drains or ditches.

Body Repair and Painting

- Conduct all body repair and painting work indoors.
- Minimize waste from paints and thinners. Calculate paint needs based on surface area.
- Use dry cleanup methods (vacuum, sweep) to clean up metal filings and dust and paint chips from grinding, shaving and sanding. Sweep debris from wet sanding after allowing it to dry overnight on the shop floor. Dispose of waste properly; never dump waste into storm or sanitary sewers.
- Use sanding tools equipped with vacuum capability to pick up debris and dust.

Fueling

- Fueling areas owned or operated by the municipality should be covered.
- Fueling areas should be evaluated to ensure that pollutants (e.g., gasoline or oil) do not enter the MS4.

Material Management

- Store materials and waste in labeled containers under cover and in secondary containment.
- Chemicals should not be combined in containers.
- Hazardous waste must be labeled and stored according to hazardous waste regulations.
- Carefully transfer collected fluids from containers into designated storage areas as soon as possible.
- Store new and used batteries securely to avoid breakage. Store indoors or in secondary containment to contain potential acid leaks. Recycle used batteries.
- Conduct periodic inspections of storage areas to detect possible leaks.
- Do not wash or hose down storage areas unless there is prior approval to collect and discharge the water into the sanitary sewer. Use dry cleanup methods whenever possible.
- Keep lids on containers. Store them indoors or under cover to reduce exposure to rain.
- Inspect and maintain all pretreatment equipment, including interceptors, according to the manufacturer's maintenance schedule and at least once per year.
- Proper spill protocol should be followed to prevent chemicals from entering the stormwater system.

Parts Cleaning

- Use designated areas for engine, parts, or radiator cleaning. Do not wash or rinse parts outdoors. If parts cleaning equipment is not available then capture parts cleaning fluids.
- Recycle cleaning solution. Never discharge waste to the sanitary sewer or storm sewer.
- Use steam cleaning or pressure washing of parts instead of solvent cleaning. Cleaning equipment must be connected to an oil/water interceptor prior entering the sanitary sewer.
- When using solvents for cleaning, drain parts over the solvent tank to avoid drips to the floor. Catch excess solutions and divert them back to tank. Allow parts to dry over the hot tank.

Vehicle and Equipment Washing

Vehicle washing can result in the discharge of nutrients, sediment, petroleum products, and other contaminants to a surface water body or to a stormwater system. The MS4 Permit does not authorize the discharge of municipal vehicle washing byproducts into the MS4.

Outdoor Vehicle Washing Procedures

Outdoor washing of municipal vehicles should be avoided unless wash water is contained in a tight tank or similar structure. Where no alternative wash system is available, and full containment of wash water cannot be achieved, adhere to the following procedures:

- Avoid discharge of any wash water directly to the storm drainage system or surface water (e.g., stream, pond, or drainage swale)
- Minimize the use of water to the extent practicable.
- Where the use of detergent cannot be avoided, use products that do not contain regulated contaminants. The use of a biodegradable, phosphate-free detergent is preferred.
- Do not use solvents except in dedicated solvent parts washer systems or in areas not connected to a sanitary sewer.
- Do not power wash, steam clean, or perform engine or undercarriage cleaning.
- Grassy and pervious (porous) surfaces may be used to promote direct infiltration of wash water, providing treatment before recharging groundwater and minimizing runoff to an adjacent stormwater system. Pervious surfaces or other infiltration-based systems should not be used within wellhead protection areas or within other protected resources.
- Impervious surfaces discharging to the storm drainage system should not discharge directly to a surface water unless treatment is provided. The treatment device should be positioned such that all drainage must flow through the device, preventing bypassing or short-circuiting.
- Periodic sweeping and/or cleaning should be completed to prevent accumulation from forming on the washing area.
- Maintain absorbent pads and drip pans to capture and collect spills or noticeable leaks observed during washing activities.
- Heavily soiled vehicles or vehicles dirtied from salting or snow removal efforts should follow the SOPs in the "Heavy Equipment Washing Procedures" below.

Indoor Vehicle Washing Procedures

- Vehicles and equipment should be washed inside whenever possible to reduce runoff to the stormwater system.
- Where the use of detergent cannot be avoided, use products that do not contain regulated contaminants. The use of biodegradable, phosphate-free detergent is preferred.
- Detergents should not be used in areas where oil/water separators provide pre-treatment of drainage.
- Floor drains should be connected to a sanitary sewer or tight tank. Floor drains discharging to adjacent surface water bodies or engineered storm drain systems should be permanently plugged or otherwise abandoned before any vehicle wash activities are completed.
- Designate separate areas for routine maintenance and vehicle cleaning. This helps prevent

contamination of wash water by motor oils, hydraulic lubricants, greases, or other chemicals.

- Dry cleanup methods are recommended within garage facilities. Do not wash down floors and work areas with water.
- Bring smaller vehicles to commercial washing stations.
- Maintain absorbent pads and drip pans to capture and collect spills or noticeable leaks observed during washing activities.

Heavy Equipment Washing Procedures

- Mud and heavy debris removal should occur on impervious surfaces or within a retention area.
- Maintain these areas with frequent mechanical removal and proper disposal of waste.
- Impervious surfaces with engineered storm drain systems should not discharge directly to a surface water.
- Floor drains should be connected to a sanitary sewer or tight tank. Floor drains discharging to adjacent surface waterbodies or engineered storm drain systems should be permanently plugged or otherwise abandoned before any vehicle wash activities are completed.
- Where the use of detergent cannot be avoided, use products that do not contain regulated contaminants. The use of biodegradable, phosphate-free detergent is preferred.
- Detergents should not be used in areas where oil/water separators provide pre-treatment of drainage.
- Maintain absorbent pads and drip pans to capture and collect spills or noticeable leaks observed during washing activities.

Engine and Steam Washing Procedures

- Do not wash parts outdoors.
- Maintain drip pans and smaller containers to contain motor oils, hydraulic lubricants, greases, etc. and to capture and collect spills or noticeable leaks observed during washing activities, to the extent practicable.
- Where use of detergent cannot be avoided, use products that do not contain regulated contaminants. The use of a biodegradable, phosphate-free detergent is preferred.
- Avoid cleaning with solvents except in dedicated solvent parts washer systems. Make use of pressure washing and steam cleaning.
- Recycle clean solutions and rinse water to the extent practicable.
- Wash water should discharge to a tight tank or a sanitary sewer via an oil/water separator. Detergents should not be used in areas where oil/water separators provide pre-treatment of drainage.

Employee Training

- Employees who perform work on/with municipal vehicles or equipment are trained once per year 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.

Attachments

1. Inventory of Municipal Vehicles and Equipment

Vehicle Inventory

Click here to view a sample version of this table

Model	Make	Model Year	Vehicle Function
Explorer	Ford	2015	Police Chief
Escape	Ford	2010	Det. Unmarked
Explorer	Ford	2018	Patrol
Taurus	Ford	2013	Lt Admin
Explorer	Ford	2017	Patrol
Cro Vic	Ford	2009	Patrol
Explorer	Ford	2015	Patrol
Emergency One Protecter (custom)		1993	Fire Engine
Emergency One Aerial Truck (custom)		1997	Ladder Fire Truck
Emergency One Cyclone Pumper (custom)		2000	Fire Engine
Chevrolet Silverado P/U (Brush Truck)		2001	Pick Up Truck (Transferred from Fire to DPW Hwy)
Chevrolet Tahoe		2002	Tahoe Command Vehicle
Ford F550 / Horton Ambulance		2018	Ambulance
Ford E577 CET Forestery Truck		2006	Forestery Truck
Kubota RTV		2007	Utility Vehicle

Vehicle Inventory

Click here to view a sample version of this table

Model	Make	Model Year	Vehicle Function
Chevrolet Tahoe		2014	Tahoe Command Vehicle
Chevrolet Silverado P/U		2013	Pick Up Truck
BRIGADEER	GMC	1985	DPW Highway H6
KODIAK	CHEVROLET	1994	DPW Highway H10
C6000	HOLDER	1995	DPW Highway H11
DUMP TRUCK L800	FORD	1989	
DUMP TRUCK 7400	INTERNATIONAL	2003	DPW Highway H13
DUMP TRUCK 7400	INTERNATIONAL	2005	DPW Highway H14
SILVERADO	CHEVROLET	2006	DPW Highway H15

Vehicle Inventory

Click here to view a sample version of this table

Model	Make	Model Year	Vehicle Function
SILVERADO	CHEVROLET	2008	DPW Highway H1
SILVERADO	CHEVROLET	2008	DPW Highway H2
MSV	MB	2009	DPW Highway H3
DUMP TRUCK	FREIGHTLINER	2012	DPW Highway H4
Ranger	Ford	2009	DPW Water W4
F250	Ford	2011	DPW Water W2
F450	Ford	2012	DPW Water W6
F250	Ford	2012	DPW Sewer S7
SILVERADO	CHEVROLET	2004	DPW Sewer S8
SILVERADO	CHEVROLET	2007	DPW Sewer S9
Cascadia Tractor	FREIGHTLINER	2010	Tractor-Trailer
Escape	Ford	2010	DPW Admin Car 1
Backhoe	Caterpillar	2010	DPW Water W5
F350	Ford	2012	DPW Solid Waste T2
Loader	Michigan	1987	DPW Highway No Number
Sweeper	Elgin Pelican	2017	DPW Highway H12
Backhoe	Caterpillar	2002	DPW Highway H9
Loader	Caterpillar	2007	DPW Highway H5
SILVERADO	CHEVROLET	2006	Parks Dept

Vehicle Inventory

Click here to view a sample version of this table

Model	Make	Model Year	Vehicle Function
SILVERADO	CHEVROLET	2006	Parks Dept
Loader	John Deere	2011	DPW Solid Waste T3
Semi-Trailer	Polar	2008	DPW Wastewater
F550 Ambulance	Ford		Fire Dept
Explorer	Ford	2016	Fire Dept
Explorer	Ford	2016	Patrol
Traverse	CHEVROLET	2017	DPW Admin Car 2
Ranger	Ford	2008	DPW Highway H7
F250	Ford	2011	DPW Solid Waste T1
SILVERADO	CHEVROLET	2003	DPW Water W1
F350 Dump	Ford	2008	DPW Water W3
SILVERADO	CHEVROLET	2015	DPW Sewer S6
SILVERADO	CHEVROLET	2016	DPW Sewer S7
Explorer	Ford	2017	Patrol
Cro Vic	Ford	2010	Police
Rescue Truck	E-One	2016	Fire
Escape	Ford	2018	Building Department
305.5E2 Mini Excavator	Caterpillar	2017	Water Dept
To insert additional rows, select this row, right-click, and select "Insert."			

SOP 22: Construction Site Stormwater Runoff Control

Introduction

Construction sites that lack adequate stormwater controls can contribute a significant amount of sediment to nearby bodies of water. This Standard Operating Procedure (SOP) describes procedures for evaluating compliance of stormwater controls at construction sites to minimize or eliminate erosion and sediment transport.

These procedures address Minimum Control Measure 4, Construction Site Stormwater Runoff Control, by documenting the processes that the Town of Ayer will use for inspection and enforcement of sediment and erosion control measures and review, inspection and enforcement of site plans. These procedures are part of the Town of Ayer's Construction Site Stormwater Runoff Control Program.

Furthermore, the Town of Ayer has a NPDES Phase II Stormwater Bylaw and accompanying Regulations which also describe measures for construction site stormwater runoff control. The Regulations describe the primary procedures which the Town utilizes for Construction Site Stormwater Control. The procedures in this document are used to supplement the Stormwater Bylaw and Regulations.

In addition to the inspection and enforcement procedures detailed in this program it is important to note that construction site operators within the MS4 jurisdiction are required to control construction wastes, including but not limited to, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes. These wastes may not be discharged to the MS4.

Attached are erosion and sediment control inspection and construction site inspection forms.

Currently, the Town of Ayer DPW is the primary inspectors of construction projects. The Conservation Commission also inspects projects which are in their jurisdiction. Per the Town's NPDES Phase II Bylaw, the Planning Board identifies a Stormwater Agent to conduct inspections. Inspection frequency usually depends on the schedule and size of each project but other factors may require more frequent inspections.

Procedures: Site Inspection and Enforcement of Sediment and Erosion Control Measures

The Ayer DPW performs routine inspections of sediment and erosion control measures for construction activities that result in a land disturbance of greater than or equal to one acre within the regulated area and construction activities that disturb less than one acre when that disturbance is part of a larger common plan of development or sale that would disturb one or more acres. Under the Town of Ayer NPDES Phase II Stormwater Bylaw, the Planning Board has the authority and has designated the Ayer DPW as its stormwater agent. Both entities may enforce sediment and erosion control procedures and/or impose sanctions to ensure compliance when necessary.

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:

- Active construction sites should be inspected bi-weekly or monthly to check the status of erosion and sedimentation controls. Inspections should also be conducted after incidents of heavy rainfall (0.25 inches or more in 24 hours).
- Erosion and sediment control features should be constructed before initiating activities that remove vegetated cover or otherwise disturb the site. These should be installed consistent with the approved site plans and with manufacturer's instructions.
- Erosion and sediment control devices should be inspected by the contractor regularly, and maintained as needed to ensure function.
- In the SWPPP or other document, the contractor should clearly identify the party responsible for maintaining erosion and sediment control devices.
- Existing vegetation should be maintained on site if possible.
- 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.
- Stockpiles should be stabilized by seeding or mulching if they are to remain for more than two weeks.
- Disturbed areas should be protected from stormwater runoff by using protective Best Management Practices (BMPs).
- Clean water should be diverted away from disturbed areas on construction sites to prevent erosion and sedimentation.
- Sediment traps and sediment barriers should be cleaned out regularly to reduce clogging and maintain design function.
- Vegetated and wooded buffers should be protected.
- Soils should 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.
- Vegetation should be allowed to establish before introducing flows to channels.
- Regular light watering should be used for dust control, as this is more effective than infrequent heavy watering.
- Excessive soil compaction with heavy machinery should be avoided, to the extent possible.
- Construction activities during months with higher runoff rates should 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 and Maintenance of Structural Stormwater Best Management Practices (BMPs) for more information. The following guidelines summarize the requirements for long-term maintenance of permanent BMPs:

- Responsibility for maintaining erosion and sediment control devices should be clearly identified.
- Erosion and sediment control devices should be inspected following heavy rainfall events to ensure they are working properly.
- Erosion control blankets should be utilized when seeding slopes.
- Vegetated and wooded buffers should be protected and left undisturbed to the extent possible.
- Runoff should not be diverted into a sensitive area unless this has been specifically approved.
- Sedimentation basins should be cleaned out once sediment reaches 50% of the basin's design

capacity.

- Snow should not be plowed into, or stored within, retention basins, rain gardens, or other BMPs.

Inspection Procedures

Construction sites will be inspected to ensure that sediment and erosion control measures are in place consistent with approved site plans. Inspections will be conducted by the Ayer DPW or a qualified member of the site crew. Inspections will be conducted in accordance with the Massachusetts Stormwater Handbook. Inspections may include, but are not limited to:

- Inspection during or immediately following initial installation of sediment controls.
- Inspection following severe rainstorms to check for damage to controls.
- Inspection prior to seeding deadlines, particularly in fall.
- Final inspection of projects nearing completion to ensure that temporary controls have been removed, stabilization is complete, drainage ways are in proper condition, and the final contours agree with the proposed contours on the approved plan.

All inspections will be completed using the Sediment and Erosion Control Inspection form, included in the attachments. All completed inspection forms will be maintained on file by the Town of Ayer in the Ayer DPW office. During inspection, the inspector will verify that sediment and erosion control measures are functioning as intended and are being maintained properly. Specific sediment and erosion control measures that will be assessed during inspection are detailed on the Inspection Form.

Enforcement Procedures

If a non-compliance issue is discovered during pre-construction or routine inspection, the Ayer DPW will document the occurrence and inform the site operator of the violation and the required corrective action. The Ayer DPW will provide the site operator with a copy of the inspection form, noting the non-compliance and the required corrective action. The site operator will have 30 days from the receipt of notice to perform the corrective action. The Ayer DPW will revisit the site for inspection after 30 days to verify that the corrective action was performed and that the site has achieved compliance. If a deficiency constitutes an imminent danger to public health, safety, or the environment, the site operator shall take immediate corrective action, and then notify the Ayer DPW for an inspection to ensure compliance.

Reporting

The following information will be included in each annual report:

- Number of site inspections conducted
- Number of violations issued
- Record of enforcement actions

Employee Training

- Employees who inspect applicable construction sites are trained once per year on these procedures.
- Employees are also trained on stormwater pollution prevention, illicit discharge detection and elimination (IDDE) procedures, and spill and response procedures.

Procedures: Site Plan Review, Inspection, and Enforcement

Under the authority of the Town of Ayer NPDES Phase II Stormwater Bylaw, the Planning Board and its Agent(s) have the authority to perform construction site plan review, inspection and enforcement.

The Town of Ayer will implement the following construction site plan review, inspection and enforcement procedures:

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:

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

Site Plan Review Procedure

- The applicant will submit site plans in accordance with the NPDES Phase II Bylaw and Stormwater Regulations. Review will be conducted by responsible Departments including but not limited to the Planning Board and DPW. The Planning Board or its Agent(s) will make the final decision to approve, reject, or request modifications to the site plan.
- Site plan review will be completed within the time frame laid out in the Stormwater Regulations, taking into consideration the following standards regarding water quality protection and stormwater management:
    - General site design will include appropriate stormwater drainage system details and calculations.
    - Planned construction operations will include adequate Best Management Practices (BMPs) and Sediment and Erosion Control Measures to reduce water quality impacts.
    - Planned BMPs must be designed to the standards found in the Massachusetts Stormwater Handbook. When possible BMPs should promote on-site infiltration of stormwater runoff from impervious surfaces.
    - For sites located in areas subject to Total Maximum Daily Load (TMDL) requirements, BMPs will be selected and prioritized to address the pollutant identified as the cause of the impairment.
    - When possible, low impact designs (LID) and/or Green Infrastructure (GI) should be included in site design. If LID/GI are not included in the site plan, the Ayer DPW will require that the applicant review opportunities for the use of LID/GI.

- Upon completion of Site Plan Review the Ayer DPW will make the site plans and review findings available for public review and comment for a period as required. The Ayer DPW will review and consider all public comments prior to issuing or denying a permit.
- The Ayer DPW may require the applicant to revise the site plan as necessary before issuing or denying a permit.

Site Inspection Procedures

Inspections will be conducted, at a minimum, during BMP construction as well as after construction of BMPs to ensure they are working as described in the approved plans. Inspection will be completed by a Professional Engineer or other qualified person with enough training, experience, and/or education to be able to adequately read site plans and assess the installation, operation and maintenance of BMPs in accordance with approved plans. An inspection form will be filled out for each site inspection and stored in the Ayer DPW office. A copy of the Inspection Form is available in the attachments.

Inspection Guidelines

- The inspection should begin at a low point and work uphill, observing all discharge points and any off-site support activities.
- Written and photographic records should be maintained for each site visit.
- During the inspection, the inspector should ask questions to the contractor. Understanding the selection, implementation, and maintenance of BMPs is an important goal of the inspection process and require site-specific input.
- 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.
- The inspector should always wear personal protective equipment (PPE) appropriate for the site.
- The inspector should abide by the contractor's site-specific safety requirements.
- 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 should determine if the project is subject to USEPA's 2017 Construction General Permit., which replaces USEPA's 2012 Construction General Permit (for more information, visit: https://www.epa.gov/sites/production/files/2019-05/documents/final_2017_cgp.pdf). Operators of sites that required coverage under the USEPA's 2012 Construction General Permit that continue to be active should have submitted a new Notice of Intent (NOI) under the 2017 Permit.

If the site requires this coverage, the inspector should visit the USEPA Region 1 NOI website to determine if the contractor filed for coverage under the 2017 and/or 2012 Construction General Permit. 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 the 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 his requirement and the violation. Work cannot proceed on the site until a NOI for coverage under the 2017 Permit has been approved by the USEPA. The inspector may choose to print instructions on how to file an NOI and meet with the contractor to review these. Issue a written Stop Work Order until the NOI has been approved by the USEPA.

Once it has been determined that the site follows the 2017 Construction General Permit, site inspection can continue.

Inspection Process

1. Pre-inspection review
    - Obtain and review permits, site plans, previous inspection reports, and any other applicable information.
    - Print the approved NOI from the USEPA 2017 Construction General Permit website.
    - Inform the contractor of the planned site visit.
2. Meet with site contractor
    - Review the construction Stormwater Pollution Prevention Plan (SWPPP) (if the site includes over one acre of disturbance) or other documents, as required by the municipality's legal authority. Compare BMPs in the approved site plans with those shown in the SWPPP.
    - Review the project's approved NOI and confirm that information shown continues to be accurate.
    - Get a general overview of the project from the contractor.
    - Review inspections done by the contactor.
    - Review the status of any issues or corrective actions noted in previous inspection reports.
    - Discuss any complaints or incidents since the last meeting.
3. Inspect perimeter controls
    - Examine perimeter controls to determine if they are adequate, properly installed, and properly maintained.
    - 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
    - Determine if sediment and erosion controls are effective.
    - Look for slumps rills and tracking of stockpiled materials around the site.
5. Compare BMPs in the site plan with the construction site conditions
    - Determine whether BMPs are in place as specified in the site plan, and if the BMPs have been adequately installed and maintained.
    - Note any areas where additional BMPs may be needed that are not specified in the site plans.
    - Inspect BMPs prior to and after construction.
6. Inspect site entrances/exits
    - Determine if there has been excessive tracking of sediment from the site.
    - Look for evidence of additional entrances/exist which are not on the site plan and are not properly stabilized.
7. Inspect sediment basins
    - Look for signs that sediment has accumulated beyond 50% of the original capacity of the basin.
8. Inspect pollution prevention and good housekeeping practices
    - 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.
    - Inspect vehicles/equipment fueling and maintenance areas for the presence of spill control measure sand for evidence of leaks or spills.
9. Inspect discharge points and downstream, off-site areas
    - Walk down the street and/or in other directions of-site to determine if erosion and sedimentation control measures are effective in preventing off-site impacts.
    - 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
    - Discuss the effectiveness of current controls and whether modifications are needed.
    - 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.
    - 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 copies of subsequent inspections to the contractor.
13. Use Stop Work orders, as needed, until compliance with the 2017 General Construction Permit can be achieved.

Enforcement Procedure

If a non-compliance issue is discovered during inspections, the Ayer DPW will document the occurrence and inform the site operator of the violation and the required corrective action. The Ayer DPW will provide the site operator with a copy of the inspection form, noting the non-compliance and the required corrective action. The site operator will have the timeframe set forth in the Stormwater Regulations from the receipt of notice to perform the corrective action. The Ayer DPW will revisit the site for inspection to verify that the corrective action was performed and that the site has achieved

The number of site reviews, inspections and enforcement actions will be tracked. Records will be maintained and included in the annual report.

Employee Training

- Employees who inspect applicable construction sites are trained once per year on these procedures.
- Employees are also trained on stormwater pollution prevention, illicit discharge detection and elimination (IDDE) procedures, and spill and response procedures.

Reporting

The following information will be included in each annual report:

- Number of site reviews conducted
- Number of site inspections conducted
- Number of violations issued
- Record of enforcement actions

Attachments

1. Erosion and Sedimentation Control Inspection Report
2. Construction Site Stormwater Inspection Report

Related Standard Operating Procedures

1. SOP 9: Inspection and Maintenance of Structural Stormwater Best Management Practices (BMPs)

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.

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 ☐	
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.

Written IDDE Program

Town of AYER Public Works

Illicit Discharge Detection and Elimination (IDDE) Plan

Ayer, Massachusetts

June 2019
Revised June 2020

Table of Contents

Illicit Discharge Detection and Elimination Plan

Tables

Figures

Appendices

1 Introduction

1.1 MS4 Program

This Illicit Discharge Detection and Elimination (IDDE) Plan has been developed by the Town of Ayer to address the requirements 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."

The 2016 Massachusetts MS4 Permit requires that each permittee, or regulated community, address six Minimum Control Measures. These measures include the following:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination Program
4. Construction Site Stormwater Runoff Control
5. Stormwater Management in New Development and Redevelopment (Post Construction Stormwater Management); and
6. Good Housekeeping and Pollution Prevention for Permittee Owned Operations.

Under Minimum Control Measure 3, the permittee is required to implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its municipal separate storm sewer system and implement procedures to prevent such discharges. The IDDE program must also be recorded in a written (hardcopy or electronic) document. This IDDE Plan has been prepared to address this requirement.

1.2 Illicit Discharges

An "illicit discharge" is any discharge to a drainage system that is not composed entirely of stormwater, with the exception of discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the MS4) and discharges resulting from fire-fighting activities.

Illicit discharges may take a variety of forms. Illicit discharges may enter the drainage system through direct or indirect connections. Direct connections may be relatively obvious, such as cross-connections of sewer services to the storm drain system. Indirect illicit discharges may be more difficult to detect or address, such as failing septic systems that discharge untreated sewage to a ditch within the MS4, or a sump pump that discharges contaminated water on an intermittent basis.

Some illicit discharges are intentional, such as dumping used oil (or other pollutant) into catch basins, a resident or contractor illegally tapping a new sewer lateral into a storm drain pipe to avoid the costs of a sewer connection fee and service, and illegal dumping of yard wastes into surface waters.
Some illicit discharges are related to the unsuitability of original infrastructure to the modern regulatory environment. Examples of illicit discharges in this category include connected floor drains in old buildings, as well as sanitary sewer overflows that enter the drainage system. Sump pumps legally

connected to the storm drain system may be used inappropriately, such as for the disposal of floor washwater or old household products, in many cases due to a lack of understanding on the part of the homeowner.

Elimination of some discharges may require substantial costs and efforts, such as funding and designing a project to reconnect sanitary sewer laterals. Others, such as improving self-policing of dog waste management, can be accomplished by outreach in conjunction with the minimal additional cost of dog waste bins and the municipal commitment to disposal of collected materials on a regular basis.

Regardless of the intention, when not addressed, illicit discharges can contribute high levels of pollutants, such as heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to surface waters.

1.3 Allowable Non-Stormwater Discharges

The following categories of non-storm water discharges are allowed under the MS4 Permit unless the permittee, USEPA or Massachusetts Department of Environmental Protection (MassDEP) identifies any category or individual discharge of non-stormwater discharge as a significant contributor of pollutants to the MS4:

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground water
- Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20))
- Uncontaminated pumped groundwater
- Discharge from potable water sources
- Foundation drains
- Air conditioning condensation
- Irrigation water, springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual resident car washing
- De-chlorinated swimming pool discharges
- Street wash waters
- Residential building wash waters without detergents

If these discharges are identified as significant contributors to the MS4, they must be considered an "illicit discharge" and addressed in the IDDE Plan (i.e., control these sources so they are no longer significant contributors of pollutants, and/or eliminate them entirely).

1.4 Receiving Waters and Impairments

Table 1-1 lists the "impaired waters" within the boundaries of the Town of Ayer's regulated area based on the 2014 Massachusetts Integrated List of Waters produced by MassDEP every two years. Impaired waters are water bodies that do not meet water quality standards for one or more designated use(s) such as recreation or aquatic habitat.

Table 1-1. Impaired Waters
Ayer, Massachusetts

Water Body Name	Segment ID	Category	Impairment(s)	Associated Approved TMDL
Plow Shop Pond	MA81103	5	(Non-Native Aquatic Plants), Aquatic Plants (Macrophytes), Arsenic, Chromium (total), Mercury in Fish Tissue, Polycyclic Aromatic Hydrocarbons (PAHs) (Aquatic Ecosystems), Sediment Bioassays -- Chronic Toxicity Freshwater	N/A
Grove Pond	MA81053	5	(Non-Native Aquatic Plants), Aquatic Plants (Macrophytes), Arsenic, DEHP (Di-sec-octyl phthalate), Mercury in Fish Tissue, Polycyclic Aromatic Hydrocarbons (PAHs) (Aquatic Ecosystems), Sediment Bioassays -- Chronic Toxicity Freshwater	N/A
Nonacoicus Brook	MA81-17	5	Oxygen Dissolved	N/A
Nashua River	MA81-05	5	Aquatic Macroinvertebrate Bioassessments, Escherichia coli, Phosphorus (Total), Sediment Bioassays -- Acute Toxicity Freshwater	N/A
Nashua River	MA81-06	5	(Non-Native Aquatic Plants), Aquatic Macroinvertebrate Bioassessments, Mercury in Fish Tissue, Nutrient/Eutrophication Biological Indicators	N/A
James Brook	MA81-20	5	Escherichia coli	N/A
Flannagan Pond	MA81044	4c	(Non-Native Aquatic Plants)	N/A
Sandy Pond	MA81117	3	N/A	N/A
Long Pond	MA81073	3	N/A	N/A
Spectacle Pond	MA84089	5	(Non-Native Aquatic Plants), Oxygen Dissolved	N/A
Bennetts Brook	MA84B-06	5	Escherichia coli	N/A

Category 4a Waters – impaired water bodies with a completed Total Maximum Daily Load (TMDL).
Category 4c Waters – impaired water bodies where the impairment is not caused by a pollutant. No TMDL required.
Category 5 Waters – impaired water bodies that require a TMDL.
"Approved TMDLs" are those that have been approved by EPA as of the date of issuance of the 2016 MS4 Permit.

At this time, there are no TMDLs approved for the waterbodies listed in Table 1-1. When TMDLs are approved, this paragraph will be updated to indicate any IDDE-related requirements identified in the approved TMDLs.

1.5 IDDE Program Goals, Framework, and Timeline

The goals of the IDDE program are to find and eliminate illicit discharges to municipal separate storm sewer system and to prevent illicit discharges from happening in the future. The program consists of the following major components as outlined in the MS4 Permit:

- Legal authority and regulatory mechanism to prohibit illicit discharges and enforce this prohibition
- Storm system mapping
- Inventory and ranking of outfalls
- Dry weather outfall screening
- Catchment investigations
- Identification/confirmation of illicit sources
- Illicit discharge removal
- Followup screening
- Employee training.

The IDDE investigation procedure framework is shown in **Figure 1-1.** The required timeline for implementing the IDDE program is shown in **Table 1-2**.

Figure 1-1. IDDE Investigation Procedure Framework

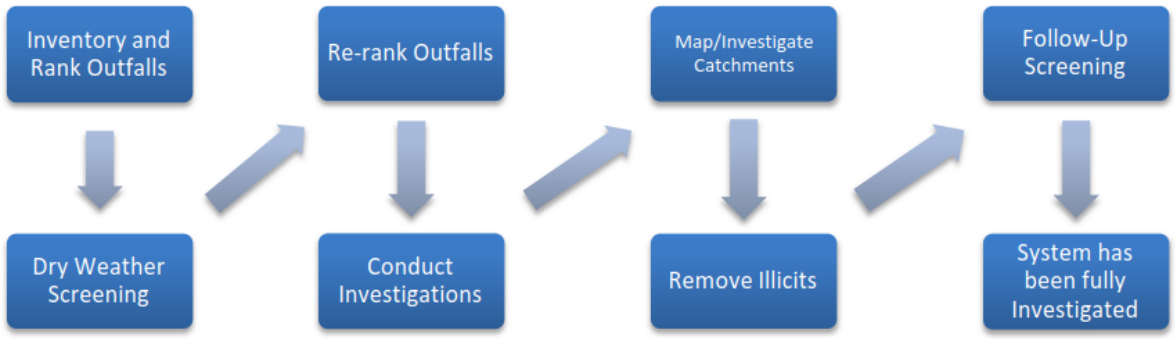

Table 1-2. IDDE Program Implementation Timeline

IDDE Program Requirement	Completion Date from Effective Date of Permit					
	1 Year	1.5 Years	2 Years	3 Years	7 Years	10 Years
Written IDDE Program Plan	X					
SSO Inventory	X					
Written Catchment Investigation Procedure		X				
Phase I Mapping			X			
Phase II Mapping						X
IDDE Regulatory Mechanism or By-law (if not already in place)				X		
Dry Weather Outfall Screening				X		
Follow-up Ranking of Outfalls and Interconnections				X		
Catchment Investigations – Problem Outfalls					X	
Catchment Investigations – all Problem, High and Low Priority Outfalls						X

1.6 Work Completed to Date

The 2003 MS4 Permit required each MS4 community to develop a plan to detect illicit discharges using a combination of storm system mapping, adopting a regulatory mechanism to prohibit illicit discharges and enforce this prohibition, and identifying tools and methods to investigate suspected illicit discharges. Each MS4 community was also required to define how confirmed discharges would be eliminated and how the removal would be documented.

The Town of Ayer has completed the following IDDE program activities consistent with the 2003 MS4 Permit requirements:

- Developed a map of outfalls and receiving waters
- Adopted an IDDE bylaw or regulatory mechanism
- Developed procedures for locating illicit discharges (i.e., visual screening of outfalls for dry weather discharges, dye or smoke testing)
- Developed procedures for locating the source of the discharge
- Developed procedures for removal of the source of an illicit discharge
- Developed procedures for documenting actions and evaluating impacts on the storm sewer system subsequent to removal

In addition to the 2003 MS4 Permit requirements, other IDDE-related activities that may have been completed include:

- SSO inventory
- Outfall sampling
- Additional storm system mapping, including the locations of catch basins, manholes and pipe connectivity

2 Authority and Statement of IDDE Responsibilities

2.1 Legal Authority

The Town of Ayer has adopted an Illicit Discharges to the Municipal Storm Drain Systems Bylaw (Article 48), approved by the Attorney General in September 2008. A copy of the Illicit Discharges to the Municipal Storm Drain Systems Bylaw (Article 48) is provided in **Appendix A**. The Illicit Discharges to the Municipal Storm Drain Systems Bylaw (Article 48) provides the Town of Ayer with adequate legal authority to:

- Prohibit illicit discharges
- Investigate suspected illicit discharges
- Eliminate illicit discharges, including discharges from properties not owned by or controlled by the MS4 that discharge into the MS4 system
- Implement appropriate enforcement procedures and actions.

The Town of Ayer will review its current Illicit Discharges to the Municipal Storm Drain Systems Bylaw (Article 48) and related land use regulations and policies for consistency with the 2016 MS4 Permit.

2.2 Statement of Responsibilities

The Ayer Department of Public Works (DPW) is the lead municipal agency or department responsible for implementing the IDDE program pursuant to the provisions of the Illicit Discharges to the Municipal Storm Drain Systems Bylaw (Article 48). Other agencies or departments with responsibility for aspects of the program include:

- Department of Public Works – Managing department with overall responsibility for implementing IDDE Program
- Highway Department – Assistance with implementation of IDDE, field efforts, enforcement
- Sewer Department - Assistance with implementation of IDDE, field efforts, enforcement
- Building Inspector and/or Code Enforcement Officer – Notifies DPW of IDDE issues identified with building inspection/permitting and code enforcement
- Engineering Department – Writes, manages, revises IDDE program and stormwater GIS mapping. Works with consultants to implement IDDE as required.
- Conservation Agent - Notifies DPW of IDDE issues, assists with public education/involvement
- Planning Board Chairperson – Assists with implementation of Ayer's NPDES Phase II Stormwater Bylaw
- Board of Selectmen – Assists with public education/involvement
- Town Administrator and/or Mayor – Assists with public education, budgeting, staffing.
- Stormwater Committee – Assists with the implementation of the Town's MS4 Program in an advisory role

3 Stormwater System Mapping

The Ayer DPW originally developed mapping of its stormwater system to meet the mapping requirements of the 2003 MS4 Permit. A copy of the existing storm system map is provided in **Appendix B**. The 2016 MS4 Permit requires a more detailed storm system map than was required by the 2003 MS4 Permit. The revised mapping is intended to facilitate the identification of key infrastructure, factors influencing proper system operation, and the potential for illicit discharges.

The 2016 MS4 Permit requires the storm system map to be updated in two phases as outlined below. The Ayer DPW is responsible for updating the stormwater system mapping pursuant to the 2016 MS4 Permit. The Town of Ayer will report on the progress towards completion of the storm system map in each annual report. Updates to the stormwater mapping will be included in **Appendix B**.

3.1 Phase I Mapping

Phase I mapping must be completed within two (2) years of the effective date of the permit (July 1, 2020) and include the following information:

- Outfalls and receiving waters (previously required by the MS4-2003 permit)
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- Municipally owned stormwater treatment structures
- Water bodies identified by name and indication of all use impairments as identified on the most recent EPA approved Massachusetts Integrated List of Waters report
- Initial catchment delineations. Topographic contours and drainage system information may be used to produce initial catchment delineations.

The Town of Ayer will update its stormwater mapping by July 1, 2020 to include the Phase I information.

3.2 Phase II Mapping

Phase II mapping must be completed within ten (10) years of the effective date of the permit (July 1, 2028) and include the following information:

- Outfall spatial location (latitude and longitude with a minimum accuracy of +/-30 feet)
- Pipes
- Manholes
- Catch basins
- Refined catchment delineations. Catchment delineations must be updated to reflect information collected during catchment investigations.
- Municipal Sanitary Sewer system (if available)
- Municipal combined sewer system (if applicable).

The Town of Ayer will update its stormwater mapping by July 1, 2028 to include the Phase II information.

3.3 Additional Recommended Mapping Elements

Although not a requirement of the 2016 MS4 Permit, the Town of Ayer may include the following recommended elements in its storm system mapping:

- Storm sewer material, size (pipe diameter), age
- Sanitary sewer system material, size (pipe diameter), age
- Privately owned stormwater treatment structures
- Where a municipal sanitary sewer system exists, properties known or suspected to be served by a septic system, especially in high density urban areas
- Topography
- Orthophotography
- Area where the permittee's MS4 has received or could receive flow from septic system discharges
- Seasonal high water table elevations impacting sanitary alignments
- Alignments, dates and representation of work completed of past illicit discharge investigations
- Locations of suspected confirmed and corrected illicit discharges with dates and flow estimates.

4 Sanitary Sewer Overflows (SSOs)

The 2016 MS4 Permit requires municipalities to prohibit illicit discharges, including sanitary sewer overflows (SSOs), to the separate storm sewer system. SSOs are discharges of untreated sanitary wastewater from a municipal sanitary sewer that can contaminate surface waters, cause serious water quality problems and property damage, and threaten public health. SSOs can be caused by blockages, line breaks, sewer defects that allow stormwater and groundwater to overload the system, power failures, improper sewer design, and vandalism.

The Town of Ayer has completed an inventory of SSOs that have discharged to the MS4 within the five (5) years prior to the effective date of the 2016 MS4 Permit, based on review of available documentation pertaining to SSOs (**Table 4-1**). The inventory includes all SSOs that occurred during wet or dry weather resulting from inadequate conveyance capacities or where interconnectivity of the storm and sanitary sewer infrastructure allows for transfer of flow between systems (please note the Town of Ayer does not have any combined sewer).

Upon detection of an SSO, the Town of Ayer will eliminate it as expeditiously as possible and take interim measures to minimize the discharge of pollutants to and from its MS4 until the SSO is eliminated. Upon becoming aware of an SSO to the MS4, the Town of Ayer will provide oral notice to EPA within 24 hours and written notice to EPA and MassDEP within five (5) days of becoming aware of the SSO occurrence.

The inventory in **Table 4-1** will be updated by the Ayer DPW when new SSOs are detected. The SSO inventory will be included in the annual report, including the status of mitigation and corrective measures to address each identified SSO.

Table 4-1. SSO Inventory

Ayer, Massachusetts
Revision Date: 06-23-2020

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]
63 Groton School Road	Mostly in road	02/14/2018	7:00AM	7:30AM	10-15 gallons	Sewer service blockage	Yes	N/A
109 Central Avenue	Discharge entered catch basin which discharged to Balch Pond	07/11/2018	1:30PM	3:00PM	2000 gallons	Broken air release valve on sewer force main.	Yes	Inventory and inspection of all existing air release valves in sewer collection system
112 Old Farm Way	Discharge into basement	06/22/2020	10:00AM	11:00AM	50 gallons	Sewer System blockage due to grease and rags	Yes	Notification to area residents regarding grease disposal into sewer

[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

5 Assessment and Priority Ranking of Outfalls

The 2016 MS4 Permit requires an assessment and priority ranking of outfalls in terms of their potential to have illicit discharges and SSOs and the related public health significance. The ranking helps determine the priority order for performing IDDE investigations and meeting permit milestones.

5.1 Outfall Catchment Delineations

A catchment is the area that drains to an individual outfall[1] or interconnection.[2] The catchments for each of the MS4 outfalls will be delineated to define contributing areas for investigation of potential sources of illicit discharges. Catchments are typically delineated based on topographic contours and mapped drainage infrastructure, where available. As described in **Section 3**, initial catchment delineations will be completed as part of the Phase I mapping, and refined catchment delineations will be completed as part of the Phase II mapping to reflect information collected during catchment investigations

5.2 Outfall and Interconnection Inventory and Initial Ranking

The Town of Ayer DPW will complete an initial outfall and interconnection inventory and priority ranking to assess illicit discharge potential based on existing information. The initial inventory and ranking will be completed within one (1) year from the effective date of the permit. An updated inventory and ranking will be provided in each annual report thereafter. The inventory will be updated annually to include data collected in connection with dry weather screening and other relevant inspections.

The outfall and interconnection inventory will identify each outfall and interconnection discharging from the MS4, record its location and condition, and provide a framework for tracking inspections, screenings and other IDDE program activities.

Outfalls and interconnections will be classified into one of the following categories:

1. **Problem Outfalls**: Outfalls/interconnections with known or suspected contributions of illicit discharges based on existing information shall be designated as Problem Outfalls. This shall include any outfalls/interconnections where previous screening indicates likely sewer input. Likely sewer input indicators are any of the following:

[1] **Outfall** means a point source as defined by 40 CFR § 122.2 as the point where the municipal separate storm sewer discharges to waters of the United States. An outfall does not include open conveyances connecting two municipal separate storm sewers or pipes, tunnels or other conveyances that connect segments of the same stream or other waters of the United States and that are used to convey waters of the United States. Culverts longer than a simple road crossing shall be included in the inventory unless the permittee can confirm that they are free of any connections and simply convey waters of the United States.

[2] **Interconnection** means the point (excluding sheet flow over impervious surfaces) where the permittee's MS4 discharges to another MS4 or other storm sewer system, through which the discharge is conveyed to waters of the United States or to another storm sewer system and eventually to a water of the United States.

- Olfactory or visual evidence of sewage,
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

Dry weather screening and sampling, as described in **Section 6** of this IDDE Plan and Part 2.3.4.7.b of the MS4 Permit, is not required for Problem Outfalls.

2. **High Priority Outfalls**: Outfalls/interconnections that have not been classified as Problem Outfalls and that are:

    - Discharging to an area of concern to public health due to proximity of public beaches, recreational areas, drinking water supplies or shellfish beds
    - Determined by the permittee as high priority based on the characteristics listed below or other available information.

3. **Low Priority Outfalls**: Outfalls/interconnections determined by the permittee as low priority based on the characteristics listed below or other available information.

4. **Excluded outfalls**: Outfalls/interconnections with no potential for illicit discharges may be excluded from the IDDE program. This category is limited to roadway drainage in undeveloped areas with no dwellings and no sanitary sewers; drainage for athletic fields, parks or undeveloped green space and associated parking without services; cross-country drainage alignments (that neither cross nor are in proximity to sanitary sewer alignments) through undeveloped land.

Outfalls will be ranked into the above priority categories (except for excluded outfalls, which may be excluded from the IDDE program) based on the following characteristics of the defined initial catchment areas, where information is available. Additional relevant characteristics, including location-specific characteristics, may be considered but must be documented in this IDDE Plan.

- **Previous screening results** – previous screening/sampling results indicate likely sewer input (see criteria above for Problem Outfalls).

- **Past discharge complaints and reports.**

- **Poor receiving water quality** – the following guidelines are recommended to identify waters as having a high illicit discharge potential:
    - Exceeding water quality standards for bacteria
    - Ammonia levels above 0.5 mg/l
    - Surfactants levels greater than or equal to 0.25 mg/l

- **Density of generating sites** – Generating sites are those places, including institutional, municipal, commercial, or industrial sites, with a potential to generate pollutants that could contribute to illicit discharges. Examples of these sites include, but are not limited to, car dealers; car washes; gas stations; garden centers; and industrial manufacturing areas.

- **Age of development and infrastructure** – Industrial areas greater than 40 years old and areas where the sanitary sewer system is more than 40 years old will probably have a high illicit discharge potential. Developments 20 years or younger will probably have a low illicit discharge potential.

- **Water quality limited waterbodies** that receive a discharge from the MS4 or waters with approved TMDLs applicable to the permittee, where illicit discharges have the potential to contain the pollutant identified as the cause of the water quality impairment.

Table 5-1 provides a sample format for an outfall inventory and priority ranking matrix.

Table 5-1 Outfall Inventory and Priority Ranking Matrix
Ayer, Massachusetts
Revision Date: 11-30-2020

Outfall ID	Receiving Water	1	2	3	4	5	6	7	Score	Priority Ranking	Priority Re-Ranking after Dry Weather Monitoring
		Previous Screening Results Indicate Likely Sewer Input[1]	Discharge to Area of Concern to Public Health[2]	Frequency of Past Discharge Complaints	Receiving Water Quality[3]	Density of Generating Sites[4]	Age of Development/Infrastructure	Additional Characteristics			
Information Source		Outfall Inspections and Sample Results	GIS Maps	Town Staff	Impaired Waters List	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual	Other			
Scoring Criteria		Yes = 3 (Problem Outfall) No = 0	Yes = 3 No = 0	Frequent = 3 Occassional = 2 None = 0	Poor = 3 Fair = 2 Good = 0	High = 3 Medium = 2 Low = 1	High = 3 Medium = 2 Low = 1	TBD			
1DO02	Wetland	0	0	0	0	1	3	None	4	Low	Low
1DO03	James Brook	0	0	0	2	1	3	High	6	High	Low
1DO04	James Brook	0	0	0	2	1	3	High	6	High	Low
1DO05	Wetland	0	0	0	0	1	3	None	4	Low	Low[8]
1DO06	Hydrologic Connection to Wetland	0	0	0	0	1	3	None	4	Low	Low
1DO07	Wetland	0	0	0	0	1	3	None	4	Low	Low
1DO08	Wetland	0	0	0	0	1	3	None	4	Low	Low
1DO09	Private (MassDOT Owned)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
1DO10	Hydrologic Connection to Wetland	0	0	0	0	1	3	None	4	Problem	Low
1DO11	Nonacoicus Brook	0	0	0	2	1	3	None	6	Problem	Low
1DO12	Overland to Nonacoicus Brook	0	0	0	2	1	3	None	6	Problem	Low
1DO14	Wetland	0	3	0	0	1	3	None	7	Problem	Low
1DO15	Wetland	0	3	0	0	1	3	None	7	Problem	Low
1DO16	Wetland	0	3	0	0	1	3	None	7	Problem	Low
1DO17	Wetland	0	3	0	0	1	3	None	7	Problem	Low
1DO18	Wetland	0	3	0	0	1	3	None	7	Problem	Low
1DO19	Wetland	0	3	0	0	1	3	None	7	Problem	Low
1DO20	Wetland	0	3	0	0	1	3	None	7	Problem	Low
1DO21	Nashua River	0	0	0	2	1	3	High	6	High	Low[9]
1DO23	Hydrologic Connection to Wetland	0	0	0	0	1	3	None	4	Low	Low[14]
1DO27	Wetland	0	3	0	0	2	3	None	8	Problem	Low
1DO27	Located at DPW- not outfall - need to delete in GIS	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
1DO28	Hydrologic Connection to Wetland	0	0	0	0	2	3	None	5	Problem	Low
1DO29	Hydrologic Connection to Wetland	0	0	0	0	2	3	None	5	Problem	Low
1DO30	Not outfalll - Need to delete in GIS	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
1DO31	Hydrologic Connection to Wetland	0	0	0	0	1	1	None	2	Low	Low[8]
1DO32	Ditch Conveyance to 1DO29 - update GIS	0	0	0	0	1	3	None	4	Low	Low
1DO33	Private (Isaacs Lane)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Low
1DO34	Hydrologic Connection to Wetland	0	0	0	0	1	3	None	4	Low	Low
1DO35	Hydrologic Connection to Wetland	0	0	0	0	1	3	None	4	Low	Low
1DO36	Hydrologic Connection to Wetland	0	0	0	0	1	3	None	4	Low	Low
1DO37	Hydrologic Connection to Wetland	0	0	0	0	1	3	None	4	Low	Low
1DO38	James Brook	0	0	0	2	1	3	High	6	High	High
1DO39	James Brook	0	0	0	2	1	3	High	6	High	High
1DO40	James Brook	0	0	0	2	1	1	High	4	High	High
1DO41	Wetland to Nonacoicus Brook	0	0	0	2	3	3	None	8	Problem	Low[10]
1DO42	Wetland to Nonacoicus Brook	0	0	0	2	3	3	None	8	Problem	Low[10]
1DO43	Hydrologic Connection to Wetland	0	0	0	0	1	3	None	4	Low	Low
1DO44	Hydrologic Connection to Wetland	0	0	0	0	1	3	None	4	Low	Low
1DO45	Hydrologic Connection to Wetland	0	0	0	0	1	3	None	4	Low	Low
1DO46	Hydrologic Connection to Wetland	0	0	0	0	1	3	None	4	Low	Low
2DO02	Hydrologic Connection to Wetland	0	0	0	0	1	3	None	4	Low	Low
2DO03	Ditch Conveyance to 2DO19 - update GIS	0	0	0	0	1	3	None	4	Low	Low
2DO05	Wetland	0	0	0	0	1	1	None	2	Low	Low
2DO06	Hydrologic Connection to Wetland	0	0	0	0	1	3	None	4	Low	Low
2DO07	Hydrologic Connection to School House Pond	0	0	0	0	1	3	None	4	Low	Low

Table 5-1 Outfall Inventory and Priority Ranking Matrix
Ayer, Massachusetts
Revision Date: 11-30-2020

Outfall ID	Receiving Water	1	2	3	4	5	6	7	Score	Priority Ranking	Priority Re-Ranking after Dry Weather Monitoring
		Previous Screening Results Indicate Likely Sewer Input[1]	Discharge to Area of Concern to Public Health[2]	Frequency of Past Discharge Complaints	Receiving Water Quality[3]	Density of Generating Sites[4]	Age of Development/Infrastructure	Additional Characteristics			
Information Source		Outfall Inspections and Sample Results	GIS Maps	Town Staff	Impaired Waters List	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual	Other			
Scoring Criteria		Yes = 3 (Problem Outfall) No = 0	Yes = 3 No = 0	Frequent = 3 Occassional = 2 None = 0	Poor = 3 Fair = 2 Good = 0	High = 3 Medium = 2 Low = 1	High = 3 Medium = 2 Low = 1	TBD			
2DO08	Wetland	0	0	0	0	1	1	None	2	Low	Low[8]
2DO09	Wetland	0	0	0	0	1	1	None	2	Low	Low
2DO10	Wetland	0	0	0	0	1	3	None	4	Low	Low[9]
2DO11	Wetland	0	0	0	0	1	3	None	4	Low	Low
2DO12	Wetland	0	0	0	0	1	3	None	4	Low	Low[10]
2DO13	Hydrologic Connection to School House Pond	0	0	0	0	1	3	None	4	Low	Low
2DO14	Hydrologic Connection to School House Pond	0	0	0	0	1	3	None	4	Low	Low
2DO15	Hydrologic Connection to School House Pond	0	0	0	0	1	1	None	2	Low	Low
2DO16	Hydrologic Connection to School House Pond	0	0	0	0	1	3	None	4	Low	Low
2DO17	Hydrologic Connection to School House Pond	0	0	0	0	1	3	None	4	Low	Low[8]
2DO18	Hydrologic Connection to School House Pond	0	0	0	0	2	3	None	5	Problem	Low
2DO19	Wetland	0	0	0	0	1	3	None	4	Low	Low
2DO20	Wetland	0	0	0	0	1	3	None	4	Low	Low
3DO01	School House Pond	0	3	0	0	1	3	None	7	Problem	Low
3DO02	Hydrologic Connection to Wetland	0	3	0	0	1	3	None	7	Problem	Low
3DO03	Private (Ayer Housing Authority)	0	0	0	N/A	1	3	None	4	Low	Low
3DO04	Private (Ayer Housing Authority)	0	0	0	N/A	1	3	None	4	Low	Low
3DO05	Private (Ayer Housing Authority)	0	0	0	N/A	1	3	None	4	Low	Low
3DO06	Grove Pond	0	3	0	3	1	3	High	10	High	Low
3DO07	Balch Pond	0	0	0	2	1	3	None	6	Problem	Low
3DO08	Flannagan Pond	0	0	0	2	1	3	None	6	Problem	Low
3DO09	Private (McDonalds)	0	0	0	N/A	1	3	None	4	Low	Low
3DO10	Private (MassDOT Owned)	0	0	0	N/A	1	3	None	4	Low	Low
3DO11	Flannagan Pond	0	0	0	2	1	3	None	6	Problem	Low
3DO12	Grove Pond	0	0	0	3	1	3	High	7	High	Low
3DO13	Grove Pond	0	3	0	3	1	3	High	10	High	Low[8]
3DO14	Grove Pond	0	0	0	3	1	3	High	7	High	Low
3DO15	School House Pond	0	3	0	0	1	3	None	7	Problem	Low
3DO16	School House Pond	0	0	0	0	1	3	None	4	Low	Low
3DO17	Private (MassDOT Owned)	0	0	0	N/A	1	3	None	4	Low	Low
3DO18	Private (MassDOT Owned)	0	0	0	N/A	1	3	None	4	Low	Low
3DO19	School House Pond	0	0	0	0	2	3	None	5	Problem	Problem
3DO20	Flannagan Pond	0	0	0	2	1	3	None	6	Problem	Low
4DO01	Wetland	0	0	0	0	1	3	None	4	Low	Low
4DO02	Flannagan Pond	0	0	0	2	1	3	None	6	Problem	Low
4DO03	Flannagan Pond	0	0	0	2	1	3	None	6	Problem	Low
4DO04	Flannagan Pond	0	0	0	2	1	3	None	6	Problem	Low
4DO05	Flannagan Pond	0	0	0	2	1	3	None	6	Problem	Low
4DO06	Flannagan Pond	0	0	0	2	1	3	None	6	Problem	Low
4DO07	Flannagan Pond	0	0	0	2	1	3	None	6	Problem	Low
4DO08	Flannagan Pond	0	0	0	2	1	3	None	6	Problem	Low
4DO09	Flannagan Pond	0	0	0	2	1	3	None	6	Problem	Low
4DO10	Flannagan Pond	0	0	0	2	1	3	None	6	Problem	Low
4DO11	Flannagan Pond	0	0	0	2	1	3	None	6	Problem	Low
4DO12	Flannagan Pond	0	0	0	2	1	3	None	6	Problem	Low
4DO13	Flannagan Pond	0	0	0	2	1	3	None	6	Problem	Low

Table 5-1 Outfall Inventory and Priority Ranking Matrix
Ayer, Massachusetts
Revision Date: 11-30-2020

Outfall ID	Receiving Water	1	2	3	4	5	6	7	Score	Priority Ranking	Priority Re-Ranking after Dry Weather Monitoring
		Previous Screening Results Indicate Likely Sewer Input[1]	Discharge to Area of Concern to Public Health[2]	Frequency of Past Discharge Complaints	Receiving Water Quality[3]	Density of Generating Sites[4]	Age of Development/Infrastructure	Additional Characteristics			
Information Source		Outfall Inspections and Sample Results	GIS Maps	Town Staff	Impaired Waters List	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual	Other			
Scoring Criteria		Yes = 3 (Problem Outfall) No = 0	Yes = 3 No = 0	Frequent = 3 Occassional = 2 None = 0	Poor = 3 Fair = 2 Good = 0	High = 3 Medium = 2 Low = 1	High = 3 Medium = 2 Low = 1	TBD			
4DO14	Sandy Pond	0	0	0	2	1	3	None	6	Problem	Problem
4DO15	Sandy Pond	0	0	0	2	1	3	None	6	Problem	Low
4DO16	Sandy Pond	0	0	0	2	1	3	None	6	Problem	Low
4DO17	Sandy Pond	0	3	0	2	1	3	None	9	High	Low
4DO21	Wooded Area near RR tracks	0	0	0	0	1	3	None	4	Low	Low
4DO22	Wetland	0	0	0	0	1	3	None	4	Low	Low
4DO23	Wetland	0	0	0	0	1	3	None	4	Low	Low
4DO24	Incomplete Subdivision (Stratton Hill)	0	0	0	0	1	3	None	4	Low	Low
4DO25	Wetland	0	0	0	0	1	3	None	4	Low	Low
4DO26	Wetland	0	0	0	0	1	3	None	4	Low	Low
4DO27	Wooded Area to Pine Meadow Pond	0	0	0	2	1	3	None	6	Problem	Low
4DO28	Wooded Area to Pine Meadow Pond	0	0	0	2	1	3	None	6	Problem	Low[8]
4DO29	Wetland	0	0	0	0	1	3	None	4	Low	Low
4DO30	Wetland	0	0	0	0	1	3	None	4	Low	Low
4DO31	Wetland	0	0	0	0	1	3	None	4	Low	Low
4DO32	Wetland	0	0	0	0	1	3	None	4	Low	Low
4DO33	Wetland	0	0	0	0	1	3	None	4	Low	Low
4DO34	Wetland	0	0	0	0	1	3	None	4	Low	Low
4DO35	Hydrologic Connection to Wetland	0	0	0	0	1	3	None	4	Low	Low
4DO36	Wetland	0	0	0	0	1	3	None	4	Low	Low[8]
4DO37	Sandy Pond	0	0	0	2	1	3	None	6	Problem	Problem[11]
4DO38	Sandy Pond	0	0	0	2	1	3	None	6	Problem	Low[8]
5DO01	Wetland	0	0	0	0	1	1	None	2	Low	Low
5DO02	Bennetts Brook	0	0	0	2	1	1	High	4	High	Low
5DO03	Wetland	0	0	0	0	1	1	None	2	Low	Low
5DO04	Wetland	0	0	0	0	1	1	None	2	Low	Low
5DO05	Wetland	0	0	0	0	1	1	None	2	Low	Low
5DO06	Wooded Area	0	0	0	0	1	1	None	2	Low	Low
5DO07	Wooded Area	0	0	0	0	1	1	None	2	Low	Low
5DO08	Wooded Area	0	0	0	0	1	1	None	2	Low	Low
5DO10	Wetland	0	0	0	0	1	1	None	2	Low	Low
5DO11	Wetland	0	0	0	0	1	1	None	2	Low	Low
5DO12	Wetland	0	0	0	0	1	1	None	2	Low	Low
5DO13	Wetland	0	0	0	0	1	1	None	2	Low	Low[14]
5DO14	Wetland	0	0	0	0	1	1	None	2	Low	Low[11]
5DO15	Wetland	0	0	0	0	1	1	None	2	Low	Low
5DO16	Private (MassDOT Owned)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
5DO17	Private (MassDOT Owned)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
5DO18	Private (MassDOT Owned)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
5DO19	Private (MassDOT Owned)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
5DO20	Private (MassDOT Owned)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
5DO21	Bennetts Brook	0	0	0	2	1	1	High	4	High	Low[8]
5DO22	Bennetts Brook	0	0	0	2	1	1	High	4	High	Low
5DO23	Unnammed Stream	0	0	0	0	1	1	None	2	Low	Low
5DO24	Wetland to Bennetts Brook	0	0	0	2	1	1	High	4	High	Low
5DO25	Unnammed Stream	0	0	0	0	1	1	None	2	Low	Low

Table 5-1 Outfall Inventory and Priority Ranking Matrix
Ayer, Massachusetts
Revision Date: 11-30-2020

Outfall ID	Receiving Water	1	2	3	4	5	6	7	Score	Priority Ranking	Priority Re-Ranking after Dry Weather Monitoring
		Previous Screening Results Indicate Likely Sewer Input[1]	Discharge to Area of Concern to Public Health[2]	Frequency of Past Discharge Complaints	Receiving Water Quality[3]	Density of Generating Sites[4]	Age of Development/Infrastructure	Additional Characteristics			
Information Source		Outfall Inspections and Sample Results	GIS Maps	Town Staff	Impaired Waters List	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual	Other			
Scoring Criteria		Yes = 3 (Problem Outfall) No = 0	Yes = 3 No = 0	Frequent = 3 Occassional = 2 None = 0	Poor = 3 Fair = 2 Good = 0	High = 3 Medium = 2 Low = 1	High = 3 Medium = 2 Low = 1	TBD			
5DO26	Hydrologic Connection to Wetland	0	0	0	0	1	3	None	4	Low	Low
5DO27	Wooded Area	0	0	0	0	1	1	None	2	Low	Low
5DO28	Wooded Area	0	0	0	0	1	1	None	2	Low	Low
5DO29	Hydrologic Connection to Bennetts Brook	0	0	0	2	1	1	High	4	High	Low
5DO30	Cold Spring Brook	0	0	0	0	1	3	None	4	Low	Low
6DO03	Private? (Turtle Hill)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
6DO04	Wooded Area to Long Pond	0	0	0	0	1	1	None	2	Low	Low[14]
6DO05	Wooded Area to Long Pond	0	0	0	0	1	1	None	2	Low	Low
6DO13	Private (Longview Cir)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
6DO14	Private (Longview Cir)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
6DO15	Private (Longview Cir)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
6DO16	Long Pond	0	0	0	0	1	1	None	2	Low	Low
6DO17	Wetland	0	0	0	0	1	1	None	2	Low	Low
6DO18	Private (Longview Cir)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
6DO20	Private (Catagnia Spagna)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Low
6DO21	Private (Catagnia Spagna)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
6DO22	Wetland	0	0	0	0	1	3	None	4	Low	Low
6DO23	Bennetts Brook	0	3	0	Fair	1	3	High	7	High	High
6DO24	Wetland	0	0	0	0	1	3	None	4	Low	Low
6DO25	Wetland	0	0	0	0	1	1	None	2	Low	Low
6DO26	Wetland	0	0	0	0	1	1	None	2	Low	Low
6DO27	Wooded Area near RR tracks	0	0	0	0	1	1	None	2	Low	Low[8]
6DO28	Private (Nasoya)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
6DO29	Private (Ardent Mills)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
6DO30	Wetland, could be private outfall	0	0	0	0	3	3	None	6	Problem	Low[8]
6DO31	Wetland	0	0	0	0	3	3	None	6	Problem	Low
6DO32	Unnammed Stream	0	3	0	0	1	3	None	7	Problem	Low
6DO33	Private (Creative Materials)	0	0	0	N/A	N/A	N/A	None	0	Excluded	Excluded
6DO34	Wetland	0	3	0	0	1	3	None	7	Problem	Low
6DO35	Wetland	0	3	0	0	1	3	None	7	Problem	Low[14]
6DO36	Bennetts Brook	0	3	0	2	1	3	High	9	High	N/A[12]
6DO37	Bennetts Brook	0	3	0	2	1	3	High	9	High	Low[13]
6DO38	Wooded Area	0	0	0	0	1	3	None	4	Low	Low
6DO39	Wetland	0	0	0	0	1	3	None	4	Low	Low
1CB34	Town Discharge to Private Drainage on Isaacs Lane	0	0	0	0	1	3	None	4	Low	Low
1CB54	Town Discharge to Private Drainage on Park Street	0	0	0	0	2	3	None	5	Problem	Low
6DC14	Town Discharge to Private Drainage Catania Spagna	0	0	0	0	1	3	None	4	Low	Low
6DM54	Town Discharge to Private Drainage Catania Spagna	0	0	0	0	3	3	None	6	Problem	Low
6DM64	Town Discharge to Private Drainage New England Way	0	0	0	0	3	1	None	4	Low	High
3CB153	Town Discharge to Private Drainage on Rotary	0	0	0	0	2	3	None	5	Problem	Problem
5DM04	Town Discharge to Private Drainage Littleton Road	0	0	0	0	1	3	None	4	Low	Low
5DM05	Town Discharge to Private Drainage Littleton Road	0	0	0	0	1	3	None	4	Low	Low
5DM06	Town Discharge to Private Drainage Littleton Road	0	0	0	0	1	3	None	4	Low	Low
5DM07	Town Discharge to Private Drainage Littleton Road	0	0	0	0	1	3	None	4	Low	Problem
5CB65	Town Discharge to Private Drainage Littleton Road	0	0	0	0	1	3	None	4	Low	High
5CB74	Town Discharge to Private Drainage Littleton Road	0	0	0	0	1	3	None	4	Low	Low

Table 5-1 Outfall Inventory and Priority Ranking Matrix

Ayer, Massachusetts

Revision Date: 11-30-2020

Outfall ID	Receiving Water	1	2	3	4	5	6	7	Score	Priority Ranking	Priority Re-Ranking after Dry Weather Monitoring
		Previous Screening Results Indicate Likely Sewer Input[1]	Discharge to Area of Concern to Public Health[2]	Frequency of Past Discharge Complaints	Receiving Water Quality[3]	Density of Generating Sites[4]	Age of Development/Infrastructure	Additional Characteristics			
Information Source		Outfall Inspections and Sample Results	GIS Maps	Town Staff	Impaired Waters List	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual	Other			
Scoring Criteria		Yes = 3 (Problem Outfall) No = 0	Yes = 3 No = 0	Frequent = 3 Occassional = 2 None = 0	Poor = 3 Fair = 2 Good = 0	High = 3 Medium = 2 Low = 1	High = 3 Medium = 2 Low = 1	TBD			

Scoring Criteria:

[1] Previous screening results indicate likely sewer input if any of the following are true:

- Olfactory or visual evidence of sewage,
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine

[2] Outfalls/interconnections that discharge to or in the vicinity of any of the following areas: public beaches, recreational areas, drinking water supplies, or shellfish beds

[3] Receiving water quality based on latest version of MassDEP Integrated List of Waters.

- Poor = Waters with approved TMDLs (Category 4a Waters) where illicit discharges have the potential to contain the pollutant identified as the cause of the impairment
- Fair = Water quality limited waterbodies that receive a discharge from the MS4 (Category 5 Waters)
- Good = No water quality impairments

[4] Generating sites are institutional, municipal, commercial, or industrial sites with a potential to contribute to illicit discharges (e.g., car dealers, car washes, gas stations, garden centers, industrial manufacturing, etc.)

[5] Age of development and infrastructure:

- High = Industrial areas greater than 40 years old and areas where the sanitary sewer system is more than 40 years old
- Medium = Developments 20-40 years old
- Low = Developments less than 20 years old

[6] Areas once served by combined sewers and but have been separated, or areas once served by septic systems but have been converted to sanitary sewers.

[7] Additional characteristics shows impaired waters required to be listed as high priority.

[7] Priority ranking based on the following:

High Priority - Per permit requirement to be considered High (e.g. impaired water) OR a score greater than 8.

Problem Outfall - A score of 5 to 8.

Low Priority - A score below 5

Excluded - See definition in Section 5.2

[8] Outfall could not be located but upstream structure was observed dry.

[9] Outfall had standing water but upstream structure was observed dry.

[10] Outfall inaccessible but upstream structure was observed dry.

[11] Outfall could not be located and upstream structure could not be observed, no result obtained.

[12] Outfall does not exist.

[13] Outfall was a percentage submerged but upstream structure was observed dry.

[14] Outfall at this location is the retention pond outlet but upstream structure was observed dry.

6 Dry Weather Outfall Screening and Sampling

Dry weather flow is a common indicator of potential illicit connections. The MS4 Permit requires all outfalls/interconnections (excluding Problem and excluded Outfalls) to be inspected for the presence of dry weather flow. The Ayer DPW is responsible for conducting dry weather outfall screening, starting with High Priority outfalls, followed by Low Priority outfalls, based on the initial priority rankings described in the previous section.

6.1 Weather Conditions

Dry weather outfall screening and sampling may occur when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period and no significant snow melt is occurring. For purposes of determining dry weather conditions, program staff will use precipitation data from Fitchburg Municipal Station (KFIT). If Fitchburg Municipal Station (KFIT) is not available or not reporting current weather data, then Boire (Nashua), NH (KASH) will be used as a back-up.

6.2 Dry Weather Screening/Sampling Procedure

6.2.1 General Procedure

The dry weather outfall inspection and sampling procedure consists of the following general steps:

1. Identify outfall(s) to be screened/sampled based on initial outfall inventory and priority ranking
2. Acquire the necessary staff, mapping, and field equipment (see **Table 6-1** for list of potential field equipment)
3. Conduct the outfall inspection during dry weather:
    a. Mark and photograph the outfall
    b. Record the inspection information and outfall characteristics (see form in **Appendix C**)
    c. Look for and record visual/olfactory evidence of pollutants in flowing outfalls including odor, color, turbidity, and floatable matter (suds, bubbles, excrement, toilet paper or sanitary products). Also observe outfalls for deposits and stains, vegetation, and damage to outfall structures.
4. If flow is observed, sample and test the flow following the procedures described in the following sections.
5. If no flow is observed, but evidence of illicit flow exists (illicit discharges are often intermittent or transitory), revisit the outfall during dry weather within one week of the initial observation, if practicable, to perform a second dry weather screening and sample any observed flow. Other techniques can be used to detect intermittent or transitory flows including conducting inspections during evenings or weekends and using optical brighteners.
6. Input results from screening and sampling into spreadsheet/database. Include pertinent information in the outfall/interconnection inventory and priority ranking.
7. Include all screening data in the annual report.

6.2.2 Field Equipment

Table 6-1 lists field equipment commonly used for dry weather outfall screening and sampling.

Table 6-1. Field Equipment – Dry Weather Outfall Screening and Sampling

Equipment	Use/Notes
Clipboard	For organization of field sheets and writing surface
Field Sheets	Field sheets for both dry weather inspection and Dry weather sampling should be available with extras
Chain of Custody Forms	To ensure proper handling of all samples
Pens/Pencils/Permanent Markers	For proper labeling
Nitrile Gloves	To protect the sampler as well as the sample from contamination
Flashlight/headlamp w/batteries	For looking in outfalls or manholes, helpful in early mornings as well
Cooler with Ice	For transporting samples to the laboratory
Digital Camera	For documenting field conditions at time of inspection
Personal Protective Equipment (PPE)	Reflective vest, Safety glasses and boots at a minimum
GPS Receiver	For taking spatial location data
Water Quality Sonde	If needed, for sampling conductivity, temperature, pH
Water Quality Meter	Hand held meter, if available, for testing for various water quality parameters such as ammonia, surfactants and chlorine
Test Kits	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
Label Tape	For labeling sample containers
Sample Containers	Make sure all sample containers are clean. Keep extra sample containers on hand at all times. Make sure there are proper sample containers for what is being sampled for (i.e., bacteria requires sterile containers).
Pry Bar or Pick	For opening catch basins and manholes when necessary
Sandbags	For damming low flows in order to take samples
Small Mallet or Hammer	Helping to free stuck manhole and catch basin covers
Utility Knife	Multiple uses
Measuring Tape	Measuring distances and depth of flow
Safety Cones	Safety
Hand Sanitizer	Disinfectant/decontaminant
Zip Ties/Duct Tape	For making field repairs
Rubber Boots/Waders	For accessing shallow streams/areas
Sampling Pole/Dipper/Sampling Cage	For accessing hard to reach outfalls and manholes

6.2.3 Sample Collection and Analysis

If flow is present during a dry weather outfall inspection, a sample will be collected and analyzed for the required permit parameters[3] listed in **Table 6-2**. The general procedure for collection of outfall samples is as follows:

1. Fill out all sample information on sample bottles and field sheets (see **Appendix C** for Field Sheets)
2. Put on protective gloves (nitrile/latex/other) before sampling
3. Collect sample with dipper or directly in sample containers. If possible, collect water from the flow directly in the sample bottle. Be careful not to disturb sediments.
4. If using a dipper or other device, triple rinse the device with distilled water and then in water to be sampled (not for bacteria sampling)
5. Use test strips, test kits, and field meters (rinse similar to dipper) for most parameters (see **Table 6-2**)
6. Place laboratory samples on ice for analysis of bacteria and pollutants of concern
7. Fill out chain-of-custody form for laboratory samples
8. Deliver samples to Nashoba Analytical
9. Dispose of used test strips and test kit ampules properly
10. Decontaminate all testing personnel and equipment

In the event that an outfall is submerged, either partially or completely, or inaccessible, field staff will proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results. Field staff will continue to the next upstream structure until there is no longer an influence from the receiving water on the visual inspection or sampling.

Field test kits or field instrumentation are permitted for all parameters except indicator bacteria and any pollutants of concern. Field kits need to have appropriate detection limits and ranges. **Table 6-2** lists various field test kits and field instruments that can be used for outfall sampling associated with the 2016 MS4 Permit parameters, other than indicator bacteria and any pollutants of concern. Analytic procedures for field test kits and field instrumentation are provided in **Appendix D**.

[3] Other potentially useful parameters, although not required by the MS4 Permit, include **fluoride** (indicator of potable water sources in areas where water supplies are fluoridated), **potassium** (high levels may indicate the presence of sanitary wastewater), and **optical brighteners** (indicative of laundry detergents).

Table 6-2. Sampling Parameters and Analysis Methods

Analyte or Parameter	Instrumentation (Portable Meter)	Field Test Kit
Ammonia	CHEMetrics™ V-2000 Colorimeter Hach™ DR/890 Colorimeter Hach™ Pocket Colorimeter™ II	CHEMetrics™ K-1410 CHEMetrics™ K-1510 (series) Hach™ NI-SA Hach™ Ammonia Test Strips
Surfactants (Detergents)	CHEMetrics™ I-2017	CHEMetrics™ K-9400 and K-9404 Hach™ DE-2
Chlorine	CHEMetrics™ V-2000, K-2513 Hach™ Pocket Colorimeter™ II	NA
Conductivity	CHEMetrics™ I-1200 YSI Pro30 YSI EC300A Oakton 450	NA
Temperature	YSI Pro30 YSI EC300A Oakton 450	NA
Salinity	YSI Pro30 YSI EC300A Oakton 450	NA
Temperature	YSI Pro30 YSI EC300A Oakton 450	NA
Indicator Bacteria: *E. coli* (freshwater) or Enterococcus (saline water)	EPA certified laboratory procedure (40 CFR § 136)	NA
Pollutants of Concern[1]	EPA certified laboratory procedure (40 CFR § 136)	NA

[1] Where the discharge is directly into a water quality limited water or a water subject to an approved TMDL, the sample must be analyzed for the pollutant(s) of concern identified as the cause of the water quality impairment.

Testing for indicator bacteria and any pollutants of concern must be conducted using analytical methods and procedures found in 40 CFR § 136.[4] Samples for laboratory analysis must also be stored and preserved in accordance with procedures found in 40 CFR § 136. **Table 6-3** lists analytical methods, detection limits, hold times, and preservatives for laboratory analysis of dry weather sampling parameters.

Table 6-3. Required Analytical Methods, Detection Limits, Hold Times, and Preservatives[4]

[4] 40 CFR § 136: http://www.ecfr.gov/cgi-bin/text-idx?SID=b3b41fdea0b7b0b8cd6c4304d86271b7&mc=true&node=pt40.25.136&rgn=div5

Analyte or Parameter	Analytical Method	Detection Limit	Max. Hold Time	Preservative
Ammonia	**EPA**: 350.2, **SM**: 4500-NH3C	0.05 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2, No preservative required if analyzed immediately
Surfactants	**SM**: 5540-C	0.01 mg/L	48 hours	Cool ≤6°C
Chlorine	**SM**: 4500-Cl G	0.02 mg/L	Analyze within 15 minutes	None Required
Temperature	**SM**: 2550B	*NA*	Immediate	None Required
Specific Conductance	**EPA**: 120.1, **SM**: 2510B	0.2 µs/cm	28 days	Cool ≤6°C
Salinity	**SM**: 2520	-	28 days	Cool ≤6°C
Indicator Bacteria: *E.coli* Enterococcus	*E.coli* **EPA**: 1603 **SM**: 9221B, 9221F , 9223 B **Other**: Colilert®, Colilert-18® *Enterococcus* **EPA**: 1600 **SM**: 9230 C **Other**: Enterolert®	*E.coli* **EPA**: 1 cfu/100mL **SM**: 2 MPN/100mL **Other**: 1 MPN/100mL *Enterococcus* **EPA**: 1 cfu/100mL **SM**: 1 MPN/100mL **Other**: 1 MPN/100mL	8 hours	Cool ≤10°C, 0.0008% $Na_2S_2O_3$
Total Phosphorus	**EPA**: Manual-365.3, Automated Ascorbic acid digestion-365.1 Rev. 2, ICP/AES4-200.7 Rev. 4.4 **SM**: 4500-P E-F	**EPA**: 0.01 mg/L **SM** : 0.01 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2
Total Nitrogen (Ammonia + Nitrate/Nitrite, methods are for Nitrate-Nitrite and need to be combined with Ammonia listed above.)	**EPA**: Cadmium reduction (automated)-353.2 Rev. 2.0, **SM**: 4500-NO_3 E-F	**EPA**: 0.05 mg/L **SM** : 0.05 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2

SM = Standard Methods

6.3 Interpreting Outfall Sampling Results

Outfall analytical data from dry weather sampling can be used to help identify the major type or source of discharge. **Table 6-4** shows values identified by the U.S. EPA and the Center for Watershed Protection as typical screening values for select parameters. These represent the typical concentration (or value) of each parameter expected to be found in stormwater. Screening values that exceed these benchmarks may be indicative of pollution and/or illicit discharges.

Table 6-4. Benchmark Field Measurements for Select Parameters

Analyte or Parameter	Benchmark
Ammonia	>0.5 mg/L
Conductivity	>2,000 µS/cm
Surfactants	>0.25 mg/L
Chlorine	>0.02 mg/L (detectable levels per the 2016 MS4 Permit)
Indicator Bacteria[5]: *E.coli* *Enterococcus*	*E.coli*: the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 126 colonies per 100 ml and no single sample taken during the bathing season shall exceed 235 colonies per 100 ml *Enterococcus:* the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 33 colonies per 100 ml and no single sample taken during the bathing season shall exceed 61 colonies per 100 ml

6.4 Follow-up Ranking of Outfalls and Interconnections

The Ayer DPW will update and re-prioritize the initial outfall and interconnection rankings based on information gathered during dry weather screening. The rankings will be updated periodically as dry weather screening information becomes available, but will be completed within three (3) years of the effective date of the permit (July 1, 2021).

Outfalls/interconnections where relevant information was found indicating sewer input to the MS4 or sampling results indicating sewer input are highly likely to contain illicit discharges from sanitary sources. Such outfalls/interconnections will be ranked at the top of the High Priority Outfalls category for investigation. Other outfalls and interconnections may be re-ranked based on any new information from the dry weather screening.

[5] Massachusetts Water Quality Standards: http://www.mass.gov/eea/docs/dep/service/regulations/314cmr04.pdf

7 Catchment Investigations

Once stormwater outfalls with evidence of illicit discharges have been identified, various methods can be used to trace the source of the potential discharge within the outfall catchment area. Catchment investigation techniques include but are not limited to review of maps, historic plans, and records; manhole observation; dry and wet weather sampling; video inspection; smoke testing; and dye testing. This section outlines a systematic procedure to investigate outfall catchments to trace the source of potential illicit discharges. All data collected as part of the catchment investigations will be recorded and reported in each annual report.

7.1 System Vulnerability Factors

The Ayer DPW will review relevant mapping and historic plans and records to identify areas within the catchment with higher potential for illicit connections. The following information will be reviewed:

- Plans related to the construction of the drainage network
- Plans related to the construction of the sewer drainage network
- Prior work on storm drains or sewer lines
- Board of Health or other municipal data on septic systems
- Complaint records related to SSOs
- Septic system breakouts.

Based on the review of this information, the presence of any of the following **System Vulnerability Factors (SVFs)** will be identified for each catchment:

- History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages
- Common or twin-invert manholes serving storm and sanitary sewer alignments
- Common trench construction serving both storm and sanitary sewer alignments
- Crossings of storm and sanitary sewer alignments where the sanitary system is shallower than the storm drain system
- Sanitary sewer alignments known or suspected to have been constructed with an underdrain system
- Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints
- Areas formerly served by combined sewer systems
- Sanitary sewer infrastructure defects such as leaking service laterals, cracked, broken, or offset sanitary infrastructure, directly piped connections between storm drain and sanitary sewer infrastructure, or other vulnerability factors identified through Inflow/Infiltration Analyses, Sanitary Sewer Evaluation Surveys, or other infrastructure investigations

The following SVFs are recommended by EPA to include for consideration:

- Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs
- Any sanitary sewer and storm drain infrastructure greater than 40 years old

- Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance)
- History of multiple Board of Health actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance).

A SVF inventory will be documented for each catchment (see **Table 7-1**), retained as part of this IDDE Plan, and included in the annual report.

Table 7-1 Outfall Catchment System Vulnerability Factor (SVF) Inventory

Ayer, Massachusetts

Revision Date: 07-15-2019

Outfall ID	Receiving Water	1	2	3	4	5	6	7
		History of SSOs	Storm/Sanitary Crossings (Sanitary Above)	Inadequate Sanitary Level of Service	Sanitary Infrastructure Defects	SSO Potential In Event of System Failures	Sanitary and Storm Drain Infrastructure >40 years Old	Septic with Poor Soils or Water Table Separation
1DO02	Wetland	No	Yes	No	Yes	Yes	Yes	No
1DO03	James Brook	No	Yes	No	Yes	Yes	Yes	No
1DO04	James Brook	No	Unknown	No	Yes	Yes	Yes	No
1DO05	Wetland	No	Unknown	No	Yes	No	Yes	No
1DO06	Hydrologic Connection to Wetland	No	Unknown	No	Yes	No	Yes	No
1DO07	Wetland	No	Unknown	No	No	No	Yes	No
1DO08	Wetland	No	Unknown	No	No	No	Yes	No
1DO09	Private (MassDOT Owned)							
1DO10	Hydrologic Connection to Wetland	No	No	No	No	No	Unknown	No
1DO11	Nonacoicus Brook	This will be replaced as part of W Main Bridge						
1DO12	Overland to Nonacoicus Brook	No	Unknown	No	Unknown	No	Unknown	No
1DO14	Wetland	No	No	No	No	No	No	No
1DO15	Wetland	No	No	No	No	No	No	No
1DO16	Wetland	No	No	No	No	No	No	No
1DO17	Wetland	No	No	No	No	No	No	No
1DO18	Wetland	No	No	No	No	No	No	No
1DO19	Wetland	No	No	No	No	No	No	No
1DO20	Wetland	No	No	No	No	No	No	No
1DO21	Nashua River	No	No	No	No	No	No	Unknown
1DO23	Hydrologic Connection to Wetland	No	No	No	Yes	Yes	No	No
1DO27	Wetland	No	No	No	No	Yes	Yes	No
1DO27	Located at DPW- not outfall - need to delete in GIS							
1DO28	Hydrologic Connection to Wetland	No	Unknown	No	Yes	Yes	Yes	No
1DO29	Hydrologic Connection to Wetland	No	Unknown	No	Yes	Yes	Yes	No
1DO30	Not outfalll - Need to delete in GIS							
1DO31	Hydrologic Connection to Wetland	No	No	No	Yes	No	No	No
1DO32	Ditch Conveyance to 1DO29 - update GIS							
1DO33	Private (Isaacs Lane)							
1DO34	Hydrologic Connection to Wetland	No	Unknown	No	No	Yes	Yes	No
1DO35	Hydrologic Connection to Wetland	No	No	No	Yes	No	Yes	No
1DO36	Hydrologic Connection to Wetland	No	No	No	No	No	No	No
1DO37	Hydrologic Connection to Wetland	No	No	No	No	No	No	No
1DO38	James Brook	No	Unknown	No	Yes	Yes	Yes	No
1DO39	James Brook	No	Unknown	No	Yes	Yes	Yes	No
1DO40	James Brook	No	No	No	No	Yes	No	No
1DO41	Wetland to Nonacoicus Brook	No	Unknown	No	Yes	Yes	Yes	No
1DO42	Wetland to Nonacoicus Brook	No	Unknown	No	Yes	Yes	Yes	No
1DO43	Hydrologic Connection to Wetland	No	No	No	Yes	No	Yes	No
1DO44	Hydrologic Connection to Wetland	No	No	No	Yes	No	Yes	No
1DO45	Hydrologic Connection to Wetland	No	No	No	Yes	No	Yes	No
1DO46	Hydrologic Connection to Wetland	No	No	No	Yes	No	Yes	No
2DO02	Hydrologic Connection to Wetland	No	No	No	No	No	Yes	No
2DO03	Ditch Conveyance to 2DO19 - update GIS							

Table 7-1 Outfall Catchment System Vulnerability Factor (SVF) Inventory

Ayer, Massachusetts

Revision Date: 07-15-2019

Outfall ID	Receiving Water	1	2	3	4	5	6	7
		History of SSOs	Storm/Sanitary Crossings (Sanitary Above)	Inadequate Sanitary Level of Service	Sanitary Infrastructure Defects	SSO Potential In Event of System Failures	Sanitary and Storm Drain Infrastructure >40 years Old	Septic with Poor Soils or Water Table Separation
2DO05	Wetland	No	Unknown	No	No	No	No	No
2DO06	Hydrologic Connection to Wetland	No	Unknown	No	Yes	No	Yes	No
2DO07	Hydrologic Connection to School House Pond	No	Unknown	No	Yes	No	No	No
2DO08	Wetland	No	No	No	No	No	No	No
2DO09	Wetland	No	No	No	No	No	No	No
2DO10	Wetland	No	No	No	No	No	No	No
2DO11	Wetland	No	No	No	No	No	No	No
2DO12	Wetland	No	No	No	No	No	Yes	No
2DO13	Hydrologic Connection to School House Pond	No	Unknown	No	Yes	No	Yes	No
2DO14	Hydrologic Connection to School House Pond	No	Unknown	No	Yes	No	Yes	No
2DO15	Hydrologic Connection to School House Pond	No	Unknown	No	Yes	No	Yes	No
2DO16	Hydrologic Connection to School House Pond	No	Unknown	No	Yes	No	Yes	No
2DO17	Hydrologic Connection to School House Pond	No	Unknown	No	Yes	No	Yes	No
2DO18	Hydrologic Connection to School House Pond	No	Unknown	No	Yes	No	Yes	No
2DO19	Wetland	No	Unknown	No	No	Yes	No	No
2DO20	Wetland	No	No	No	No	Yes	No	No
3DO01	School House Pond	No	Unknown	No	No	No	No	No
3DO02	Hydrologic Connection to Wetland	No	Unknown	No	Yes	No	Yes	No
3DO03	Private (Ayer Housing Authority)							
3DO04	Private (Ayer Housing Authority)							
3DO05	Private (Ayer Housing Authority)							
3DO06	Grove Pond	No	No	No	No	No	No	No
3DO07	Balch Pond	Yes	Unknown	No	Yes	Yes	Yes	No
3DO08	Flannagan Pond	No	Unknown	No	Unknown	Yes	Yes	No
3DO09	Private (McDonalds)							
3DO10	Private (MassDOT Owned)							
3DO11	Flannagan Pond	No	No	No	Yes	Yes	Yes	No
3DO12	Grove Pond	No	Unknown	No	Unknown	Yes	Yes	No
3DO13	Grove Pond	No	Unknown	No	Yes	No	Yes	No
3DO14	Grove Pond	No	Unknown	No	Yes	No	Yes	No
3DO15	School House Pond	No	Unknown	No	No	No	No	No
3DO16	School House Pond	No	Unknown	No	Yes	No	Yes	No
3DO17	Private (MassDOT Owned)							
3DO18	Private (MassDOT Owned)							
3DO19	School House Pond	No	Unknown	No	Yes	Yes	Yes	No
3DO20	Flannagan Pond	No	No	No	Unknown	No	Yes	No
4DO01	Wetland	No	No	No	No	No	No	No
4DO02	Flannagan Pond	No	Unknown	No	Unknown	No	Yes	No
4DO03	Flannagan Pond	No	Unknown	No	No	No	Yes	No
4DO04	Flannagan Pond	No	Unknown	No	Unknown	Yes	Yes	No
4DO05	Flannagan Pond	No	Unknown	No	Unknown	No	Yes	No
4DO06	Flannagan Pond	No	Unknown	No	Unknown	No	Yes	No
4DO07	Flannagan Pond	No	Unknown	No	Unknown	No	Yes	No

Table 7-1 Outfall Catchment System Vulnerability Factor (SVF) Inventory

Ayer, Massachusetts

Revision Date: 07-15-2019

Outfall ID	Receiving Water	1	2	3	4	5	6	7
		History of SSOs	Storm/Sanitary Crossings (Sanitary Above)	Inadequate Sanitary Level of Service	Sanitary Infrastructure Defects	SSO Potential In Event of System Failures	Sanitary and Storm Drain Infrastructure >40 years Old	Septic with Poor Soils or Water Table Separation
4DO08	Flannagan Pond	No	Unknown	No	Unknown	Yes	Yes	No
4DO09	Flannagan Pond	No	Unknown	No	Unknown	No	Yes	No
4DO10	Flannagan Pond	No	Unknown	No	Unknown	No	Yes	No
4DO11	Flannagan Pond	No	No	No	Unknown	Yes	No	No
4DO12	Flannagan Pond	No	No	No	Unknown	No	No	No
4DO13	Flannagan Pond	No	No	No	Unknown	No	No	No
4DO14	Sandy Pond	No	Unknown	No	Unknown	No	Unknown	No
4DO15	Sandy Pond	No	Unknown	No	Unknown	No	Unknown	No
4DO16	Sandy Pond	No	No	No	Unknown	No	Yes	No
4DO17	Sandy Pond	No	Unknown	No	Unknown	No	Yes	No
4DO21	Wooded Area near RR tracks	No	No	No	Unknown	No	No	No
4DO22	Wetland	No	No	No	Unknown	No	No	No
4DO23	Wetland	No	No	No	Unknown	No	No	No
4DO24	Incomplete Subdivision (Stratton Hill)							
4DO25	Wetland	No	Unknown	No	Yes	No	Yes	No
4DO26	Wetland	No	Unknown	No	Yes	No	Yes	No
4DO27	Wooded Area to Pine Meadow Pond	No	No	No	No	No	Unknown	No
4DO28	Wooded Area to Pine Meadow Pond	No	No	No	No	No	Unknown	No
4DO29	Wetland	No	No	No	No	No	No	No
4DO30	Wetland	No	No	No	No	No	No	No
4DO31	Wetland	No	No	No	No	No	No	No
4DO32	Wetland	No	No	No	No	No	No	No
4DO33	Wetland	No	No	No	No	No	No	No
4DO34	Wetland	No	No	No	No	No	No	No
4DO35	Hydrologic Connection to Wetland	No	Yes	No	Unknown	No	No	No
4DO36	Wetland	No	No	No	Unknown	No	No	No
4DO37	Sandy Pond	No	No	No	Yes	No	Yes	No
4DO38	Sandy Pond	No	No	No	Yes	No	Yes	No
5DO01	Wetland	No	No	No	Unknown	No	No	No
5DO02	Bennetts Brook	No	No	No	Unknown	Yes	No	No
5DO03	Wetland	No	No	No	No	No	No	No
5DO04	Wetland	No	No	No	No	No	No	No
5DO05	Wetland	No	No	No	No	No	No	No
5DO06	Wooded Area	No	No	No	No	No	No	No
5DO07	Wooded Area	No	No	No	No	No	No	No
5DO08	Wooded Area	No	No	No	No	No	No	No
5DO10	Wetland	No	No	No	No	No	No	No
5DO11	Wetland	No	No	No	No	No	No	No
5DO12	Wetland	No	No	No	No	No	No	No
5DO13	Wetland	No	No	No	No	No	No	No
5DO14	Wetland	No	No	No	No	No	No	No
5DO15	Wetland	No	No	No	No	No	No	No
5DO16	Private (MassDOT Owned)							

Table 7-1 Outfall Catchment System Vulnerability Factor (SVF) Inventory

Ayer, Massachusetts

Revision Date: 07-15-2019

Outfall ID	Receiving Water	1	2	3	4	5	6	7
		History of SSOs	Storm/Sanitary Crossings (Sanitary Above)	Inadequate Sanitary Level of Service	Sanitary Infrastructure Defects	SSO Potential In Event of System Failures	Sanitary and Storm Drain Infrastructure >40 years Old	Septic with Poor Soils or Water Table Separation
5DO17	Private (MassDOT Owned)							
5DO18	Private (MassDOT Owned)							
5DO19	Private (MassDOT Owned)							
5DO20	Private (MassDOT Owned)							
5DO21	Bennetts Brook	No	No	No	Unknown	No	No	No
5DO22	Bennetts Brook	No	No	No	Unknown	No	No	No
5DO23	Unnammed Stream	No	No	No	Unknown	No	No	No
5DO24	Wetland to Bennetts Brook	No	No	No	Unknown	No	No	No
5DO25	Unnammed Stream	No	No	No	Unknown	No	No	No
5DO26	Hydrologic Connection to Wetland	No	Unknown	No	Unknown	No	Yes	No
5DO27	Wooded Area	No	No	No	No	No	No	No
5DO28	Wooded Area	No	No	No	No	No	No	No
5DO29	Hydrologic Connection to Bennetts Brook	No	No	No	No	No	No	No
5DO30	Cold Spring Brook	No	No	No	Yes	No	Yes	No
6DO03	Private? (Turtle Hill)							
6DO04	Wooded Area to Long Pond	No	No	No	Unknown	Yes	No	No
6DO05	Wooded Area to Long Pond	No	No	No	Unknown	Yes	No	No
6DO13	Private (Longview Cir)							
6DO14	Private (Longview Cir)							
6DO15	Private (Longview Cir)							
6DO16	Long Pond	No	Yes	No	No	Yes	No	No
6DO17	Wetland	No	No	No	Unknown	No	No	No
6DO18	Private (Longview Cir)							
6DO20	Private (Catagnia Spagna)							
6DO21	Private (Catagnia Spagna)							
6DO22	Wetland	No	No	No	No	No	No	No
6DO23	Bennetts Brook	No	No	No	No	No	No	Unknown
6DO24	Wetland	No	No	No	Unknown	No	No	No
6DO25	Wetland	No	No	No	Unknown	No	No	No
6DO26	Wetland	No	No	No	Unknown	No	No	No
6DO27	Wooded Area near RR tracks	No	No	No	Unknown	No	No	No
6DO28	Private (Nasoya)							
6DO29	Private (Ardent Mills)							
6DO30	Wetland, could be private outfall	No	Unknown	No	Unknown	No	Unknown	No
6DO31	Wetland	No	No	No	No	No	No	No
6DO32	Unnammed Stream	No	Unknown	No	Unknown	Yes	No	No
6DO33	Private (Creative Materials)							
6DO34	Wetland	No	No	No	Unknown	No	No	No
6DO35	Wetland	No	No	No	Unknown	No	No	No
6DO36	Bennetts Brook	No	No	No	No	No	No	Unknown
6DO37	Bennetts Brook	No	No	No	No	No	No	Unknown
6DO38	Wooded Area	No	No	No	Unknown	Yes	No	No
6DO39	Wetland	No	No	No	No	No	No	No

Table 7-1 Outfall Catchment System Vulnerability Factor (SVF) Inventory

Ayer, Massachusetts

Revision Date: 07-15-2019

Outfall ID	Receiving Water	1	2	3	4	5	6	7
		History of SSOs	Storm/Sanitary Crossings (Sanitary Above)	Inadequate Sanitary Level of Service	Sanitary Infrastructure Defects	SSO Potential In Event of System Failures	Sanitary and Storm Drain Infrastructure >40 years Old	Septic with Poor Soils or Water Table Separation
1CB34	Town Discharge to Private Drainage on Isaacs Lane	No	Unknown	No	No	No	Yes	No
1CB54	Town Discharge to Private Drainage on Park Street	No	Unknown	No	Yes	No	Yes	No
6DC14	Town Discharge to Private Drainage Catania Spagna	No	Unknown	No	Unknown	No	No	No
6DM54	Town Discharge to Private Drainage Catania Spagna	No	Unknown	No	Unknown	No	Unknown	No
6DM64	Town Discharge to Private Drainage New England Way	No	Unknown	No	Unknown	No	No	No
3CB153	Town Discharge to Private Drainage on Rotary	No	Unknown	No	Yes	No	Yes	No
5DM04	Town Discharge to Private Drainage Littleton Road	No	Unknown	No	No	No	No	No
5DM05	Town Discharge to Private Drainage Littleton Road	No	Unknown	No	No	No	No	No
5DM06	Town Discharge to Private Drainage Littleton Road	No	Unknown	No	No	No	No	No
5DM07	Town Discharge to Private Drainage Littleton Road	No	Unknown	No	No	No	No	No
5CB65	Town Discharge to Private Drainage Littleton Road	No	No	No	No	No	No	No
5CB74	Town Discharge to Private Drainage Littleton Road	No	No	No	No	No	No	No

Presence/Absence Evaluation Criteria:

1. History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages
2. Crossings of storm and sanitary sewer alignments where the sanitary system is shallower than the storm drain system
3. Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints
4. Sanitary sewer infrastructure defects such as leaking service laterals, cracked, broken, or offset sanitary infrastructure, directly piped connections between storm drain and sanitary sewer infrastructure, or other vulnerability factors identified through Inflow/Infiltration Analyses, Sanitary Sewer Evaluation Surveys, or other infrastructure investigations
5. Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs
6. Any sanitary sewer and storm drain infrastructure greater than 40 years old
7. Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance)
8. History of multiple Board of Health actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance)

7.2 Dry Weather Manhole Inspections

The Town of Ayer will implement a dry weather storm drain network investigation that involves systematically and progressively observing, sampling and evaluating key junction manholes in the MS4 to determine the approximate location of suspected illicit discharges or SSOs.

The Ayer DPW will be responsible for implementing the dry weather manhole inspection program and making updates as necessary. Infrastructure information will be incorporated into the storm system map, and catchment delineations will be refined based on the field investigation, where necessary. The SVF inventory will also be updated based on information obtained during the field investigations, where necessary.

Several important terms related to the dry weather manhole inspection program are defined by the MS4 Permit as follows:

- **Junction Manhole** is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes.

- **Key Junction Manholes** are those junction manholes that can represent one or more junction manholes without compromising adequate implementation of the illicit discharge program. Adequate implementation of the illicit discharge program would not be compromised if the exclusion of a particular junction manhole as a key junction manhole would not affect the permittee's ability to determine the possible presence of an upstream illicit discharge. A permittee may exclude a junction manhole located upstream from another located in the immediate vicinity or that is serving a drainage alignment with no potential for illicit connections.

For all catchments identified for investigation, during dry weather, field crews will systematically inspect **key junction manholes** for evidence of illicit discharges. This program involves progressive inspection and sampling at manholes in the storm drain network to isolate and eliminate illicit discharges.

The manhole inspection methodology will be conducted in one of two ways (or a combination of both):

- By working progressively up from the outfall and inspecting key junction manholes along the way, or
- By working progressively down from the upper parts of the catchment toward the outfall.

For most catchments, manhole inspections will proceed from the outfall moving up into the system. However, the decision to move up or down the system depends on the nature of the drainage system and the surrounding land use and the availability of information on the catchment and drainage system. Moving up the system can begin immediately when an illicit discharge is detected at an outfall, and only a map of the storm drain system is required. Moving down the system requires more advance preparation and reliable drainage system information on the upstream segments of the storm drain system, but may be more efficient if the sources of illicit discharges are believed to be located in the

upstream portions of the catchment area. Once a manhole inspection methodology has been selected, investigations will continue systematically through the catchment.

Inspection of key junction manholes will proceed as follows:

1. Manholes will be opened and inspected for visual and olfactory evidence of illicit connections. The field inspection form is located on Survey123 for ArcGIS, named "Drain Manhole Inspection Form".

2. If flow is observed, a sample will be collected and analyzed at a minimum for ammonia, chlorine, and surfactants. Field kits can be used for these analyses. Sampling and analysis will be in accordance with procedures outlined in **Section 6**. Additional indicator sampling may assist in determining potential sources (e.g., bacteria for sanitary flows, conductivity to detect tidal backwater, etc.).

3. Where sampling results or visual or olfactory evidence indicate potential illicit discharges or SSOs, the area draining to the junction manhole will be flagged for further upstream manhole investigation and/or isolation and confirmation of sources.

4. Subsequent key junction manhole inspections will proceed until the location of suspected illicit discharges or SSOs can be isolated to a pipe segment between two manholes.

5. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completion of key junction manhole sampling.

7.3 Wet Weather Outfall Sampling

Where a minimum of one (1) System Vulnerability Factor (SVF) is identified based on previous information or the catchment investigation, a wet weather investigation must also be conducted at the associated outfall. The Town of Ayer will be responsible for implementing the wet weather outfall sampling program and making updates as necessary.

Outfalls will be inspected and sampled under wet weather conditions, to the extent necessary, to determine whether wet weather-induced high flows in sanitary sewers or high groundwater in areas served by septic systems result in discharges of sanitary flow to the MS4.

Wet weather outfall sampling will proceed as follows:

1. At least one wet weather sample will be collected at the outfall for the same parameters required during dry weather screening.

2. Wet weather sampling will occur during or after a storm event of sufficient depth or intensity to produce a stormwater discharge at the outfall. There is no specific rainfall amount that will trigger sampling, although minimum storm event intensities that are likely to trigger sanitary sewer interconnections are preferred. To the extent feasible, sampling should occur during the spring (March through June) when groundwater levels are relatively high.

3. If wet weather outfall sampling indicates a potential illicit discharge, then additional wet weather source sampling will be performed, as warranted, or source isolation and confirmation procedures will be followed as described in **Section 7.4**.

4. If wet weather outfall sampling does not identify evidence of illicit discharges, and no evidence of an illicit discharge is found during dry weather manhole inspections, catchment investigations will be considered complete.

7.4 Source Isolation and Confirmation

Once the source of an illicit discharge is approximated between two manholes, more detailed investigation techniques will be used to isolate and confirm the source of the illicit discharge. The following methods may be used in isolating and confirming the source of illicit discharges

- Sandbagging
- Smoke Testing
- Dye Testing
- CCTV/Video Inspections
- Optical Brightener Monitoring
- IDDE Canines

These methods are described in the sections below. Instructions and Standard Operating Procedures (SOPs) for these and other IDDE methods are provided in **Appendix F**.

Public notification is an important aspect of a detailed source investigation program. Prior to smoke testing, dye testing, or TV inspections, the Ayer DPW will notify property owners in the affected area. Smoke testing notification will include Code Red reverse 911, hanging notifications, social media distribution for single family homes, businesses and building lobbies for multi-family dwellings.

7.4.1 Sandbagging

This technique can be particularly useful when attempting to isolate intermittent illicit discharges or those with very little perceptible flow. The technique involves placing sandbags or similar barriers (e.g., caulking, weirs/plates, or other temporary barriers) within outlets to manholes to form a temporary dam that collects any intermittent flows that may occur. Sandbags are typically left in place for 48 hours, and should only be installed when dry weather is forecast. If flow has collected behind the sandbags/barriers after 48 hours it can be assessed using visual observations or by sampling. If no flow collects behind the sandbag, the upstream pipe network can be ruled out as a source of the intermittent discharge. Finding appropriate durations of dry weather and the need for multiple trips to each manhole makes this method both time-consuming and somewhat limiting.

7.4.2 Smoke Testing

Smoke testing involves injecting non-toxic smoke into drain lines and noting the emergence of smoke from sanitary sewer vents in illegally connected buildings or from cracks and leaks in the system itself.

Typically a smoke bomb or smoke generator is used to inject the smoke into the system at a catch basin or manhole and air is then forced through the system. Test personnel are place in areas where there are suspected illegal connections or cracks/leaks, noting any escape of smoke (indicating an illicit connection or damaged storm drain infrastructure). It is important when using this technique to make proper notifications to area residents and business owners as well as local police and fire departments.

If the initial test of the storm drain system is unsuccessful then a more thorough smoke-test of the sanitary sewer lines can also be performed. Unlike storm drain smoke tests, buildings that do not emit smoke during sanitary sewer smoke tests may have problem connections and may also have sewer gas venting inside, which is hazardous.

It should be noted that smoke may cause minor irritation of respiratory passages. Residents with respiratory conditions may need to be monitored or evacuated from the area of testing altogether to ensure safety during testing.

7.4.3 Dye Testing

Dye testing involves flushing non-toxic dye into plumbing fixtures such as toilets, showers, and sinks and observing nearby storm drains and sewer manholes as well as stormwater outfalls for the presence of the dye. Similar to smoke testing, it is important to inform local residents and business owners. Police, fire, and local public health staff should also be notified prior to testing in preparation of responding to citizen phone calls concerning the dye and their presence in local surface waters.

A team of two or more people is needed to perform dye testing (ideally, all with two-way radios). One person is inside the building, while the others are stationed at the appropriate storm sewer and sanitary sewer manholes (which should be opened) and/or outfalls. The person inside the building adds dye into a plumbing fixture (i.e., toilet or sink) and runs a sufficient amount of water to move the dye through the plumbing system. The person inside the building then radios to the outside crew that the dye has been dropped, and the outside crew watches for the dye in the storm sewer and sanitary sewer, recording the presence or absence of the dye.

The test can be relatively quick (about 30 minutes per test), effective (results are usually definitive), and inexpensive. Dye testing is best used when the likely source of an illicit discharge has been narrowed down to a few specific houses or businesses.

7.4.4 CCTV/Video Inspection

Another method of source isolation involves the use of mobile video cameras that are guided remotely through stormwater drain lines to observe possible illicit discharges. IDDE program staff can review the videos and note any visible illicit discharges. While this tool is both effective and usually definitive, it can be costly and time consuming when compared to other source isolation techniques.

7.4.5 Optical Brightener Monitoring

Optical brighteners are fluorescent dyes that are used in detergents and paper products to enhance their appearance. The presence of optical brighteners in surface waters or dry weather discharges suggests

there is a possible illicit discharge or insufficient removal through adsorption in nearby septic systems or wastewater treatment. Optical brightener monitoring can be done in two ways. The most common, and least expensive, methodology involves placing a cotton pad in a wire cage and securing it in a pipe, manhole, catch basin, or inlet to capture intermittent dry weather flows. The pad is retrieved at a later date and placed under UV light to determine the presence/absence of brighteners during the monitoring period. A second methodology uses handheld fluorometers to detect optical brighteners in water sample collected from outfalls or ambient surface waters. Use of a fluorometer, while more quantitative, is typically more costly and is not as effective at isolating intermittent discharges as other source isolation techniques.

7.4.6 IDDE Canines

Dogs specifically trained to smell human related sewage are becoming a cost-effective way to isolate and identify sources of illicit discharges. While not widespread at the moment, the use of IDDE canines is growing as is their accuracy. The use of IDDE canines is not recommended as a standalone practice for source identification; rather it is recommended as a tool to supplement other conventional methods, such as dye testing, in order to fully verify sources of illicit discharges.

7.5 Illicit Discharge Removal

When the specific source of an illicit discharge is identified, the Town of Ayer will exercise its authority as necessary to require its removal. The annual report will include the status of IDDE investigation and removal activities including the following information for each confirmed source:

- The location of the discharge and its source(s)
- A description of the discharge
- The method of discovery
- Date of discovery
- Date of elimination, mitigation or enforcement action OR planned corrective measures and a schedule for completing the illicit discharge removal
- Estimate of the volume of flow removed.

7.5.1 Confirmatory Outfall Screening

Within one (1) year of removal of all identified illicit discharges within a catchment area, confirmatory outfall or interconnection screening will be conducted. The confirmatory screening will be conducted in dry weather unless System Vulnerability Factors have been identified, in which case both dry weather and wet weather confirmatory screening will be conducted. If confirmatory screening indicates evidence of additional illicit discharges, the catchment will be scheduled for additional investigation.

7.6 Ongoing Screening

Upon completion of all catchment investigations and illicit discharge removal and confirmation (if necessary), each outfall or interconnection will be re-prioritized for screening and scheduled for ongoing

screening once every five (5) years. Ongoing screening will consist of dry weather screening and sampling consistent with the procedures described in **Section 6** of this plan. Ongoing wet weather screening and sampling will also be conducted at outfalls where wet weather screening was required due to System Vulnerability Factors and will be conducted in accordance with the procedures described in **Section 7.3**. All sampling results will be reported in the annual report.

8 Training

Annual IDDE training will be made available to all employees involved in the IDDE program. This training will at a minimum include information on how to identify illicit discharges and SSOs and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program. Training records will be maintained in **Appendix E**. The frequency and type of training will be included in the annual report.

9 Progress Reporting

The progress and success of the IDDE program will be evaluated on an annual basis. The evaluation will be documented in the annual report and will include the following indicators of program progress:

- Number of SSOs and illicit discharges identified and removed
- Number and percent of total outfall catchments served by the MS4 evaluated using the catchment investigation procedure
- Number of dry weather outfall inspections/screenings
- Number of wet weather outfall inspections/sampling events
- Number of enforcement notices issued
- All dry weather and wet weather screening and sampling results
- Estimate of the volume of sewage removed, as applicable
- Number of employees trained annually.

The success of the IDDE program will be measured by the IDDE activities completed within the required permit timelines.

Appendix A

Legal Authority (IDDE Bylaw or Ordinance)

ARTICLE XLVIII - ILLICIT DISCHARGES TO THE MUNICIPAL STORM DRAIN SYSTEMS BY-LAW

§ 1. PURPOSE and AUTHORITY

A. Purpose: The purpose of this bylaw is to manage connections and discharges to the municipal storm drain system and waters of the Commonwealth, that are necessary for the protection of Ayer's water bodies and groundwater, and to safeguard the public health, safety, welfare and the environment. The objectives of this bylaw are:
   1. To prevent pollutants from entering Ayer's municipal separate storm sewer system (MS4) and waters of the Commonwealth;
   2. To prohibit illicit connections and unauthorized discharges to the MS4;
   3. To require the removal of illicit connections;
   4. To comply with state and federal statutes and regulations relating to stormwater discharges;
   5. To establish the legal authority to ensure compliance with the provisions of this bylaw through inspection, monitoring, and enforcement;
   6. To prevent contamination of drinking water supplies.

B. Authority: This bylaw is adopted under the authority granted by the Home Rule Amendment of the Massachusetts Constitution and the Home Rule Procedures Act, and pursuant to the regulations of the Federal Clean Water Act found at 40 CFR 122.34. The DPW Superintendent shall administer, implement and enforce this bylaw. Any powers granted to or duties imposed upon the DPW Superintendent may be delegated in writing to other qualified employees or agents of the Town of Ayer.

§ 2. DEFINITIONS

For the purposes of this bylaw, the following shall apply:

CLEAN WATER ACT: The Federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.) as hereafter amended.

DISCHARGE OF POLLUTANTS: The addition from any source of any pollutant or combination of pollutants from any source into the municipal storm drain system or into the waters of the United States or Commonwealth.

GROUNDWATER: All water beneath the surface of the ground.

HAZARDOUS MATERIAL OR WASTE: Any material, which because of its quantity, concentration, chemical, corrosive, flammable, reactive, toxic, infectious or radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential threat to human health, safety, welfare, or to the environment. Hazardous materials include any synthetic or organic chemical, petroleum product, heavy metals, radioactive or infectious waste, acid and alkali, pathogens and any substance defined as Toxic or Hazardous under Massachusetts General Laws Ch.21C and Ch.21E, and the regulations at 310 CMR 30.000 and 310 CMR 40.0000.

ILLICIT CONNECTION: Any surface or subsurface drain or conveyance, that allows an illegal discharge into the municipal storm drain system. Illicit connections include conveyances that allow a non-stormwater discharge to the municipal storm drain system including but not limited to: sewage, processed wastewater or wash water and also any connections from indoor drains, sinks, or toilets, regardless of whether said connection was previously allowed, permitted, or approved prior to the effective date of this bylaw.

ILLICIT DISCHARGE: Any direct or indirect non-stormwater discharge into the municipal storm drain system, not specifically exempted in Section 6. The term excludes a discharge in compliance with an NPDES Storm Water or Surface Water Discharge Permit.

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OR MUNICIPAL STORM DRAIN SYSTEM: The system of conveyances designed or used for collecting or conveying stormwater, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drainage system owned or operated by the Town of Ayer.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER DISCHARGE PERMIT: A permit issued by United States Environmental Protection Agency or jointly with the State that authorizes the discharge of pollutants to waters of the United States.

NON-STORMWATER DISCHARGE: Any discharge to the municipal storm drain system not composed entirely of stormwater.

PERSON: Any individual, partnership, association, firm, company, trust, corporation or other organization, and, any agency, authority, department or political subdivision of the Commonwealth or the federal government, to the extent permitted by law, and any officer, employee, or agent of such person.

POLLUTANT: Any constituent part or property of sewage, agricultural, industrial or commercial waste, runoff, leachate, heated effluent, or other matter whether originating at a point or nonpoint source, that is or may be introduced into any sewage treatment works or waters of the Commonwealth. Pollutants include, but are not limited to:

1. Preservatives including paints, varnishes and other chemical agents, cleaning agents, disinfectants and solvents;
2. Oil and other automotive or other vehicular fluids and any fuels irrespective of use;
3. Non-hazardous liquids, solid wastes and yard wastes;
4. Refuse, rubbish, garbage, litter, or other discarded or abandoned objects, articles, accumulations and floatables;
5. Pesticides, herbicides, and fertilizers;
6. Hazardous materials and wastes; sewage, fecal coliform and other pathogens;
7. Metals: dissolved, in suspension or in particulate form;
8. Animal wastes;
9. Rock, sand, salts, soils;
10. Construction wastes and residues, including but not limited to sediments, slurries, and concrete rinsates;

11. Noxious or offensive matter of any kind.

STORMWATER: Storm (rain) runoff, snowmelt runoff, and surface water runoff and drainage.

UNCONTAMINATED: Water containing no pollutants.

WATERCOURSE: A natural or man-made channel through which water flows including a river, brook or underground stream.

WATERS OF THE COMMONWEALTH: All waters within the jurisdiction of the Commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, coastal waters, and groundwater.

WASTEWATER: any sanitary waste, sludge, or septic tank or cesspool overflow, and water that during manufacturing, cleaning or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct or waste product.

§ 3. APPLICABILITY

This bylaw shall apply to flows entering the municipally owned storm drainage system and waters of the Commonwealth.

§ 4. REGULATIONS

The DPW Superintendent may promulgate rules, regulations and a permitting process to effectuate the purposes of this bylaw. Failure by the DPW Superintendent to promulgate such rules and regulations shall neither suspend nor invalidate this bylaw.

§ 5. PROHIBITED ACTIVITIES

A. Illegal Discharges: No person shall dump, discharge, cause or allow to be dumped or discharged any pollutant or non-stormwater discharge into the municipal storm drain system, watercourse, or into the waters of the Commonwealth.
B. Illicit Connections: No person shall construct, use, allow, maintain or continue any illicit connection to the municipal storm drain system, regardless of whether the connection was permissible under applicable law, regulation or custom at the time of connection.
C. Obstruction of Municipal Storm Drain System: No person shall obstruct or interfere with the normal flow of stormwater into or out of the municipal storm drain system without prior approval from the DPW Superintendent or his/her designee.

§ 6. EXEMPTIONS

This section shall not apply to discharges or flows resulting from fire fighting activities;

This section shall not apply to any of the following non-stormwater discharges or flows provided that the source is not deemed by the DPW Superintendent to be a significant contributor of a pollutant to the municipal storm drain system:

1. Waterline flushing;
2. Flows from potable water sources;
3. Springs;
4. Natural flows from riparian habitats and wetlands;
5. Rising groundwater;
6. Uncontaminated groundwater infiltration as defined in 40 CFR 35.2005(20), or uncontaminated pumped groundwater;
7. Discharge from landscape irrigation or lawn watering;
8. Water from individual residential car washing;
9. Discharge from dechlorinated swimming pool water [defined as containing less than one part per million (ppm) chlorine] provided the water is allowed to stand for one week prior to draining and the pool is drained in such a way as not to cause a nuisance.
10. Water from exterior foundation drains, footing drains (not including active groundwater dewatering systems, such as dewatering excavations for foundation or pipelines), crawl space pumps, or air conditioning condensation;
11. Discharges from street sweeper operations of inconsequential amounts of water.;
12. Dye testing, provided verbal notification is given to the DPW Superintendent and approval is obtained prior to the time of the test;
13. Non-stormwater discharges permitted under an NPDES permit, waiver, or waste discharge order administered under the authority of the United States Environmental Protection Agency or the Massachusetts Department of Environmental Protection, provided that the discharge is in full compliance with the requirements of the permit, waiver, or order and applicable laws and regulations;
14. Discharges for which advanced written approval is received from the DPW Superintendent if necessary to protect public health, safety, welfare or the environment.

§ 7. SUSPENSION OF STORM DRAINAGE SYSTEM ACCESS

A. The DPW Superintendent may suspend municipal storm drain system access to any person or property without prior written notice when such suspension is necessary to stop an actual or threatened illegal discharge that presents or may present imminent risk of harm to the public health, safety, welfare or to the environment. If any person fails to comply with an emergency suspension order, the DPW Superintendent may take all reasonable steps necessary to prevent or minimize harm to the public health, safety and welfare or to the environment.

B. Any person discharging to a municipal storm drain system in violation of this bylaw may have access to their municipal storm drain system terminated if such termination would abate or reduce an illicit discharge. The DPW Superintendent will notify a violator of the proposed termination of access to the municipal storm drain system. The violator may petition the DPW Superintendent for reconsideration and hearing. An offense is committed if the person reinstates access to the municipal storm drain system from premises terminated pursuant to this section, without prior approval from the DPW Superintendent.

§ 8. NOTIFICATION OF SPILLS

Notwithstanding any other requirements of local, state or federal law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation, has information of any known or suspected release of materials at that facility or operation that results or may result in illegal discharge of pollutants, that person shall take all steps necessary to ensure

containment, and cleanup of the release. In the event of a release of oil or hazardous materials, the person shall immediately notify the municipal fire and police departments, DPW Superintendent and Board of Health. In the event of a release of non-hazardous material, said person shall notify the DPW Superintendent no later than the next business day. Written confirmation of all telephone, facsimile or in person notifications shall be provided to the DPW Superintendent within three business days thereafter.

If the discharge of prohibited materials is from a commercial or industrial facility, the facility owner or operator of the facility shall retain on-site a written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

§ 9. ENFORCEMENT

A. The DPW Superintendent or the Superintendent's designee shall enforce this bylaw, and the regulations promulgated thereunder, as well as the terms and conditions of all permits, notices, and orders, and may pursue all civil and criminal remedies for such violations.

B. Civil Relief: The DPW Superintendent may seek injunctive relief in a court of competent jurisdiction to restrain the person that violates the provisions of this bylaw, regulations, permit, notice, or order issued thereunder from activities that would create further violations and additionally compelling the person to abate or remediate the violation.

C. Compliance Orders: The DPW Superintendent may issue a written order to enforce the provisions of this bylaw or the regulations thereunder, which may include:
    1. Elimination of illicit connections or discharges to the storm drainage system;
    2. Termination of access to the storm drainage system;
    3. Performance of monitoring, analyses, and reporting;
    4. Cessation of unlawful discharges, practices, or operations;
    5. Remediation of contamination in connection therewith. If the DPW Superintendent determines that abatement or remediation of contamination is required, the order shall set forth a deadline for completion of the abatement or remediation.

D. Criminal and Civil Penalties: Any person that violates any provision of this bylaw, valid regulation, or the terms or conditions in any permit or order prescribed or issued thereunder, shall be subject to a fine not to exceed $300.00 for each day such violation occurs or continues or be subject to a civil penalty, that may be assessed in an action brought on behalf of the Town in any court of competent jurisdiction.

E. Non-Criminal Disposition: As an alternative to criminal prosecution or civil action, the Town of Ayer may elect to utilize the non-criminal disposition procedure set forth in Massachusetts General Laws Chapter 40, §21D. The DPW Superintendent, or the Superintendent's designee, shall be the enforcement officer. The penalty for the 1st violation shall be $100. The penalty for the 2nd violation shall be $200. The penalty for the 3rd and subsequent violations shall be $300. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

F. Entry to Perform Duties Under this Bylaw: To the extent permitted by state law, or if authorized by the owner or other party in control of the property, the DPW Superintendent, his/her agents, officers, and employees may enter upon privately owned property for the purpose of performing their duties under this bylaw and regulations and may make or cause to be made such examinations, surveys or sampling as the DPW Superintendent deems reasonably necessary

G. Appeals: The decisions or orders of the DPW Superintendent shall be final. Further relief shall be to a court of competent jurisdiction.

H. Remedies Not Exclusive: The remedies listed in this bylaw are not exclusive of any other remedies available under any applicable federal, state or local law.

§ 10. SEVERABILITY

The provisions of this bylaw are hereby declared to be severable. If any provision, paragraph, sentence or clause of this bylaw or the application thereof to any party, establishment, or circumstances shall be held invalid, such invalidity shall not affect the other provisions or application of this bylaw.

§ 11. TRANSITIONAL PROVISIONS

Residential property owners shall have ninety (90) days from the effective date of this bylaw to comply with its provisions. An extension may be granted provided good cause is shown for the failure to comply with the bylaw during that period.

§ 12. EFFECTIVE DATE

This Bylaw shall take effect upon approval of the Attorney General and upon compliance with the requirements of Massachusetts General Law Chapter 40, Section 32.

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Appendix B

Storm System Mapping

The map is created from a subset of data from the Ayer Geographic Information System (GIS) database. The Town of Ayer makes no claims, no representations, and no warranties, express or implied, concerning the validity (express or implied), the reliability or the accuracy of the GIS data and GIS data products furnished by the Town, including the implied validity of any uses of such data.

N

W E

S

Nashua River

James Brook

Long Pond

Sandy Pond

Flannagan Pond

Spectacle Pond

Plow Shop Pond

Grove Pond

Nonacoicus Brook

Nashua River

Unnamed Brook

DEP Wetlands

- WETLAND ARCS
- WETLAND POLYGONS
  - BOG
  - DEEP MARSH
  - SHALLOW MARSH
  - MEADOW OR FEN
  - SHRUB SWAMP
  - WOODED SWAMP
- OPEN WATER

0 0.125 0.25 0.5 0.75 1 Miles

TOWN OF AYER, MASSACHUSETTS
STORMWATER MS4 MAP

June 2020

S:\GIS\Ayer GIS Mapping Files\GIS\Systemwide Map - Stormwater.mxd

Legend

- Catch Basin (Private Owner)
- Culvert (Private Owner)
- Manhole (Private Owner)
- Outfall (Private Owner)
- Vortex (Private Owner)
- Catch Basin
- Culvert Inlet/Outlet
- Manhole
- Outfall
- Vortex
- Culvert
- Drain Pipe (Private Owner)
- Drain Pipe
- Open Channel Conveyance
- Private BMP Steward
- Stormwater Basin (Publicly Owned or Maintained)
- Stormwater Basin (Privately Owned or Maintained)
- Town Owned Bioretention/ Rain Gardens
- Initial Catchment Delineations

Impaired Waters (303d Category)

- 2-Attaining Some Uses; Other Uses Not Assessed
- 3-No Uses Assessed
- 4A-Impaired-TMDL is Completed
- 4C-Impairment Not Caused by a Pollutant
- 5-Impaired-TMDL Required

Impaired Rivers (303d Category)

- 2-Attaining Some Uses; Other Uses Not Assessed
- 3-No Uses Assessed
- 4A-Impaired-TMDL is Completed
- 4C-Impairment Not Caused by a Pollutant
- 5-Impaired-TMDL Required

Appendix C

Field Forms

See Town of Ayer SOPs in SWMP for Field Forms

Town of AYER Public Works

Appendix D

Water Quality Analysis Instructions and Standard Operating Procedures

SOP 13: WATER QUALITY SCREENING IN THE FIELD

Introduction

Outfalls from an engineered storm drain system can be in the form of pipes or ditches. Under current and pending regulations, it is important to inspect and document water quality within the MS4 system under both dry weather and wet weather conditions. SOP 1, "Dry Weather Outfall Inspection" and SOP 2, "Wet Weather Outfall Inspection", cover the objectives of these activities and how water quality parameters can be collected during both types of inspections. SOP 3, "Catch Basin Inspection and Cleaning", describes how this operations and maintenance activity can serve as an additional opportunity to collect water quality data.

SOP 2 included detailed information on how to collect discrete analytical samples to be processed by a laboratory. In contrast, this SOP addresses screening-level measurements than can be collected at outfalls, catch basins, receiving waters, or other water bodies. The measurements can be collected with field test kits or with portable meters.

Water quality screening data collected in this manner can feed into an illicit discharge detection and elimination investigation, like the process described in SOP 10, "Locating Illicit Discharges".

Visual Condition Assessment

SOP 1, SOP 2, and SOP 3 describe a Visual Condition Assessment to collect observations related to the quality of stormwater conveyed by an engineered storm drain system. These observations may include such visual evidence and/or potential pollutants as:

- Foaming (detergents)
- Discoloration
- Evidence of sanitary waste
- Optical enhancers (fluorescent dyes added to laundry detergent); and
- Turbidity

If a Visual Condition Assessment indicates the presence of these pollutants, it may be necessary to quantify the extent of each, and gather data on other parameters that cannot be visually observed but can be measured using field kits or meters. These parameters include:

- Ammonia
- Chloride (present in treated drinking water but not groundwater)
- Conductivity
- Fluoride
- Hardness
- pH
- Potassium

Field Kits and Sampling Methods Available

In recent drafts of new MS4 Permits, U.S. EPA Region 1 has identified several test kits that are acceptable for use in the field, and other regulatory agencies have also completed similar reviews. The following table shows field test kits and portable meters that can be used for screening parameters.

Table SOP 13-1
Field Measurements, Test Kits, and Instrumentation

Analyte or Parameter	Instrumentation (Portable meter)	Field Test Kit
Ammonia	CHEMetrics™ V-2000 Colorimeter Hach™ DR/890 Colorimeter Hach™ Pocket Colorimeter™ II	CHEMetrics™ K-1410 CHEMetrics™ K-1510 (series) Hach™ NI-SA Hach™ Ammonia Test Strips
Bacteria	Bacteria field test kits require 24-hour window	
Boron	N/A	Hanna™ HI 38074 Taylor™ K-1541
Chloride	CHEMetrics™ V-2000 Colorimeter Hach™ Pocket Colorimeter™ II LaMotte™ DC1200 Colorimeter	CHEMetrics™ K-2002 through K-2070 Hach™ CDS-DT Hach™ Chloride QuanTab® Test Strips
Color		Hach™ ColorDisc
Conductivity	CHEMetrics™ I-1200	N/A
Detergents (Surfactants)	CHEMetrics™ I-2017	CHEMetrics™ K-9400 and K-9404 Hach™ DE-2
Fluoride	CHEMetrics™ V-2000 Colorimeter Hach™ Pocket Colorimeter™ II	N/A
Hardness	N/A	CHEMetrics™ K-1705 and K-1710 CHEMetrics™ K-4502 through K-4530 Hach™ HA-DT Hach™ Hardness Test Strips
Optical enhancers	Field tests still under development	
pH	CHEMetrics™ I-1000	Hach™ 17J through 17N Hach™ pH Test Strips
Potassium	Horiba™ Cardy C-131	LaMotte™ 3138 KIW
Turbidity	CHEMetrics™ I-1300	N/A

Each field test kit will include instructions specific to that test kit, and most kits are available in configurations that detect different ranges of the parameter. For example, the CHEMetrics™ detergents kit K-9400 shown above detects concentrations of 0 to 3 milligrams per liter (mg/L) while the K-9404 kit detects concentrations of 0 to 1,400 mg/L.

The table below shows values identified by the U.S. EPA and the Center for Watershed Protection as typical screening values for select parameters. These represent the typical concentration (or value) of each parameter expected to be found in stormwater. Screening values that exceed these benchmarks may be indicative of pollution and/or illicit discharges.

Table SOP 13-2
Benchmark Field Measurements for Select Parameters

Analyte or Parameter	Benchmark
Ammonia	>50.0 mg/L
Conductivity	>2,000
Detergents (Surfactants)	> 0.25 mg/L
Fluoride	>0.25 mg/L
pH	<5
Potassium	>20 mg/L

If and when water quality screening samples, whether using field test kits or portable meters, exceed these benchmark concentrations, the inspector should consider collecting analytical samples for laboratory analysis.

Advantages and Disadvantages of Field Testing

Field test kits can be convenient for use as a screening tool, initial purchase costs are low (typically $0.50 to $5.00 for the kits included in Table SOP 13-1), and the costs are far less than full analyses at a laboratory. However, some disadvantages of this screening method include:

- Limited shelf life
- Labor cost associated with inspector's time
- Generation of wastes, including glass vials and used reagent
- Steps and processes for each kit can vary widely, resulting in errors
- Trained staff are required in order to effectively utilize kits
- Not all kits are accepted by all regulatory agencies
- Limited useful detection range

Portable instrumentation such as the colorimeters shown in Table SOP 13-1 have the benefit of providing accurate readings, measure to low detection limits, and can be purchased pre-programmed to measure concentrations of most parameters required. Disadvantages of portable instrumentation include:

- High initial purchase cost
- Requirement for ongoing calibration and maintenance
- Individual probes require periodic replacement
- Specific storage requirements to maintain calibration
- Trained staff are required in order to effectively utilize meters

Related Standard Operating Procedures

1. SOP 1, Dry Weather Outfall Inspection
2. SOP 2, Wet Weather Outfall Inspection
3. SOP 3, Catch Basin Cleaning and Inspection
4. SOP 10, Locating Illicit Discharges

WATER QUALITY SCREENING FORM

Outfall I.D.			
Outfall 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 ☐			
Most Recent Storm Event			

FIELD WATER QUALITY SCREENING RESULTS

Sample Parameter	Field Test Kit or Portable Instrument Meter	Benchmark	Field Screening Result	Full Analytical Required?
Ammonia[1]		> 50.0 mg/L		☐ Yes ☐ No
Boron[1]		> 0.35 mg/L		☐ Yes ☐ No
Chloride[2]		230 mg/L		☐ Yes ☐ No
Color[1]		> 500 units		☐ Yes ☐ No
Specific Conductance[1]		> 2,000 µS/cm		☐ Yes ☐ No
Detergents & Surfactants[3]		> 0.25 mg/L		☐ Yes ☐ No
Fluoride[3]		> 0.25 mg/L		☐ Yes ☐ No
Hardness[1]		< 10 mg/L or > 2,000 mg/L		☐ Yes ☐ No
pH[1]		< 5		☐ Yes ☐ No
Potassium[1]		> 20 mg/L		☐ Yes ☐ No
Turbidity[1]		> 1,000 NTU		☐ Yes ☐ No

[1] – *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*, Center for Watershed Protection and Robert Pitt of University of Alabama, 2004, p. 134, Table 45.

[2] –*Env-Ws 1703.21 Water Quality Criteria for Toxic Substances*, State of New Hampshire Department Surface Water Quality Regulations.

[3] – *Appendix I – Field Measurements, Benchmarks and Instrumentation*, Draft Massachusetts North Coastal Small MS4 General Permit, 2009.

CMRSWC

FULL ANALYTICAL TESTING WATER QUALITY RESULTS

Sample Parameter	Analytical Test Method	Sample Collection (Time/Date)	Testing Lab	Analytical Testing Result
Ammonia	EPA 350.2/SM4500-NH3C			
Bacteria	E coli: 1103.1; 1603 Enterococcus: 1106.1; 1600			
Boron	EPA 212.3			
Chloride	EPA 9251			
Color	EPA 110.2			
Specific Conductance	SM 2510B			
Detergents & Surfactants	EPA 425.1/SM5540C			
Fluoride	EPA 300.0			
Hardness	EPA 130.1/SM 2340B			
Optical Enhancers	N/A*			
pH	EPA 150.1/SM 4500H			
Potassium	EPA 200.7			
Turbidity	SM 2130B			

*- There is presently no USEPA Standard Method for analysis of optical enhancers. Typically, sample pads are described as with “Present” or “Not Present” for fluorescing dye when exposed to UV light or a fluorometer.

Appendix E

IDDE Employee Training Record

Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

##MUNICIPALITY, Massachusetts

Date of Training: _____

Duration of Training: _____

Name	Title	Signature

Appendix F

Source Isolation and Confirmation Methods: Instructions, Manuals, and SOPs

See Town of Ayer SOPs in SWMP

Site Inspection and Enforcement of Sediment and Erosion Control Procedures

(Attachments include the NPDES Bylaw and Regulations, please also refere to SOPs 5 and 6)

Town of AYER Public Works

ARTICLE XLVIII - ILLICIT DISCHARGES TO THE MUNICIPAL STORM DRAIN SYSTEMS BY-LAW

§ 1. PURPOSE and AUTHORITY

A. Purpose: The purpose of this bylaw is to manage connections and discharges to the municipal storm drain system and waters of the Commonwealth, that are necessary for the protection of Ayer's water bodies and groundwater, and to safeguard the public health, safety, welfare and the environment. The objectives of this bylaw are:
    1. To prevent pollutants from entering Ayer's municipal separate storm sewer system (MS4) and waters of the Commonwealth;
    2. To prohibit illicit connections and unauthorized discharges to the MS4;
    3. To require the removal of illicit connections;
    4. To comply with state and federal statutes and regulations relating to stormwater discharges;
    5. To establish the legal authority to ensure compliance with the provisions of this bylaw through inspection, monitoring, and enforcement;
    6. To prevent contamination of drinking water supplies.

B. Authority: This bylaw is adopted under the authority granted by the Home Rule Amendment of the Massachusetts Constitution and the Home Rule Procedures Act, and pursuant to the regulations of the Federal Clean Water Act found at 40 CFR 122.34. The DPW Superintendent shall administer, implement and enforce this bylaw. Any powers granted to or duties imposed upon the DPW Superintendent may be delegated in writing to other qualified employees or agents of the Town of Ayer.

§ 2. DEFINITIONS

For the purposes of this bylaw, the following shall apply:

CLEAN WATER ACT: The Federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.) as hereafter amended.

DISCHARGE OF POLLUTANTS: The addition from any source of any pollutant or combination of pollutants from any source into the municipal storm drain system or into the waters of the United States or Commonwealth.

GROUNDWATER: All water beneath the surface of the ground.

HAZARDOUS MATERIAL OR WASTE: Any material, which because of its quantity, concentration, chemical, corrosive, flammable, reactive, toxic, infectious or radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential threat to human health, safety, welfare, or to the environment. Hazardous materials include any synthetic or organic chemical, petroleum product, heavy metals, radioactive or infectious waste, acid and alkali, pathogens and any substance defined as Toxic or Hazardous under Massachusetts General Laws Ch.21C and Ch.21E, and the regulations at 310 CMR 30.000 and 310 CMR 40.0000.

ILLICIT CONNECTION: Any surface or subsurface drain or conveyance, that allows an illegal discharge into the municipal storm drain system. Illicit connections include conveyances that allow a non-stormwater discharge to the municipal storm drain system including but not limited to: sewage, processed wastewater or wash water and also any connections from indoor drains, sinks, or toilets, regardless of whether said connection was previously allowed, permitted, or approved prior to the effective date of this bylaw.

ILLICIT DISCHARGE: Any direct or indirect non-stormwater discharge into the municipal storm drain system, not specifically exempted in Section 6. The term excludes a discharge in compliance with an NPDES Storm Water or Surface Water Discharge Permit.

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OR MUNICIPAL STORM DRAIN SYSTEM: The system of conveyances designed or used for collecting or conveying stormwater, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drainage system owned or operated by the Town of Ayer.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER DISCHARGE PERMIT: A permit issued by United States Environmental Protection Agency or jointly with the State that authorizes the discharge of pollutants to waters of the United States.

NON-STORMWATER DISCHARGE: Any discharge to the municipal storm drain system not composed entirely of stormwater.

PERSON: Any individual, partnership, association, firm, company, trust, corporation or other organization, and, any agency, authority, department or political subdivision of the Commonwealth or the federal government, to the extent permitted by law, and any officer, employee, or agent of such person.

POLLUTANT: Any constituent part or property of sewage, agricultural, industrial or commercial waste, runoff, leachate, heated effluent, or other matter whether originating at a point or nonpoint source, that is or may be introduced into any sewage treatment works or waters of the Commonwealth. Pollutants include, but are not limited to:

1. Preservatives including paints, varnishes and other chemical agents, cleaning agents, disinfectants and solvents;
2. Oil and other automotive or other vehicular fluids and any fuels irrespective of use;
3. Non-hazardous liquids, solid wastes and yard wastes;
4. Refuse, rubbish, garbage, litter, or other discarded or abandoned objects, articles, accumulations and floatables;
5. Pesticides, herbicides, and fertilizers;
6. Hazardous materials and wastes; sewage, fecal coliform and other pathogens;
7. Metals: dissolved, in suspension or in particulate form;
8. Animal wastes;
9. Rock, sand, salts, soils;
10. Construction wastes and residues, including but not limited to sediments, slurries, and concrete rinsates;

11. Noxious or offensive matter of any kind.

STORMWATER: Storm (rain) runoff, snowmelt runoff, and surface water runoff and drainage.

UNCONTAMINATED: Water containing no pollutants.

WATERCOURSE: A natural or man-made channel through which water flows including a river, brook or underground stream.

WATERS OF THE COMMONWEALTH: All waters within the jurisdiction of the Commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, coastal waters, and groundwater.

WASTEWATER: any sanitary waste, sludge, or septic tank or cesspool overflow, and water that during manufacturing, cleaning or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct or waste product.

§ 3. APPLICABILITY

This bylaw shall apply to flows entering the municipally owned storm drainage system and waters of the Commonwealth.

§ 4. REGULATIONS

The DPW Superintendent may promulgate rules, regulations and a permitting process to effectuate the purposes of this bylaw. Failure by the DPW Superintendent to promulgate such rules and regulations shall neither suspend nor invalidate this bylaw.

§ 5. PROHIBITED ACTIVITIES

A. Illegal Discharges: No person shall dump, discharge, cause or allow to be dumped or discharged any pollutant or non-stormwater discharge into the municipal storm drain system, watercourse, or into the waters of the Commonwealth.
B. Illicit Connections: No person shall construct, use, allow, maintain or continue any illicit connection to the municipal storm drain system, regardless of whether the connection was permissible under applicable law, regulation or custom at the time of connection.
C. Obstruction of Municipal Storm Drain System: No person shall obstruct or interfere with the normal flow of stormwater into or out of the municipal storm drain system without prior approval from the DPW Superintendent or his/her designee.

§ 6. EXEMPTIONS

This section shall not apply to discharges or flows resulting from fire fighting activities;

This section shall not apply to any of the following non-stormwater discharges or flows provided that the source is not deemed by the DPW Superintendent to be a significant contributor of a pollutant to the municipal storm drain system:

1. Waterline flushing;
2. Flows from potable water sources;
3. Springs;
4. Natural flows from riparian habitats and wetlands;
5. Rising groundwater;
6. Uncontaminated groundwater infiltration as defined in 40 CFR 35.2005(20), or uncontaminated pumped groundwater;
7. Discharge from landscape irrigation or lawn watering;
8. Water from individual residential car washing;
9. Discharge from dechlorinated swimming pool water [defined as containing less than one part per million (ppm) chlorine] provided the water is allowed to stand for one week prior to draining and the pool is drained in such a way as not to cause a nuisance.
10. Water from exterior foundation drains, footing drains (not including active groundwater dewatering systems, such as dewatering excavations for foundation or pipelines), crawl space pumps, or air conditioning condensation;
11. Discharges from street sweeper operations of inconsequential amounts of water.;
12. Dye testing, provided verbal notification is given to the DPW Superintendent and approval is obtained prior to the time of the test;
13. Non-stormwater discharges permitted under an NPDES permit, waiver, or waste discharge order administered under the authority of the United States Environmental Protection Agency or the Massachusetts Department of Environmental Protection, provided that the discharge is in full compliance with the requirements of the permit, waiver, or order and applicable laws and regulations;
14. Discharges for which advanced written approval is received from the DPW Superintendent if necessary to protect public health, safety, welfare or the environment.

§ 7. SUSPENSION OF STORM DRAINAGE SYSTEM ACCESS

A. The DPW Superintendent may suspend municipal storm drain system access to any person or property without prior written notice when such suspension is necessary to stop an actual or threatened illegal discharge that presents or may present imminent risk of harm to the public health, safety, welfare or to the environment. If any person fails to comply with an emergency suspension order, the DPW Superintendent may take all reasonable steps necessary to prevent or minimize harm to the public health, safety and welfare or to the environment.

B. Any person discharging to a municipal storm drain system in violation of this bylaw may have access to their municipal storm drain system terminated if such termination would abate or reduce an illicit discharge. The DPW Superintendent will notify a violator of the proposed termination of access to the municipal storm drain system. The violator may petition the DPW Superintendent for reconsideration and hearing. An offense is committed if the person reinstates access to the municipal storm drain system from premises terminated pursuant to this section, without prior approval from the DPW Superintendent.

§ 8. NOTIFICATION OF SPILLS

Notwithstanding any other requirements of local, state or federal law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation, has information of any known or suspected release of materials at that facility or operation that results or may result in illegal discharge of pollutants, that person shall take all steps necessary to ensure

containment, and cleanup of the release. In the event of a release of oil or hazardous materials, the person shall immediately notify the municipal fire and police departments, DPW Superintendent and Board of Health. In the event of a release of non-hazardous material, said person shall notify the DPW Superintendent no later than the next business day. Written confirmation of all telephone, facsimile or in person notifications shall be provided to the DPW Superintendent within three business days thereafter.

If the discharge of prohibited materials is from a commercial or industrial facility, the facility owner or operator of the facility shall retain on-site a written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

§ 9. ENFORCEMENT

A. The DPW Superintendent or the Superintendent's designee shall enforce this bylaw, and the regulations promulgated thereunder, as well as the terms and conditions of all permits, notices, and orders, and may pursue all civil and criminal remedies for such violations.

B. Civil Relief: The DPW Superintendent may seek injunctive relief in a court of competent jurisdiction to restrain the person that violates the provisions of this bylaw, regulations, permit, notice, or order issued thereunder from activities that would create further violations and additionally compelling the person to abate or remediate the violation.

C. Compliance Orders: The DPW Superintendent may issue a written order to enforce the provisions of this bylaw or the regulations thereunder, which may include:
    1. Elimination of illicit connections or discharges to the storm drainage system;
    2. Termination of access to the storm drainage system;
    3. Performance of monitoring, analyses, and reporting;
    4. Cessation of unlawful discharges, practices, or operations;
    5. Remediation of contamination in connection therewith. If the DPW Superintendent determines that abatement or remediation of contamination is required, the order shall set forth a deadline for completion of the abatement or remediation.

D. Criminal and Civil Penalties: Any person that violates any provision of this bylaw, valid regulation, or the terms or conditions in any permit or order prescribed or issued thereunder, shall be subject to a fine not to exceed $300.00 for each day such violation occurs or continues or be subject to a civil penalty, that may be assessed in an action brought on behalf of the Town in any court of competent jurisdiction.

E. Non-Criminal Disposition: As an alternative to criminal prosecution or civil action, the Town of Ayer may elect to utilize the non-criminal disposition procedure set forth in Massachusetts General Laws Chapter 40, §21D. The DPW Superintendent, or the Superintendent's designee, shall be the enforcement officer. The penalty for the 1st violation shall be $100. The penalty for the 2nd violation shall be $200. The penalty for the 3rd and subsequent violations shall be $300. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

F. Entry to Perform Duties Under this Bylaw: To the extent permitted by state law, or if authorized by the owner or other party in control of the property, the DPW Superintendent, his/her agents, officers, and employees may enter upon privately owned property for the purpose of performing their duties under this bylaw and regulations and may make or cause to be made such examinations, surveys or sampling as the DPW Superintendent deems reasonably necessary

G. Appeals: The decisions or orders of the DPW Superintendent shall be final. Further relief shall be to a court of competent jurisdiction.

H. Remedies Not Exclusive: The remedies listed in this bylaw are not exclusive of any other remedies available under any applicable federal, state or local law.

§ 10. SEVERABILITY

The provisions of this bylaw are hereby declared to be severable. If any provision, paragraph, sentence or clause of this bylaw or the application thereof to any party, establishment, or circumstances shall be held invalid, such invalidity shall not affect the other provisions or application of this bylaw.

§ 11. TRANSITIONAL PROVISIONS

Residential property owners shall have ninety (90) days from the effective date of this bylaw to comply with its provisions. An extension may be granted provided good cause is shown for the failure to comply with the bylaw during that period.

§ 12. EFFECTIVE DATE

This Bylaw shall take effect upon approval of the Attorney General and upon compliance with the requirements of Massachusetts General Law Chapter 40, Section 32.

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TOWN OF AYER

STORMWATER REGULATIONS

DATED: AUGUST 25, 2020

TOWN OF AYER STORMWATER REGULATIONS

In support of Article XLVII - NPDES Phase II Stormwater Management Bylaw

I. Purpose

These Stormwater Regulations are pursuant to the Town of Ayer NPDES Phase II Stormwater Bylaw for the purpose of administering the Bylaw by providing guidance and requirements.

The purpose of the Bylaw is to protect, maintain and enhance the public health, safety, environment, and general welfare by establishing minimum requirements and procedures to control the adverse effects of Construction Site stormwater runoff and post-construction stormwater discharges. In addition, the Bylaw is intended to ensure and promote compliance with US Environmental Protection Agency (EPA) stormwater management regulations pertaining to municipal separate storm sewer systems (MS4) and the National Pollutant Discharge Elimination System (NPDES), as amended.

These regulations specifically state the stormwater management requirements, permitting, design, and operations/maintenance of stormwater systems.

These regulations do not replace the requirements of the EPA Construction General Permit (CGP) and a project may have applicability to both the Town's NPDES Phase II Bylaw and the EPA CGP.

Where reference is made to other regulations and laws in this document, the latest edition and all supplemental amendments shall be applicable.

II. Authority and Responsibility.

A. The regulations contained herein have been adopted by the Ayer Stormwater Authority in accordance with Ayer NPDES Phase II Stormwater Bylaw (Town Bylaw XLVII).

B. Nothing in these Regulations is intended to replace or be in derogation of the requirements of water resource related bylaws, the Planning Board Subdivision Regulations, Ayer Zoning Bylaws, or any Rules and Regulations adopted thereunder.

C. These Regulations may be periodically amended by the Stormwater Authority in accordance with the procedures outlined in the Stormwater Bylaw.

D. For terminology used in these Regulations, see section 3.0 of the Stormwater Bylaw.

Stormwater Authority: Planning Board, or as delegated to its Agent(s).

Stormwater Agents: Department of Public Works, or as delegated by the Stormwater Authority.

III. Administration

A. The Stormwater Authority or its Agent(s) (the "Authority") shall review, implement, and enforce these Regulations. The Stormwater Agent(s) (the "Authority") shall act as field inspector.

(1) **Major Projects:** The Planning Board shall be the Stormwater Management Permit Granting Authority.

(2) **Minor Projects:** The Town Planner, in consultation with the Stormwater Agent, shall be designated as the Permit Granting Authority.

B. The Authority may:

(1) Approve the application and issue a Stormwater Management Permit ("Permit") with conditions, modifications, or restrictions; or,

(2) Disapprove the application and deny the Permit if it finds the proposed plan will not protect water resources, fails to meet the objectives and requirements of the Stormwater Bylaw and Regulations, or if the applicant has submitted insufficient information to describe the site, work, or effect of the project on the water quality and runoff.

IV. Applicability

Refer to Section 5.0 of the Stormwater Bylaw for a full description of Applicability. The definition of Minor and Major Projects from Section 5.0B of the Bylaw is carried over for convenience:

A **Minor project** is any activity subject to the Stormwater Bylaw which involves:

a. Land disturbance of an area greater than 40,000 square feet but less than 60,000 square feet for a single-family lot which has not been included in an ANR or subdivision within the prior five (5) years; or

b. Land disturbance of a volume of earth greater than 1,500 cubic yards but less than 2,200 cubic yards where not related to a subdivision or ANR; or

c. Land disturbance of an area of land 1,000 square feet to 10,000 square feet:

- If the slope is 15% or greater; or
- If the soil cut or filled exceeds four (4) feet in vertical depth at its deepest point as measured from the natural ground level. This requirement may be waived for septic system installation.

A **Major project** is any project subject to the Stormwater Bylaw which involves:

a. Land disturbance of an area of 40,000 or more square feet for a subdivision or ANR; or

b. Land disturbance of an area of greater than 60,000 square feet; or

c. Land disturbance of a volume of earth resulting in a total quantity greater than 2200 cubic yards; or

d. Land disturbance of an area of land greater than 10,000 square feet:

- If the slope is 15% or greater or
- If the soil cut or filled exceeds four (4) feet in vertical depth at its deepest point as measured from the natural ground level.

V. Procedures

An application and all required documents shall be submitted to the Town Clerk and Town Planner, accompanied by the appropriate fees. The Town Planner shall review the scope of the project, and forward projects deemed to be **Minor**, to the Stormwater Agent(s), and those deemed to be **Major**, to the Stormwater Authority. Minor and major projects are defined in Section IV.

The stormwater management application can be submitted with a Site Plan Review Application, Subdivision Application, ANR application, or other application deemed appropriate by the Authority.

VI. Applications

A. Application Package:

SUBMISSION ITEM	REQUIRED FOR MAJOR PROJECT?	REQUIRED FOR MINOR PROJECT?
Completed Application Form with original signatures of all owners	YES, 1 original copy to Town Planner, 1 original copy to town Clerk, 1 PDF to Town Planner	YES, 1 original copy to Town Planner, 1 original copy to Town Clerk, 1 PDF to Town Planner
Written authorization signed by the owner(s), if submitted by another individual.	YES, two copies	YES, two copies
Application fee payable to the "Town of Ayer" to cover expenses connected with the application review.	YES, to Town Clerk	YES, to Town Clerk
Stormwater Management Erosion and Sedimentation Control Plan ("Stormwater Plan")	YES, 7 copies to Town Planner, 1 copy to Town Clerk, 1 PDF to Town Planner	YES, 4 copies to Town Planner, 1 copy to Town Clerk, 1 PDF to Town Planner
Operation and Maintenance Plan ("O & M Plan")	YES, 7 copies to Town Planner, 1 copy to Town Clerk, 1 PDF to Town Planner	YES, 4 copies to Town Planner, 1 copy to Town Clerk, 1 PDF to Town Planner
Engineering Review Fee payable to "Town of Ayer"	Required, see Section VII below	Maybe required, see Section VII below
Certified Assessor's Abutter's List (within 300 feet of property)	YES, as part of Planning Board required submission	NO

B. Determination of Completeness:

The Town Planner shall determine if the application packet is complete within 10 business days of submission. No review shall take place until the application and number of document copies has been found to be complete.

C. Information Requests:

The Stormwater Authority may request additional information to determine whether the plan will protect water resources and meet the objectives of the Stormwater Bylaw and these regulations.

D. Combined Application:

The Stormwater Authority may allow this Application to be submitted in combination with

another Application for the same project (e.g. Site Plan Review, Subdivision, etc.) rather than as a stand-alone application. The combined submittal of required Plans and other materials shall meet the requirements of both applications.

VII. Fees

A. Application Fees:

(1) A nonrefundable application fee shall be submitted with the application. The fee schedule is listed on the application and available at Town Hall. These fees are in addition to any other local or state fees assessed under any other laws, bylaws, or regulations.

(2) Revision of fee schedules. The Authority may review and revise its fee schedule periodically. Amendments shall be preceded by a public hearing held by the Authority, and notification shall be filed with the Town Clerk.

B. Engineering and Consultant Reviews and Fees:

(1) Minor Projects:
A review fee may be required in accordance with the major projects section below if the Authority or Agent determines that engineering or consultant reviews are necessary.

(2) Major Projects:

(a) A fee will be required for engineering or consultant reviews. The DPW review fee would be submitted with the application. The stormwater consultant review fee would be deposited into a 53G interest-bearing account, pursuant to MGL c. 44, § 53G. Please refer to the fee schedule listed on the application.

(b) The Authority reserves the right to hire outside consultants at the property owner's expense if at any time after a permit is issued an inspection reveals violations.

(3) When engineering review is required, the Authority shall communicate with the DPW to determine if the DPW is able to perform the review. When the DPW is unable to review, an outside consultant shall be hired.

C. Stormwater Maintenance Surety:

(1) A stormwater maintenance fee or bond may be required to ensure O&M of the stormwater system. The fee or bond would be based on a cost estimate providing the value of 5-years of O&M of the stormwater system.

D. Fees for O&M Performed by the Town:

(1) In the case where the Town of Ayer takes ownership of a project from the Owner, a maintenance fee will be required. An annual fee will be based on the estimated value of annual routine O&M of the stormwater system. Additional fees may apply should additional maintenance be required.

VIII. Public meetings / Hearings / Decisions.

A. Public Meeting: If an applicant or Agent requests a decision by the Stormwater Authority related to an assumed minor project, the Planning Board will address the issue at a public meeting and approve or disapprove the application, or may determine that a major application filing is required.

B. Public Hearings: For **Major** projects, an advertised public hearing shall be scheduled by the Planning Board, and may be held concurrently with other hearings under review.

C. Decisions: After the close of the public hearing, the Authority will issue its decision. As a condition of approval, all stormwater management systems shall be completed within two years, unless an extension of time is authorized.

D. Appeals: The decisions or orders of the Authority shall be final. Further relief shall be to a court of competent jurisdiction.

E. Recording for Major Projects: Decisions shall be recorded at the Middlesex South Registry of Deeds in accordance with MGL c. 40A, § 11. Proof of recording shall be submitted to the Authority and Town Clerk prior to the commencement of any land-disturbing activity.

IX. Stormwater Management, Erosion and Sediment Control Plan ("The Stormwater Plan")

A. All Projects: The stormwater plan shall describe the nature and purpose of the proposed development, pertinent conditions of the site and adjacent areas, proposed erosion and sedimentation controls during construction, and proposed best management practices (BMPs) for the permanent management and treatment of stormwater. The stormwater plan shall contain sufficient information for the Authority to evaluate the environmental impact, effectiveness, and acceptability of measures proposed for reducing adverse impacts from stormwater runoff.

(1) Standards: The stormwater plan shall be designed so that the project meets the standards of the most recent Massachusetts Stormwater Management Policy, regardless of any existing wetlands on the property; and shall incorporate low-impact measures. The stormwater plan shall meet the Massachusetts Stormwater Management Policy for new development projects and to the maximum extent practicable for redevelopment projects, as defined in the Massachusetts Stormwater Standards. The stormwater plan shall also meet the standards of the most recent MS4 Permit for which the Authority is covered, notably Section 2.3.6.a.ii of the 2016 MS4 Permit.

(2) Contents: The applicant shall submit the information listed in Subsections B and C, below.

B. Minor Projects: The stormwater plan shall fully describe the project in drawings or plans and narrative containing the following information:

(1) Names, addresses, e-mails and telephone numbers of owner(s), applicant(s), and person(s) or firm(s) preparing the plan.

(2) Plan(s) or drawing(s) showing title, date, North arrow, property lines, locus map, names of abutters, scale used and legend, if necessary. This may be hand drawn.

(3) Location and description of the following natural features:

(a) Watercourses and water bodies, wetland resource areas, and their one-hundred-foot buffers and two-hundred foot riverfront areas, riparian zones, hydrologic connections, and all floodplain information, including the one hundred-year flood elevation based upon the most recent Flood Insurance Rate Map (FIRM), or as calculated by a professional engineer (PE) for areas not assessed on these maps.

(b) Habitats mapped by the Massachusetts Natural Heritage and Endangered Species Program, as Endangered, Threatened or of Special Concern; estimated Habitats of Rare Wildlife; Certified or Potential Vernal Pools, and Priority Habitats of Rare Species.

(4) Existing and proposed land use at the site including pre-development and post-development impervious areas.

(5) Description of all components of the proposed stormwater management system. Designs must include BMPs to the maximum extent practicable.

(6) Location and details of erosion and sedimentation control measures with a narrative of the construction sequence/phasing of the project, including both operation and maintenance for structural and nonstructural measures.

(7) Other permits required.

(8) Any other information requested by the Authority.

C. Major Projects: The stormwater plan, reports, and calculations must be stamped and certified by a professional engineer (PE). The stormwater plan shall fully describe the project in plans or drawings and a narrative containing the following information:

(1) Names, addresses, e-mails and telephone numbers of owner(s), applicant(s), and person(s) or firm(s) preparing the plan.

(2) Title, date, North arrow, names of abutters, scale (1" =20' or 1" =40'), legend, and locus map (1" = 800').

(3) Location and description of natural features and proposed changes including:

(a) Watercourses and water bodies, wetland resource areas, and their one-hundred-foot buffers and two-hundred foot riverfront areas, riparian zones, hydrologic connections, and all floodplain information, including the one hundred-year flood elevation based upon the most recent FIRM, or as calculated by a PE for areas not assessed on these maps.

(b) Habitats mapped by the Massachusetts Natural Heritage and Endangered Species Program as Endangered, Threatened or of Special Concern; estimated Habitats of Rare Wildlife; Certified or Potential Vernal Pools, and Priority Habitats of Rare Species within wetland resource areas, and their one-hundred-foot buffers and two hundred-foot riverfront areas.

(c) Existing soils (type, hydrologic group, erodibility) and the volume and nature of imported soil materials. Test pits and infiltration rates tests may be required.

(d) Topographical features, including existing and proposed contours at intervals no greater than two feet with spot elevations provided when needed.

(e) Existing site hydrology.

(f) An estimate made by a licensed soil evaluator (pursuant to 310 CMR 15.017) of seasonal high groundwater elevation in each area to be used for stormwater retention, detention, or infiltration.

(g) A drainage area map showing preconstruction and post-construction drainage patterns, stormwater flow paths, watersheds and sub watersheds, with calculations of proposed land disturbance within each sub watershed, and areas of soil to be disturbed in each watershed throughout the duration of the proposed land-disturbance activity.

(h) Runoff coefficient with existing and proposed vegetation, and ground surfaces.

(4) Existing and proposed land use at the site including:

(a) Lines of existing abutting streets showing drainage and driveway locations, and curb cuts within 100 feet of property lines.

(b) Surveyed property lines showing distances and monument locations, all existing and proposed easements, rights-of-way, other encumbrances, size of entire parcel, and the delineation and number of square feet of land area to be disturbed.

(c) Location of existing and proposed utilities.

(d) Proposed improvements, including location of buildings, other structures, impervious surfaces, and stormwater structures.

(e) Pre- and post-development impervious areas.

(5) Description and drawings of all components of the proposed stormwater management system including:

(a) Locations, cross sections, profiles.

(b) All methods of stabilization.

(c) All measures for the detention, retention, or infiltration of water.

(d) All measures for the protection of water quality.

(e) Design details for all components of the proposed stormwater management system including inverts, pipe sizes, and structure dimensions.

(f) Notes on drawings specifying materials to be used, construction specifications, and details.

(g) Post-development hydrology with supporting calculations.

(h) Designs must include BMPs to the maximum extent practicable. A description of the use of each BMP shall be included.

(6) Location and details of erosion and sedimentation control measures with a narrative of the construction sequence/phasing of the project, including both operation and maintenance for structural and nonstructural measures including:

(a) Description of provisions for phasing the project where 40,000 square feet of contiguous area or greater is to be altered or disturbed.

(b) Schedule and sequence of development, including clearing, stripping, rough grading, construction, final grading, and vegetative stabilization.

(c) Location, description and implementation schedule for temporary and permanent seeding, vegetative controls, and other temporary and final stabilization measures.

(d) Interim grading.

(e) Description of construction and waste materials expected to be stored on-site, including a description of controls to reduce pollutants from these materials, storage practices to minimize exposure of materials to stormwater, and spill prevention and response.

(f) Maintenance schedule for stormwater structures throughout the construction period.

(7) Other permits required.

(8) Any other information requested by the Authority.

X. Operation and Maintenance (O & M) Plan

Upon approval, applicant records Operation & Maintenance Plan along with the Decision at the Middlesex South Registry of Deeds and submits recording information to the Town Clerk and Town Planner.

All Projects:

A. Operation and Maintenance Plan Requirements:

(1) Name(s) and signatures of all owner(s) for each component of the system.

(2) Operations and maintenance plan agreement that provides contact information for person(s) responsible for operation, maintenance, long-term inspections, and emergency repairs shall be submitted to the Authority prior to the commencement of work.

(3) A description of any routine inspection and/or maintenance requirements for each BMP used in the stormwater system.

(4) A proposed inspection/maintenance and reporting schedule for each BMP.

(5) A summary of any proprietary BMPs used, with the manufacturer's O & M requirements attached.

B. Stormwater Management Easement(s)

(1) Unless waived by the Authority, stormwater management easements shall be granted to the Town of Ayer and be sufficient in location and extent to allow the Town to access the property and all areas used for off-site stormwater control in order to facilitate inspections, and allow the Town the right to perform required maintenance.

(2) The owner shall record any easements with the Middlesex South Registry of Deeds. Proof of recording shall be forwarded to the Authority and Town Clerk.

C. Changes to Operation and Maintenance Plans:

(1) The owner(s) of the stormwater management system (the system) must notify the Authority of changes in ownership within 30 days of transfer.

(2) The maintenance schedule may be amended to achieve the purposes of the Stormwater Bylaw and these regulations by mutual agreement of the Authority and the owner(s). Amendments must be signed by all owner(s).

(3) Once an amended plan is signed, the owner(s) shall record it at the Middlesex South Registry of Deeds and submit proof of recording to the Authority and Town Clerk.

D. Annual Report Submittal:

(1) Any activity approved by the permit shall remain subject to compliance with the Stormwater Bylaw and these regulations. Reports shall be submitted to the Authority each year within 30 days of the date of approval, and shall include descriptions of the BMPs, inspections, and maintenance performed.

(2) The Authority shall review annual reports and may require the permittee to attend a public meeting for a compliance review. The owner(s) shall correct any deficiencies identified by the Authority.

XI. Project Changes

The permittee shall notify the Authority in writing of any changes to a permitted land-disturbing activity at least 48 hours before modifications can occur. If the modification is determined to be significant based on Sections **IX** and **X** of these regulations, a revised or new application may be required. Alterations may require interim erosion and sedimentation control measures before considering the modification.

XII. Inspection and Site Supervision

All inspections shall be conducted by Stormwater Agent.

A. Access Permission:

The Authority shall be authorized to enter upon privately owned property at reasonable times for the purpose of performing its duties under these regulations to the extent permitted by state and federal law.

B. Pre-construction Meeting:

For all projects, the applicant, his or her engineer, general contractor, and/or pertinent subcontractors shall meet at the site with the Stormwater Agent prior to clearing, excavation, construction, or any land-disturbing activity requiring a permit.

C. Authority Inspections:

Inspections may take place at any time during the review process and throughout the duration of the project.

(1) One copy of all required plans and the permit shall be kept at the site during construction. In addition, a copy of EPA's NPDES construction general permit and stormwater pollution prevention plan (if applicable) shall be kept on site.

(2) Following inspections, the Authority shall either approve portions of work completed, or notify the permittee wherein the work fails to comply.

(3) The permittee shall notify the Authority at least three business days prior to the completion of the following events:

(a) Erosion and sedimentation control measures are in place and stabilized.

(b) Rough grading has been substantially completed.

(c) Final grading has been substantially completed.

(d) Bury inspection: prior to backfilling of any underground drainage or stormwater conveyance structures.

(e) Close of the construction season or suspension of activities for more than 30 days (temporary stabilization required).

(f) Final landscaping (permanent stabilization) and final completion of the project.

D. Permittee Inspections:

(1) All Projects: The permittee or representative shall conduct and document inspections of all control measures no less than weekly, or as specified in the permit, as well as prior to and following anticipated storms. The purpose of inspections shall be to determine the overall effectiveness of the stormwater plan, and the need for maintenance or additional control measures.

If a project is covered by the EPA NPDES General Permit for Stormwater Discharges from Construction Activities (Construction General Permit), the permittee is required to conduct inspections in accordance with requirements of the Construction General Permit, and must submit reports of all inspections required thereunder to the Authority.

(2) Major Projects: The permittee or representative shall submit monthly inspection reports on the attached Stormwater Management Monthly Construction Inspection Checklist Form during the construction phase to the Authority. The Authority may require that an

authorized environmental site monitor be retained by the owner to conduct inspections and submit reports to the Authority.

E. Final Inspections and Reports:

(1) Minor Project: After the system has been constructed, the applicant shall submit a letter to the Authority certifying that the work site has been stabilized, and that all erosion and sedimentation control devices and any approved modifications have been completed in accordance with the conditions of the permit. Any discrepancies and mitigation measures shall be noted in a cover letter.

(2) Major Project: After the system has been constructed, the applicant shall submit a report to the Authority, including as-built plans certified and stamped by a licensed Massachusetts Professional Engineer (P.E.), documenting that the system and approved modifications have been completed in accordance with the conditions of the permit. Any discrepancies and mitigation measures shall be noted in a cover letter. Five copies of the as-built plan shall be submitted to the Authority. As-built plans shall be submitted no later than six (6) months after completion of the approved modifications.

(3) Deficiencies: The system shall be corrected by the permittee if it is found to be deficient based on physical evidence of operational failure.

F. Certificate of Completion:

(1) All projects: The Agent shall inspect the system to confirm its as-built features and evaluate the effectiveness of the system in an actual storm. If the inspection finds the system to be adequate, and if upon receipt and approval of the final reports, it is determined that all work has been satisfactorily completed, the Authority will issue a certificate of completion.

(2) Major Projects: The certificate of completion shall be recorded at the Middlesex South Registry of Deeds by the owner(s), in accordance with MGL c. 40A, § 11 and proof of recording shall be forwarded to the Authority and Town Clerk.

XIII. Perpetual Inspections and Maintenance

A. All Projects: Maintenance Responsibility

(1) Stormwater management facilities and practices included in an O & M Plan shall undergo ongoing inspections to document maintenance and repairs to ensure compliance with the Bylaw and these regulations.

(2) The owner of the system shall maintain in good condition all grade surfaces, walls, drains, dams and structures, vegetation, and any other protective devices.

(3) The owner of the system shall maintain records of the system installation and all maintenance and repairs for at least five years, to be made available to the Agent during inspection of the facility and at other times upon request.

(4) The Authority or Agent shall notify the owner of the system if the requirements of the O & M Plan are not met. All deficiencies shall be corrected within 30 days. If a deficiency constitutes an imminent danger to public health, safety, or the environment, the owner

shall take immediate corrective action, and then notify the Agent for an inspection to ensure compliance.

(5) In the case where the Town of Ayer takes ownership of a project from the Owner, a maintenance fee will be required in accordance with Section VII.

B. <u>Major Projects:</u> Maintenance Inspections

(1) At a minimum, inspections by the property owner shall occur twice during the first year of operation and at least annually thereafter.

(2) Inspection reports shall be submitted to the Authority on the Stormwater Management Annual Inspection Checklist by Property Owner(s) Form (attached to this Regulation) for all systems, and shall include:

(a) Date of inspection

(b) Name of inspector.

(c) Condition of:

i. Pretreatment devices.
ii. Vegetation or filter media.
iii. Fences or other safety devices.
iv. Spillways, valves, or other control structures.
v. Embankments, slopes, and safety benches.
vi. Reservoir or treatment areas.
vii. Inlet and outlet channels and structures.
viii. Underground drainage.
ix. Sediment and debris accumulation in storage and forebay areas (including catch basins)
x. Any nonstructural practices.
xi. Any other item that could affect the proper function of the system.

(d) Description of any maintenance issues and mitigation measures taken.

XIV. Enforcement Refer to the NPDES Phase II Stormwater Management Bylaw Section 6.0.

XV. Severability If any provision, paragraph, sentence, or clause of these regulations shall be held invalid for any reason, all other provisions shall continue in full force and effect.

Attachments

Monthly Inspection Checklist Form

STORMWATER MANAGEMENT
MONTHLY CONSTRUCTION INSPECTION CHECKLIST

Project Name/Location: _____

Project Owner: _____

Inspector Name: _____ _____

Inspector's Contact Information

Inspection Date:_____

Disturbed Areas (stabilization measures)

Y, N or N/A	Description of Item	Comments
	Graded areas free of debris (rocks, roots, trash, etc.)	
	Rough grading temporarily seeded/Final grading seeded or sodded	
	Erosion controls installed per design & specifications	
	Erosion controls free of accumulated sediments	
	Erosion controls trenched in, back filled and compacted	
	Erosion controls replaced where rotten or saturated	
	Erosion controls installed without gaps between bales	
	Silt fence installed per design & specifications	
	Silt fence bottom trenched a minimum of 4 inches	
	Silt fence free of splicing between sections	
	Silt fence secured adequately (cannot be pulled out with one hand)	
	Silt fence free of accumulated sediments	
	Silt fence fabric and stakes in good condition	
	Swales stabilized	
	Swales free of sediment or debris	
	Swales free of ponding	
	Swales constructed at design elevation	

Materials Storage Areas

	Debris and stock piles maintained properly	
	Materials stored properly	
	No evidence of spills	
	Secondary containment of on-site fuel tanks	
	Spill response equipment and materials on site	

Structural Control Devices

Y, N or N/A	Description of Item	Comments
	Sediment traps used and installed properly	
	Stormwater basins constructed to proper elevation and side slopes	
	Flooding absent around or within inlet	
	Inlet free of erosion	
	Inlet free of debris and/or sediment	
	Inlet at design elevation	
	All hardware and equipment installed per design	
	Perimeter berm at design elevation	
	Perimeter berm compacted and stabilized	
	Catch basins in working order and clean	

Vehicle Ingress/Egress Locations

	Built per design, specifications and stabilized	
	Maintenance is being performed (raking, adding more stone, etc.)	
	Use of wash rack and proper discharge of wash water	
	Affected street(s) swept to remove excess stones and sediments	

Other

	Dewatering operation per plan and discharge free of turbidity	
	Sanitary facilities maintained properly	
	Original permitted plans implemented without major change(s)	
	Offsite area(s) free of impact(s) due to construction	
	Litter control	

Paperwork

	Copy of Stormwater Management Permit on site	
	Stormwater Management, Erosion and Sedimentation Control Plan on site	
	Operation and Maintenance Plan on site	
	NPDES General Construction Permit on site	

Annual Inspection Checklist Form

STORMWATER MANAGEMENT
ANNUAL INSPECTION CHECKLIST by PROPERTY OWNER(S)

This form must be completed and submitted to the Stormwater Authority at six months and again at one year, (the first year after project completion), and at least annually thereafter.

Property Location: _____ Property Owner: _____

Inspector Name: _____ Inspection Date: _____

Inspector Contact Info: _____

Y, N or N/A	Description of Item	Comments
	Final grading vegetated satisfactorily with maintenance-free ground cover (i.e. slopes stable, no erosion, etc.)?	
	Stormwater structures free of debris (rocks, roots, trash, sediment, etc.)?	
	Any fencing or security device around stormwater structures intact?	
	Swales stabilized and working as designed?	
	Swales free of ponding?	
	Discharge points and receiving waters free of sediment deposits?	
	Evidence of sediment being tracked into the street or off property?	
	Materials that are potential stormwater contaminants are stored inside or under cover?	
	List stormwater structures below and answer whether they are in working mechanical condition or require maintenance. Use additional sheets if necessary.	
	Date and nature of scheduled repairs, if necessary.	

List any maintenance, repairs, mitigation issues or unusual weather since the last inspection that has occurred:

_____

_____

_____

_____

Annual Reports

Town of AYER Public Works

Year 2 Annual Report
Massachusetts Small MS4 General Permit
Reporting Period: July 1, 2019-June 30, 2020

Please DO NOT attach any documents to this form. Instead, attach all requested documents to an email when submitting the form

Unless otherwise noted, all fields are required to be filled out. If a field is left blank, it will be assumed the requirement or task has not been completed. Please ONLY report on activities between July 1, 2019 and June 30, 2020 unless otherwise requested.

Part I: Contact Information

Name of Municipality or Organization: Town of Ayer

EPA NPDES Permit Number: MAR041179

Primary MS4 Program Manager Contact Information

Name: Mark Wetzel Title: Superintendent of Public Works

Street Address Line 1: 25 Brook Street

Street Address Line 2: N/A

City: Ayer State: MA Zip Code: 01432

Email: mwetzel@ayer.ma.us Phone Number: (978) 772-8240

Stormwater Management Program (SWMP) Information

SWMP Location (web address): https://www.ayer.ma.us/stormwater-department/pages/stormwater-management-program-swmp

Date SWMP was Last Updated: Jun 23, 2020

If the SWMP is not available on the web please provide the physical address:

n/a

Part II: Self-Assessment

First, in the box below, select the impairment(s) and/or TMDL(s) that are applicable to your MS4. Make sure you are referring to the most recent EPA approved Section 303(d) Impaired Waters List which can be found here: https://www.epa.gov/tmdl/region-1-impaired-waters-and-303d-lists-state

Impairment(s)

☒ Bacteria/Pathogens ☐ Chloride ☐ Nitrogen ☒ Phosphorus
☒ Solids/ Oil/ Grease (Hydrocarbons)/ Metals

TMDL(s)

In State: ☐ Assabet River Phosphorus ☐ Bacteria and Pathogen ☐ Cape Cod Nitrogen
☐ Charles River Watershed Phosphorus ☐ Lake and Pond Phosphorus

Out of State: ☐ Bacteria/Pathogens ☐ Metals ☐ Nitrogen ☐ Phosphorus

Clear Impairments and TMDLs

Next, check off all requirements below that have been completed. ***By checking each box you are certifying that you have completed that permit requirement fully.*** *If you have not completed a requirement leave the box unchecked. Additional information will be requested in later sections.*

Year 2 Requirements

☒ Completed Phase I of system mapping

☒ Developed a written catchment investigation procedure and added the procedure to the SWMP

☒ Developed written procedures to require the submission of as-built drawings and ensure the long term operation and maintenance of completed construction sites and added these procedures to the SWMP

☒ Enclosed or covered storage piles of salt or piles containing salt used for deicing or other purposes

☒ Developed written operations and maintenance procedures for parks and open space, buildings and facilities, and vehicles and equipment and added these procedures to the SWMP

☒ Developed an inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment and added this inventory to the SWMP

☒ Completed a written program for MS4 infrastructure maintenance to reduce the discharge of pollutants

☒ Developed written SWPPPs, included in the SWMP, for all of the following permittee owned or operated facilities: maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater

Optional: If you would like to describe progress made on any incomplete requirements listed above, provide any additional information, and/or if any of the above year 2 requirements could not be completed due to the impacts of COVID-19, please identify the requirement that could not be completed, any actions taken to attempt to complete the requirement, and reason the requirement could not be completed below:

-Phase I system mapping was completed by DPW using ArcGIS. The data is compiled in a geodatabase.
-A written catchment investigation procedure is included in the IDDE Plan.
-Written procedures to require the submission of as-built drawings and ensure long-term O&M of completed

construction sites are included in the Stormwater Regulations (also included in Subdivision and Site Plan Regulations).
-As indicated in the SWPPP for the DPW Highway Location, the Town's Salt Storage is covered in the Salt Storage Building at the DPW (25 Brook Street).
-Written O&M procedures and Inventories for the abovementioned bulletted items have been completed by the DPW and included in the SWMP.
-Written SWPPPs were completed by the DPW for the required facilities, inlcuding the DPW Highway Yard, the Grove Pond Water Treatment Plant, and the Transfer Station. Note: The Wastewater Treatment Plant already has a SWPPP per the EPA Multi-Sector General Permit.

Annual Requirements

- ☒ Provided an opportunity for public participation in review and implementation of SWMP and complied with State Public Notice requirements
- ☒ Kept records relating to the permit available for 5 years and made available to the public
- ☒ The SSO inventory has been updated, including the status of mitigation and corrective measures implemented
  - ○ This is not applicable because we do not have sanitary sewer
  - ○ This is not applicable because we did not find any new SSOs
  - ○ The updated SSO inventory is attached to the email submission
  - ◉ The updated SSO inventory can be found at the following website:

    https://www.ayer.ma.us/stormwater-department/pages/stormwater-management-program-swmp
- ☒ Properly stored and disposed of catch basin cleanings and street sweepings so they did not discharge to receiving waters
- ☒ Provided training to employees involved in IDDE program within the reporting period
- ☒ All curbed roadways were swept at least once within the reporting period
- ☒ Updated outfall and interconnection inventory and priority ranking as needed

Optional: If you would like to describe progress made on any incomplete requirements listed above, provide any additional information, and/or if any of the above annual requirements could not be completed due to the impacts of COVID-19, please identify the requirement that could not be completed, any actions taken to attempt to complete the requirement, and reason the requirement could not be completed below:

Although staffing levels were reduced in half for several months due to COVID-19, the DPW was able to perform our routine street sweeping and catch basin cleaning, among other duties.

A comment period for the SWMP was provided on the Town website in June 2020. The Town did not receive any comments.

One SSO occurred in the reporting period, details are in the SWMP (IDDE Plan).

Annual IDDE training was sponsored by CMRSWC and given by its consultant Fuss & O'neill.

Catch basin cleanings and street sweepings were properly stored at the DPW yard. All roadways were swept in accordance with the SWMP.

Bacteria/ Pathogens (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)

Annual Requirements

*Public Education and Outreach**

☒ Annual message was distributed encouraging the proper management of pet waste, including noting any existing ordinances where appropriate

☒ Permittee or its agents disseminated educational material to dog owners at the time of issuance or renewal of dog license, or other appropriate time

☒ Provided information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria

** Public education messages can be combined with other public education requirements as applicable (see Appendix H and F for more information)*

Optional: If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

Phosphorus (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)

Annual Requirements

*Public Education and Outreach**

☒ Distributed an annual message in the spring (April/May) encouraging the proper use and disposal of grass clippings and encouraging the proper use of slow-release and phosphorus-free fertilizers

☒ Distributed an annual message in the summer (June/July) encouraging the proper management of pet waste, including noting any existing ordinances where appropriate

☒ Distributed an annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter

** Public education messages can be combined with other public education requirements as applicable (see Appendix H and F for more information)*

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

☒ Increased street sweeping frequency of all municipal owned streets and parking lots subject to Permit part 2.3.7.a.iii.(c) to a minimum of two times per year (spring and fall)

Potential structural BMPs

☐ Any structural BMPs already existing or installed in the regulated area by the permittee or its agents was tracked and the phosphorus removal by the BMP was estimated consistent with Attachment 3 to Appendix F. The BMP type, total area treated by the BMP, the design storage volume of the BMP and the estimated phosphorus removed in mass per year by the BMP were documented.

- ○ The BMP information is attached to the email submission
- ○ The BMP information can be found at the following website:

Optional: If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

There are no structural BMPs in the regulated area so no phosphorus removal is estimated. However, the Town tracks phosphorus concentrations in 6 ponds as discussed in the "Monitoring and Study Results" section of this report.

Solids, Oil and Grease (Hydrocarbons), or Metals

Annual Requirements

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

☒ Increased street sweeping frequency of all municipal owned streets and parking lots to a schedule that targets areas with potential for high pollutant loads

☒ Prioritized inspection and maintenance for catch basins to ensure that no sump shall be more than 50 percent full; Cleaned catch basins more frequently if inspection and maintenance activities indicated excessive sediment or debris loadings

Optional: If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

Optional: Use the box below to provide any additional information you would like to share as part of your self-assessment:

The Town of Ayer joined the Central Massachusetts Regional Stormwater Coalition (CMRSWC) in February 2020. The town anticipates to see benefits to meeting its Permit requirements from the collaboration and knowledge sharing of CMRSWC.

A rain garden was constructed near 109 Oak Ridge Drive to reduce phosphorus loading to Flannagan Pond. A Section 319 Grant Application was submitted with several BMPs focused on removal of Phophorus in the Flannagan Pond Watershed.

The Town of Ayer has been designated a Municipal Vulnerability Preparedness (MVP) community by the Commonwealth. The MVP process resulted in priority actions to improve resilience in the Town. The Top Priority Action is to develop an integrated Stormwater Management Plan for the Town. The Town has submitted for a CWSRF Asset Management Grant to fulfill this action item.

The Town appropriated $25,000 at Spring 2020 Town Meeting for revisiting a Stormwater Utility Fund, originally approved in 2011 and rescinded in 2015.

Part III: Receiving Waters/Impaired Waters/TMDL

Have you made any changes to your lists of receiving waters, outfalls, or impairments since the NOI was submitted?

- (●) Yes
- ( ) No

If yes, describe below, including any relevant impairments or TMDLs:

The most up-to-date approved Integrated List of Waters (303d List) is for Year 2016. The NOI was based on the 2014 Integrated List of Waters. Changes from the 2014 Report to the 2016 Report are:

1. Cold Spring Brook identified in the NOI is erroneous and should be Bowers Brook. Bowers Brook has been added as Category 2 Water in the 2016 Report with uses attained for aesthetic, primary and secondary contact recreation. The segment description indicates "From outlet Barre Hill Pond, Harvard to mouth at inlet unnamed pond, Ayer." This is tributary to Grove Pond.
2. Nashua River segments MA81-05 and MA81-06 impairments changed from "Aquatic Macroinvertebrate Bioassessments" in 2014 to "Benthic Macroinvertebrates" in 2016.

Part IV: Minimum Control Measures

Please fill out all of the metrics below. If applicable, include in the description who completed the task if completed by a third party.

MCM1: Public Education

Number of educational messages completed **during this reporting period**: 12

*Below, report on the educational messages completed **during this reporting period**. For the measurable goal(s) please describe the method/measures used to assess the overall effectiveness of the educational program.*

BMP:Pet Waste

Message Description and Distribution Method:

Web Page - Distribute educational announcement related to effects of pet waste on water quality to web page, eblast, and social media.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Created one announcement via social media. 58 Likes, 7 Comments, and 8 Shares.

Message Date(s): July 2019

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ○ No ◉

If yes, describe why the change was made:

BMP:Household Hazardous Waste Including Pool and Lawn Chemicals

Message Description and Distribution Method:

Web Page - Distribute educational announcement related to disposing of pool and lawn chemicals at Devens Regional Household Hazardous Products Collection Center to web page, eblast, and social media.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Created one announcement via social media. 8 Likes, 0 Comments, and 3 Shares.

Message Date(s): August 2019

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ◉ No ○

If yes, describe why the change was made:

Worked with Conservation Administrator to implement "enhanced" public education messaging in FY20. Enhance messaging consisted of social media messages distributed each month and geared towards activities that could impact stormwater in the respective season.

BMP:Car Care

Message Description and Distribution Method:

Web Page - Distribute educational announcement related to effects of not maintaining vehicles on water quality to web page, eblast, and social media.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Created one announcement via social media. 58 Likes, 5 Comments, and 4 Shares.

Message Date(s): September 2019

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ◉ No ○

If yes, describe why the change was made:

Worked with Conservation Administrator to implement "enhanced" public education messaging in FY20. Enhance messaging consisted of social media messages distributed each month and geared towards activities that could impact stormwater in the respective season.

BMP:Leaf Disposal

Message Description and Distribution Method:

Web Page - Distribute educational announcement related to effects of not disposing of leaves properly on water quality to web page, eblast, and social media.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Created one announcement via social media. 8 Likes, 0 Comments, and 1 Shares.

Message Date(s): October 2019

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ○ No ◉

If yes, describe why the change was made:

BMP:Household Hazardous Waste

Message Description and Distribution Method:

Web Page - Distribute educational announcement related to Devens Regional Household Hazardous Products Collection Center to web page, eblast, and social media.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Created one announcement via social media. 4 Likes, 0 Comments, and 1 Shares.

Message Date(s): November 2019

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ◉ No ○

If yes, describe why the change was made:

Worked with Conservation Administrator to implement "enhanced" public education messaging in FY20. Enhance messaging consisted of social media messages distributed each month and geared towards activities that could impact stormwater in the respective season.

BMP:Septic Maintenance

Message Description and Distribution Method:

Web Page - Distribute educational announcement related to effects of septic maintenance on water quality to web page, eblast, and social media.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Created one announcement via social media. 2 Likes, 0 Comments, and 0 Shares.

Message Date(s): December 2019

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ○ No ◉

If yes, describe why the change was made:

BMP:Holiday Tree Disposal

Message Description and Distribution Method:

Web Page - Distribute educational announcement related to effects of Holiday tree disposal on water quality to web page, eblast, and social media.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Created one announcement via social media. 0 Likes, 0 Comments, and 0 Shares.

Message Date(s): January 2020

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ◉ No ○

If yes, describe why the change was made:

Worked with Conservation Administrator to implement "enhanced" public education messaging in FY20. Enhance messaging consisted of social media messages distributed each month and geared towards activities that could impact stormwater in the respective season.

BMP:De-icers, Salt, and Sand Use

Message Description and Distribution Method:

Web Page - Distribute educational announcement related to effects of de-icer, salt, and sand on water quality to web page, eblast, and social media.

Targeted Audience: Residents, businesses, institutions, and commercial facilities

Responsible Department/Parties: DPW

Measurable Goal(s):

Created one announcement via social media. 16 Likes, 1 Comments, and 0 Shares.

Message Date(s): February 2020

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ◉ No ○

If yes, describe why the change was made:

Worked with Conservation Administrator to implement "enhanced" public education messaging in FY20. Enhance messaging consisted of social media messages distributed each month and geared towards activities that could impact stormwater in the respective season.

BMP:Lawn Fertilizer Use include Friendly Fertilizers and Grass Clipping Disposal

Message Description and Distribution Method:

Web Page - Distribute educational announcement related to effects of lawn care on water quality to web page, eblast, and social media.

Targeted Audience: Residents, businesses, institutions and commercial facilities

Responsible Department/Parties: DPW

Measurable Goal(s):

Created two announcements via social media. May 2020 - 13 Likes, 0 Comments, and 7 Shares. June 2020 - 12 Likes, 0 Comments, and 1 Shares.

Message Date(s): May and June 2020

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ○ No ◉

If yes, describe why the change was made:

BMP:Rain Barrels

Message Description and Distribution Method:

Web Page - Distribute educational announcement related to effects of rain barrels and their benefits to web page, eblast, and social media.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Created one announcement via social media. 34 Likes, 25 Comments, and 12 Shares.

Message Date(s): June 2020

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ◉ No ○

If yes, describe why the change was made:

Worked with Conservation Administrator to implement "enhanced" public education messaging in FY20. Enhance messaging consisted of social media messages distributed each month and geared towards activities that could impact stormwater in the respective season.

BMP:Stormwater Tips for Parking Lot Maintenance

Message Description and Distribution Method:

Brochure/Pamphlet - Distribute pamphlet to major industries regarding proper maintenance of parking facilities.

Targeted Audience: Businesses, institutions and commercial facilities

Responsible Department/Parties: DPW

Measurable Goal(s):

Mailed pamphlets to 9 major industries. Inspections and follow-up to occur in Year 3.

Message Date(s): June 2020

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ◉

If yes, describe why the change was made:

BMP: CMRSWC - Pet Waste Message

Message Description and Distribution Method:

Ayer joined the Central Massachusetts Regional Stormwater Coalition (CMRSWC) in February 2020. CMRSWC shared messages on Twitter to encourage the proper management of pet waste.

Targeted Audience: Residents

Responsible Department/Parties: CMRSWC

Measurable Goal(s):

The CMRSWC twitter account has approximately 240 followers and averages between 100-200 impressions

per tweet.

Message Date(s): June 23, 2020

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ◉ No ○

If yes, describe why the change was made:

CMRSWC provided outreach.

Add an Educational Message

MCM2: Public Participation

Describe the opportunity provided for public involvement in the development of the Stormwater Management Program (SWMP) **during this reporting period**:

Annual review for public comment on the SWMP was available on the Town's webpage from June 15 to 26, 2020. Notification of the availability to comment was distributed via the Town's web and social media. No comments were received.

Was this opportunity different than what was proposed in your NOI? Yes ○ No ◉

Describe any other public involvement or participation opportunities conducted **during this reporting period**:

Other public involvement and participation opportunities conducted during the reporting period include maintaining the Stormwater Hotline, promoting Devens regional household hazardous waste collection, and mercury waste collection boxes. The Town Engineer gave a presentation to the Board of Selectman on June 30, 2020 on the MS4 permit activities conducted in Year 2 and anticipated in Year 3. The Town typically schedules an annual earth day cleanup, "A Cleaner Ayer", in April; however, the cleanup did not occur this reporting period due to COVID-19 and has been rescheduled for October 3, 2020.

CMRSWC members participated in public outreach and involvement at the following public events in Year 2 of the permit (Note: Ayer joined CMRSWC in February 2020):

- Holden Truck Day (July 25, 2019)
- Grafton National Night Out (August 7, 2019)
- Palmer National Night Out (August 7, 2019)
- Holden Days (August 24, 2019)
- Mass STEM Week at Framingham State University (October 22, 2019)
- Mass STEM Week at Keefe Technical High School (October 23, 2019)
- Metrowest STEM mentorship program (October 23, 2019)
- Mass STEM week showcase (October 25, 2019)
- Elementary school programs in Auburn, Dudley, Framingham, Hopkinton, and Holden

• Framingham Public Works Open House (December 7, 2019)
As a result of the COVID-19 pandemic, CMRSWC halted participation in public events from March 2020 – June 2020.

MCM3: Illicit Discharge Detection and Elimination (IDDE)

Sanitary Sewer Overflows (SSOs)

Check off the box below if the statement is true.

☐ This SSO section is NOT applicable because we DO NOT have sanitary sewer

*Below, report on the number of SSOs identified in the MS4 system and removed **during this reporting period.***

Number of SSOs identified: 1

Number of SSOs removed: 1

MS4 System Mapping

Below, check all that apply.

The following elements of the Phase I map have been completed:

☒ Outfalls and receiving waters
☒ Open channel conveyances
☒ Interconnections
☒ Municipally-owned stormwater treatment structures
☒ Waterbodies identified by name and indication of all use impairments
☒ Initial catchment delineations

Optional: Describe any additional progress you made on your map during this reporting period or provide additional status information regarding your map:

Screening of Outfalls/Interconnections

If conducted, please submit any outfall monitoring results from this reporting period. Outfall monitoring results should include the date, outfall/interconnection identifier, location, weather conditions at time of sampling, precipitation in previous 48 hours, field screening parameter results, and results from all analyses.

○ The outfall screening data is attached to the email submission
○ The outfall screening data can be found at the following website:

*Below, report on the number of outfalls/interconnections screened **during this reporting period.***

Number of outfalls screened: 0

Catchment Investigations

If conducted, please submit all data collected during this reporting period as part of the dry and wet weather investigations. Also include the presence or absence of System Vulnerability Factors for each catchment.

- ○ The catchment investigation data is attached to the email submission
- ○ The catchment investigation data can be found at the following website:

Below, report on the number of catchment investigations completed ***during this reporting period.***

Number of catchment investigations completed this reporting period: 0

Below, report on the percent of catchments investigated ***to date.***

Percent of total catchments investigated: 0

Optional: Provide any additional information for clarity regarding the catchment investigations below:

The Ayer DPW has retained SDE consultants for IDDE Dry Weather Monitoring. IDDE Dry Weather Sampling began on July 1, 2020. Though not in Year 2, ongoing dry weather sampling has occurred at 102 outfalls as of September 22, 2020, and no flow has been observed at any outfall.

IDDE Progress

If illicit discharges were found, please submit a document describing work conducted over this reporting period, and cumulative to date, including location source; description of the discharge; method of discovery; date of discovery; and date of elimination, mitigation, or enforcement OR planned corrective measures and schedule of removal.

- ○ The illicit discharge removal report is attached to the email submission
- ○ The illicit discharge removal report can be found at the following website:

Below, report on the number of illicit discharges identified and removed, along with the volume of sewage removed ***during this reporting period.***

Number of illicit discharges identified: 0

Number of illicit discharges removed: 0

Estimated volume of sewage removed: 0 gallons/day

Below, report on the total number of illicit discharges identified and removed to date. At a minimum, report on the number of illicit discharges identified and removed ***since the effective date of the permit (July 1, 2018).***

Total number of illicit discharges identified: 0

Total number of illicit discharges removed: 0

Optional: Provide any additional information for clarity regarding illicit discharges identified, removed, or planned to be removed below:

It should be noted illicit discharges related to an oil release and pet waste occurred in 2017. The oil release has been managed by a private party in accordance with the Massachusetts Contingency Plan (MCP). Notices were distributed in the problem neighborhood and no pet waste issues were identified in the problem neighborhood during the reporting period.

Employee Training

Describe the frequency and type of employee training conducted **during the reporting period**:

Employees involved in the IDDE program attended training workshops sponsored by CMRSWC on May 5, 2020 and/or May 7, 2020 remotely via GoTo Meeting. The workshops were originally intended to be inperson but were adapted to virtual workshops due to COVID-19. The workshops trained participants on important aspects of the IDDE program, including how to recognize illicit discharges and SSOs. A summary of the training, copies of the slides, an attendee roster, and a recording of the training is available at: https://www.centralmastormwater.org/toolbox/pages/2020-idde-workshop-ms4-assistance-grant

Employees involved in the developement of SWPPPs and SOPs attended workshops sponsored by CMRSWC on April 28, 2020, April 30, 2020, June 16, 2020, and/or June 18, 2020 remotely via GoTo Meeting. The workshops trained participants on the applicability of SWPPPs and SOPs and information of their contents.

MCM4: Construction Site Stormwater Runoff Control

Below, report on the construction site plan reviews, inspections, and enforcement actions completed ***during this reporting period.***

Number of site plan reviews completed: 2

Number of inspections completed: 6

Number of enforcement actions taken: 0

Optional: Enter any additional information relevant to construction site plan reviews, inspections, and enforcement actions:

Two subdivision applications (54/56 Littleton Road and Shaker Mill Pond) were completed but construction has yet to begin on either subdivision. No enforcement was deemed necessary at any of the construction sites associated with Site Plan Approval. An ANR site on Central Avenue had no erosion control and sediment was witnessed discharging into a catch basin. The DPW required the Contractor to install and maintain erosion control measures.

MCM5: Post-Construction Stormwater Management in New Development and Redevelopment

Ordinance or Regulatory Mechanism

Below, select the option that describes your ordinance or regulatory mechanism progress.

- ○ Bylaw, ordinance, or regulations are updated and adopted consistent with permit requirements
- ◉ Bylaw, ordinance, or regulations are updated consistent with permit requirements but are not yet adopted
- ○ Bylaw, ordinance, or regulations have not been updated or adopted

As-built Drawings

Describe the measures the MS4 has utilized to require the submission of as-built drawings and ensure long term operation and maintenance of completed construction sites:

As-built drawings are required for all Subdivisions, Site Plans, ANR lots, and per our Stormwater Bylaw and Regulations. Long term O&M Plans are required to be submitted where stormwater BMPs are implemented. All inspections and maintenance of private drainage is recorded and submitted to the DPW.

Street Design and Parking Lots Report

Describe the status of the street design and parking lots assessment due in year 4 of the permit term, including any planned or completed changes to local regulations and guidelines:

This report is anticipated to be started in Year 3.

Green Infrastructure Report

Describe the status of the green infrastructure report due in year 4 of the permit term, including the findings and progress towards making the practice allowable:

This report is anticipated to be started in Year 3.

Retrofit Properties Inventory

Describe the status of the inventory, due in year 4 of the permit term, of permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas and report on any properties that have been modified or retrofitted:

This report is anticipated to be started in Year 3.

MCM6: Good Housekeeping

Catch Basin Cleaning

Below, report on the number of catch basins inspected and cleaned, along with the total volume of material removed from the catch basins ***during this reporting period.***

Number of catch basins inspected: 962

Number of catch basins cleaned: 962

Total volume or mass of material removed from all catch basins: 200 tons

Below, report on the total number of catch basins in the MS4 system.

Total number of catch basins: 962

If applicable:

Report on the actions taken if a catch basin sump is more than 50% full during two consecutive routine inspections/cleaning events:

Per the Optimization Plan, the contributing drainage area will be investigated for sources which will be addressed. If no sources are found, the frequency of inspection and cleaning will be increased.

Please note a combined total of 200 tons of material was removed from catch basin cleaning AND street sweeping.

Street Sweeping

Report on street sweeping completed ***during this reporting period*** *using one of the three metrics below.*

- ○ Number of miles cleaned:
- ○ Volume of material removed: [Select Units]
- ◉ Weight of material removed: 200 tons

O&M Procedures and Inventory of Permittee-Owned Properties

Below, check all that apply.

The following permittee-owned properties have been inventoried:

- ☒ Parks and open spaces
- ☒ Buildings and facilities
- ☒ Vehicles and equipment

The following O&M procedures for permittee-owned properties have been completed:

- ☒ Parks and open spaces
- ☒ Buildings and facilities
- ☒ Vehicles and equipment

Stormwater Pollution Prevention Plan (SWPPP)

Below, report on the number of site inspections for facilities that require a SWPPP completed ***during this reporting period.***

Number of site inspections completed: 3

Describe any corrective actions taken at a facility with a SWPPP:

No corrective actions during this reporting period.

Additional Information

Monitoring or Study Results

Results from any other stormwater or receiving water quality monitoring or studies conducted during the reporting period not otherwise mentioned above, where the data is being used to inform permit compliance or permit effectiveness must be attached.

- ○ Not applicable
- ○ The results from additional reports or studies are attached to the email submission
- ◉ The results from additional reports or studies can be found at the following website(s):

https://www.ayer.ma.us/stormwater-department/pages/stormwater-management-program-swmp

If such monitoring or studies were conducted on your behalf or if monitoring or studies conducted by other entities were reported to you, a brief description of the type of information gathered or received shall be described below:

Water Quality of Long Pond, Sandy Pond, Balch Pond, Grove Pond, Flannagan Pond, and Pine Meadow Pond is monitored by the DPW three (3) times per year in accordance with the "Biological Survey, Assessment and Management Recommendations for Ayers Ponds" by Geosyntec Consultants (2015). Basic field parameters are collected and lab samples for Total Phosphorus, Ammonia Nitrogen, and Chlorophyll-a.

Additional Information

Optional: Enter any additional information relevant to your stormwater management program implementation during the reporting period. Include any BMP modifications made by the MS4 if not already discussed above:

-The SSO event identified in this report did not enter the MS4 system, the SSO was confined to a homeowner's basement.
-The Town's current NPDES Bylaw (complying with the 2003 Permit) is undergoing review by Arcadis Engineers through an agreement with CMRSWC. We anticipate the bylaw update to be completed by the end of Year 3 as required.
-Town owned stormwater BMPs were inspected and maintained or maintenance has been scheduled.
-DPW maintains a list of stenciled storm drain locations. In previous years, DPW stenciled and/or marked storm drains for a total of over 800 storm drains. Storm drains will be re-stenciled as needed in Year 3.
-The DPW completed utility construction on Prospect and Oak Streets in the Fall of 2019 and on High Street in the Spring of 2020 with new industry standard drainage (catch basins with sumps).
-The Town is provided "enhanced" public education messaging in FY2020, which consisted of a social media

message distributed each month and geared towards activities that could impact stormwater in the respective season (e.g. leaf litter disposal in October).

Our municipality is a member of the Central Massachusetts Regional Stormwater Coalition (CMRSWC). CMRSWC was awarded an Environmental Merit Award from EPA Region 1 in September 2019. CMRSWC presented on building public awareness and the benefits of regional collaboration at the following events:
• EPA New England Soak up the Rain webinar titled "Working Together: Collaborative Stormwater Management in Central Massachusetts" (December 5, 2019)
• New England Water Environment Association Annual Conference (Jan 2020)
• Massachusetts Association of Conservation Commissions Annual Conference, presentation titled "NPDES MS4 Permit: How are Municipalities Complying with Permit Requirements?" (February 28, 2020)
CMRSWC partnered with MassDEP to sponsor two 2020 Worcester Polytechnic Institute -Water Rescourse Outreach Center projects: 1) "Managing Stormwater Costs" and (2) "Promoting STEM Education on Watersheds & Stormwater in MA".

COVID-19 Impacts

Optional: If any of the above year 2 requirements could not be completed due to the impacts of COVID-19, please identify the requirement that could not be completed, any actions taken to attempt to complete the requirement, and reason the requirement could not be completed below:

COVID-19 caused several issues for the Town, however, NPDES Permit requirements were still met for Year 2. The DPW was working with half of its staff in each Division, rotating every 2 weeks during most of the Spring of 2020. Water quality monitoring of the 6 ponds is routinely conducted in May every year; however, due to COVID-19, monitoring was not completed in May 2020 (monitoring continued as scheduled in July 2020). IDDE dry weather sampling was going to start in Spring of 2020 but due to COVID-19 and budget concerns we decided to push to July 2020. The Town has, so far, been able to continue normal funding of its Stormwater budget without cuts.

Activities Planned for Next Reporting Period

Please confirm that your SWMP has been, or will be, updated to comply with all applicable permit requirements including but not limited to the year 3 requirements summarized below. (Note: impaired waters and TMDL requirements are not listed below)

Yes, I agree ☒

- Inspect all outfalls/ interconnections (excluding Problem and Excluded outfalls) for the presence of dry weather flow
- Complete follow-up ranking as dry weather screening becomes available

Annual Requirements

- Annual report submitted and available to the public
- Annual opportunity for public participation in review and implementation of SWMP
- Keep records relating to the permit available for 5 years and make available to the public
- Properly store and dispose of catch basin cleanings and street sweepings so they do not discharge to receiving waters
- Annual training to employees involved in IDDE program
- Update inventory of all known locations where SSOs have discharged to the MS4
- Continue public education and outreach program
- Update outfall and interconnection inventory and priority ranking and include data collected in

connection with the dry weather screening and other relevant inspections conducted
- Implement IDDE program
- Review site plans of construction sites as part of the construction stormwater runoff control program
- Conduct site inspection of construction sites as necessary
- Inspect and maintain stormwater treatment structures
- Log catch basins cleaned or inspected
- Sweep all uncurbed streets at least annually
- Continue investigations of catchments associated with Problem Outfalls
- Review inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment; update if necessary

Provide any additional details on activities planned for permit year 3 below:

-Additional Public Education Messages
-Update SWMP and Public Review for Year 3
-IDDE Dry Weather Sampling Completion
-Stormwater Bylaw and Regulation Revised and Adopted
-Infrastructure/Outfall Improvements
-Begin Work on items due at the end of Year 4
-Activities required by Appendix H as identified in the SWMP.
-Other required BMPs not listed above but included in the SWMP:
-Annual Roadside Cleanup "A Cleaner Ayer"
-Maintain the Stormwater Hotline
-Promotion of Devens Household Hazaradous Waste Collection
-Promotion of Mercury Waste Collection

Part V: Certification of Small MS4 Annual Report 2020

40 CFR 144.32(d) Certification

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 gather and evaluate 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, I certify that 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.

Name:	Dan Van Schalkwyk, P.E.	Title:	Town Engineer
Signature:	Dan Van Schalkwyk — Digitally signed by Dan Van Schalkwyk DN: cn=Dan Van Schalkwyk, o=Ayer DPW, ou, email=dvanschalkwyk@ayer.ma.us, c=US Date: 2020.09.23 14:24:28 -04'00'	Date:	

[Signatory may be a duly authorized representative]

Town of Ayer, MA
23 hrs ·

It's not really a rainbow! It's an oil slick! Here, in Ayer, oil leaking from cars and trucks is washed into our wetlands every time it rains. Please do your part to keep our stormwater and wetlands clean by maintaining your vehicles. Thanks! #ThinkBlueMA

58 5 Comments 4 Shares

Like Comment Share

Most Relevant

Write a comment...

Faith Salter It's easy to prevent this kind of pollution. We just have to learn new habits!

Ayer Massachusetts
@TownOfAyer

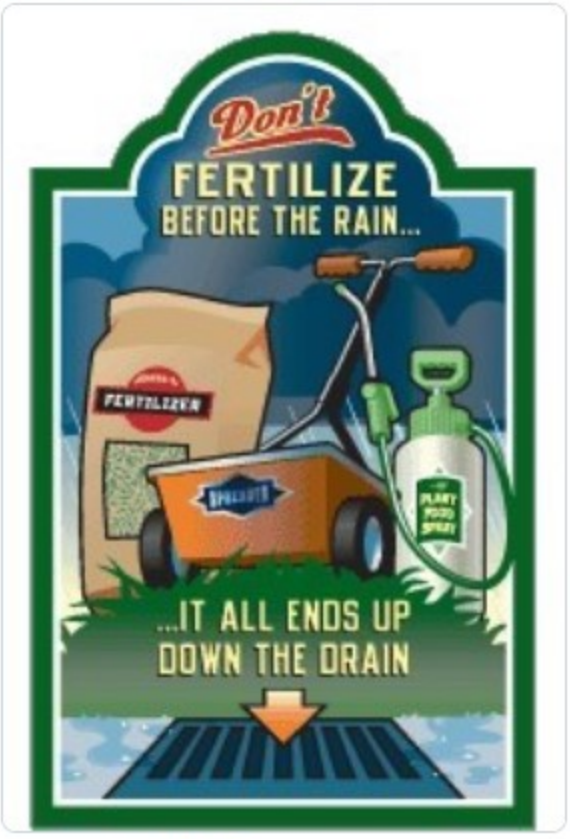
Are you still looking for a home for your Christmas tree?
If you have a Transfer Station permit, the Transfer Station
will still gladly accept your tree.

8:01 AM · Jan 30, 2020 · Hootsuite Inc.

Ayer Massachusetts
@TownOfAyer

Careful use of lawn fertilizer helps to keep Ayer's streams
and ponds healthy. Excess fertilizer is washed into storm
drains and directly into our waterways. For more info on
lawn care, click this link:

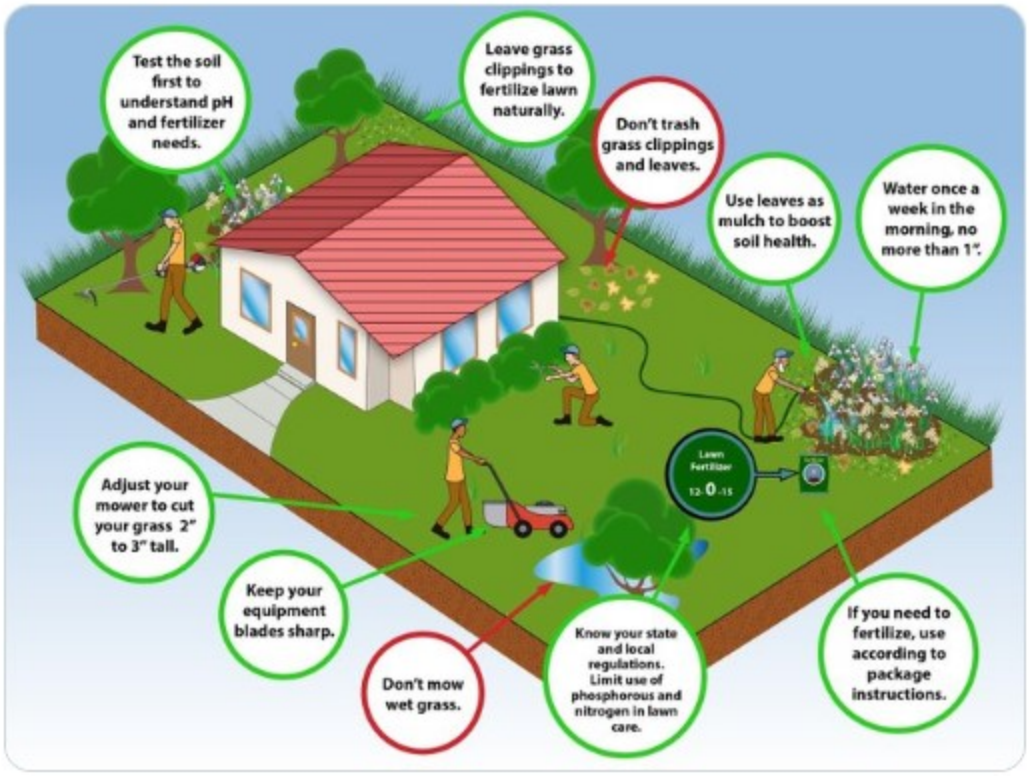
rocklandcce.org/resources/lawn...



7:30 AM · Jun 10, 2020 · Hootsuite Inc.

Ayer Massachusetts
@TownOfAyer

Spring is here- really it is! Please use care in maintaining your lawn. Over-fertilizing can have a negative impact on Ayer's streams and ponds. Stormwater runoff carries excess fertilizer to our wetland resources and fertilizes pond weeds, too!



8:55 AM · May 4, 2020 · Hootsuite Inc.

3 Likes

Ayer Massachusetts @TownOfAyer · Aug 15, 2019

Do you have end-of-season pool chemicals and lawn care products? If any of these characters are hanging around your home, collect and properly dispose of them! Click here for information on household hazardous waste disposal: devenshhw.com

Town of Ayer, MA
November 27 at 12:00 PM ·

Please dispose of household hazardous waste properly. We are lucky to have the Devens Regional Household Hazardous Waste Center nearby! The Center will be open December 4th and 7th from 9 am to 1 pm. For more information, click this link:

http://devenshhw.com/

4 1 Share

Like Comment Share

Write a comment...

Ayer Massachusetts @TownOfAyer · Oct 21, 2019

Properly managing leaves this time of year is an important part of keeping our local waterways and wetlands free of excess nutrients like phosphorus and nitrogen. For more information, click this link: ow.ly/IKQI50wQmq9

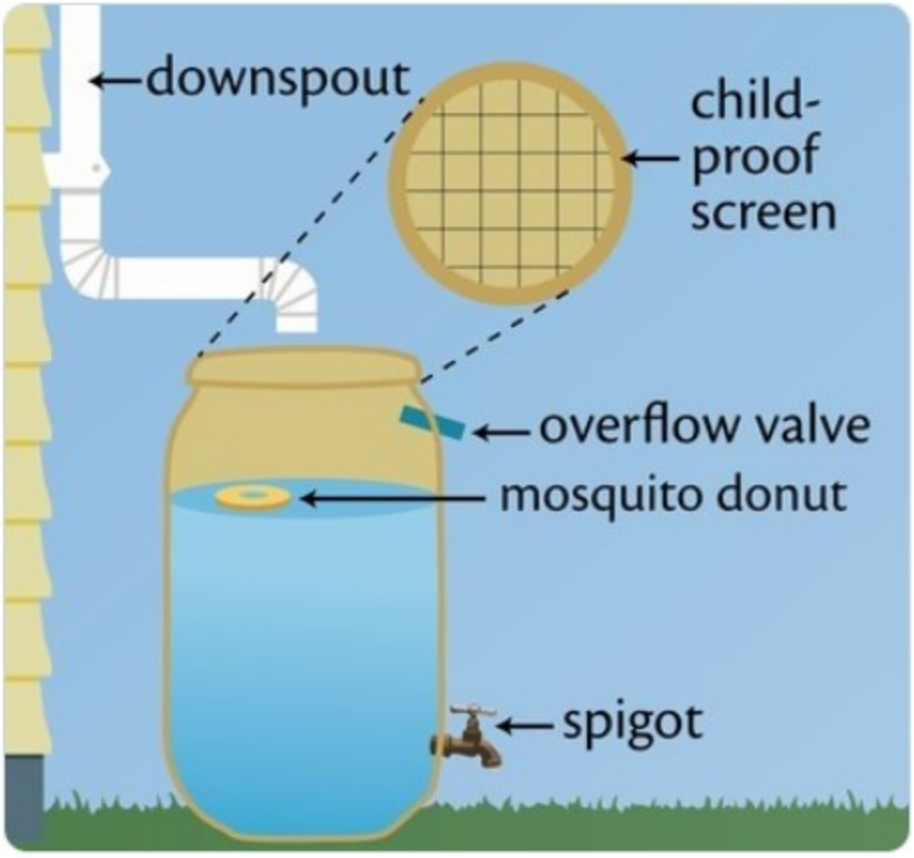
Town of Ayer, MA
July 25 ·

Pet Waste Belongs in the Trash!
You hate stepping in it. And fish hate swimming in it, too! When you walk your dog, make sure to carry a plastic bag with you so that you can pick up the waste and dispose of it properly.
Do your "doody" in both public areas and in your yard.

58 7 Comments 8 Shares

Ayer Massachusetts
@TownOfAyer

A rain barrel installed at your home has many benfits! They help to manage storm water and also provide water for use in your yard and garden. Click the link for more info: climateactiontool.org/content/manage...



8:26 AM · Jun 22, 2020 · Hootsuite Inc.

Ayer Massachusetts
@TownOfAyer

Salt and sand are a part of winter life in New England. Sweeping up the excess will help keep Ayer's ponds and waterways clean and healthy.

12:01 PM · Feb 5, 2020 · Hootsuite Inc.

1 Like

Ayer Massachusetts @TownOfAyer · Dec 20, 2019

Maintaining a septic system is an important way to assure our shared groundwater resources are protected from pollution. If your home has a septic system, please be sure to keep it in proper working order. For more information, click this EPA link: epa.gov/septic

1

What is stormwater runoff?

Stormwater runoff is the water that flows off roofs, driveways, parking lots, streets and other hard surfaces during rain storms. Instead of infiltrating into the ground, it flows into storm drains. Runoff from the storm drains in Ayer flow directly into local streams, ponds, and rivers.

Stormwater runoff sometimes receives **NO TREATMENT** before entering waterways!

What is NPDES Phase II and what is its purpose?

The United States Environmental Protection Agency (EPA) established a plan under the Clean Water Act to improve water quality in our surface waters. This plan is the National Pollution Discharge Elimination System (NPDES). Currently, Ayer is within an MS4 area faced with meeting water quality standards for stormwater runoff, and is required to implement six minimum control measures to reduce the amount of pollutants entering into waterbodies including wetlands, streams, ponds, and rivers.

For more information directly from the EPA:
https://www.epa.gov/npdes

NPDES Phase II and Businesses

As part of being an MS4 designated community, Ayer is faced with meeting the EPA's Phase II requirements of the National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System (NPDES- MS4) Permit. A goal of Ayer's is to educate and raise public awareness so that local businesses can understand the important part they play in protecting our surface waters. By implementing good housekeeping practices, you will be doing your part to help provide clean, healthy drinking water to your neighbors as well as the Town of Ayer and its water resources and water supply.

Town of AYER Public Works

Contact Information:

Department of Public Works
25 Brook Street
Ayer, MA 01432
https://www.ayer.ma.us/department-public-works

Stormwater Tips for Parking Lot Maintenance

What goes in here…

…comes out here.

Image: Sandy Pond, Ayer, MA

Town of AYER Public Works

Businesses Can Help with Parking Lot Care:

Sweeping, Grass and Leaf Care:

- Sweep parking lots annually at a minimum in the Spring following winter treatment activities.
- Sweep lots in the Fall following leaf fall.
- Sweep or soak up spills on parking lots, driveways or sidewalks.
- Sweep sidewalks, parking lots, and driveways regularly instead of hosing them down.
- Bag, mulch or compost lawn waste. Don't sweep leaves, grass clippings and other debris near or into storm drains or gutters.
- Control erosion. Stabilize exposed soil areas.

Sweepings Reuse and Disposal:

- The reuse and/or disposal of sweepings must be in accordance with current MassDEP policies and regulations. If sweepings are reused (e.g., as anti-skid material or fill in parking lots), they should be properly filtered to remove solid waste, such as paper or trash, in accordance with their intended reuse.
- Sweepings intended for reuse can be stored for up to one year in approved temporary storage areas. Storage areas should be protected to prevent erosion and runoff and should be located away from wetland resource areas and buffer zones, surface water, or groundwater.

General Good Housekeeping:

- Apply sand and deicing chemicals sparingly and sweep as soon as possible.
- Keep stored materials covered.
- Regularly inspect and maintain storm drains, catch basins, and stormwater structures on your property if you are responsible for them.
- Make sure any outdoor lunch areas are free from trash.
- Check property regularly for litter.
- Empty dumpsters on a regular basis to prevent overflow, inspect for leaking and ensure covers are utilized.
- Never put leaking containers in your dumpster, and never hose down the inside of the dumpster.
- Shovel and/or plow snow away from storm drains or wetlands where it will have a chance to filter through the soil during snowmelt.
- Consider using alternative environmentally friendly products.
- Stencil around storm drains to remind employees that they flow to surface waters.

Stormwater Management Structures

Owners and operators of industrial and commercial properties should be aware of the maintenance requirements of stormwater management structures located on their site. All stormwater structures, including detention basins, catch basins, storm drains, and oil/water separators require regular maintenance and inspection to perform properly and remove contaminants from stormwater as designed.

Ayer Pond Water Quality Monitoring
September 2019

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (09/10/2019)	Deep	UFP-D	5.0	18.47	6.77	0.85	8.9	167	191	3.5	10	0.1	NS
	Middle	UFP-M	2.5	18.56	6.86	1.38	14.8	150	171		20	0.13	NS
	Surface	UFP-S	0.5	18.71	6.95	2.08	22.3	150	171		10	ND	2.30
Flannagan Pond (09/10/2019)	Tributary	FP-T	0.5	18.01	6.70	2.04	21.5	206	237	Bottom	50	0.56	NS
	Deep	FP-D	4.5	20.42	6.71	2.65	29.9	209	230		250	ND	NS
	Middle	FP-M	2.5	20.34	6.78	4.61	50.8	211	232		20	ND	NS
	Surface	FP-S	0.5	20.28	6.84	5.03	55.6	211	232		20	ND	0.50
Grove Pond (09/10/2019)	Tributary	GP-T	0.5	17.93	6.57	2.22	23.2	405	468	Bottom	50	ND	NS
	Deep	GP-D	6.0	18.76	6.64	1.85	22.1	356	404		ND	ND	NS
	Middle	GP-M	3.0	18.77	6.74	2.34	24.7	348	396		ND	ND	NS
	Surface	GP-S	0.5	19.00	6.81	4.84	52.0	350	396		ND	ND	3.20
Balch Pond (09/10/2019)	Tributary	BP-T	0.5	19.55	6.85	4.54	49.1	209	233	Bottom	ND	ND	NS
	Deep	BP-D	6.0	19.76	6.65	2.76	29.9	212	236		20	ND	NS
	Middle	BP-M	3.0	19.73	6.76	5.98	65.9	205	227		10	ND	NS
	Surface	BP-S	0.5	19.81	6.76	6.86	75.3	204	227		10	ND	0.8
Lower Long Pond (09/10/2019)	Tributary	LLP-T	0.5	20.36	8.42	3.01	33.8	98	107	9	ND	ND	NS
	Deep	LLP-D	20.0	9.19	6.21	2.16	19.0	139	201		30	ND	NS
	Middle	LLP-M	12.0	17.20	7.04	1.69	17.3	91	109		ND	ND	NS
	Surface	LLP-S	0.5	20.68	7.75	4.61	51.3	95	104		ND	ND	1.3
			2.0	20.67	7.90	4.40	49.8	95	104		NS	NS	NS
			3.5	20.67	7.67	2.31	25.8	96	105		NS	NS	NS
			5.0	20.68	7.54	2.27	25.2	95	103		NS	NS	NS
			6.5	20.66	7.48	2.26	24.8	96	105		NS	NS	NS
			8.0	20.35	7.36	2.09	22.8	94	104		NS	NS	NS
			9.5	20.19	7.25	2.00	21.9	95	105		NS	NS	NS
			11.0	18.20	7.18	1.97	20.2	90	105		NS	NS	NS
			12.5	16.46	6.96	1.70	17.1	91	112		NS	NS	NS
			14.0	14.80	6.84	1.70	16.5	90	115		NS	NS	NS
			15.5	11.60	6.68	1.81	16.6	107	145		NS	NS	NS
			17.0	10.85	6.51	1.83	16.4	105	146		NS	NS	NS
			18.5	10.11	6.30	1.77	15.8	115	164		NS	NS	NS
			20.0	9.19	6.21	2.16	19.0	139	201		NS	NS	NS
Sandy Pond (09/10/2019)	Tributary	SP-T	0.5	16.58	6.92	1.53	15.4	192	229	9	ND	ND	NS
	Deep	SP-D	20.0	12.10	6.69	0.53	4.9	147	195		ND	ND	NS
	Middle	SP-M	12.0	21.41	7.03	6.91	77.2	165	177		ND	ND	NS
	Surface	SP-S	0.5	21.74	7.04	7.64	86.5	165	176		ND	ND	0.8
			2.0	21.73	7.08	7.53	85.3	166	177		NS	NS	NS
			3.5	21.73	7.07	7.43	84.4	165	177		NS	NS	NS
			5.0	21.72	7.08	7.35	83.7	166	176		NS	NS	NS
			6.5	21.73	7.07	7.35	83.0	166	177		NS	NS	NS
			8.0	21.72	7.06	7.43	84.1	165	176		NS	NS	NS
			9.5	21.64	7.05	7.31	82.5	166	177		NS	NS	NS
			11.0	21.62	7.03	7.34	83.1	164	176		NS	NS	NS
			12.5	21.77	6.98	5.54	55.1	160	177		NS	NS	NS
			14.0	17.93	6.88	0.93	9.3	157	182		NS	NS	NS
			15.5	16.50	6.83	0.68	6.7	150	182		NS	NS	NS
			17.0	13.01	6.80	0.60	5.8	149	185		NS	NS	NS
			18.5	12.80	6.72	0.58	5.3	147	195		NS	NS	NS

Ayer Pond Water Quality Monitoring
July 2019

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (07/11/2019)	Deep	UFP-D	5.0	20.81	6.24	1.45	16.1	314	341	4	140	0.28	NS
	Middle	UFP-M	2.5	22.13	6.48	3.63	32.8	309	328		60	0.1	NS
	Surface	UFP-S	0.5	25.2	6.88	6.60	78.1	174	173		30	ND	10.30
Flannagan Pond (07/11/2019)	Tributary	FP-T	0.5	25.29	6.67	5.07	62.4	184	183	3.5	20	ND	NS
	Deep	FP-D	4.5	26.90	6.45	3.06	37.3	250	241		20	ND	NS
	Middle	FP-M	2.5	26.79	6.51	3.37	42.2	250	241		20	ND	NS
	Surface	FP-S	0.5	27.21	6.73	6.06	75.9	250	240		10	ND	7.38
Grove Pond (07/11/2019)	Tributary	GP-T	0.5	25.57	6.77	4.04	48.7	432	428	3.5	60	ND	NS
	Deep	GP-D	6.0	24.15	6.38	0.52	5.7	357	376		20	ND	NS
	Middle	GP-M	3.0	22.73	6.52	0.55	5.1	356	373		40	0.11	NS
	Surface	GP-S	0.5	23.94	6.67	4.31	52.2	379	379		10	ND	3.18
Balch Pond (07/11/2019)	Tributary	BP-T	0.5	27.6	6.81	3.55	46.2	260	246	3.5	20	ND	NS
	Deep	BP-D	6.0	25.17	6.43	0.20	2.4	304	304		260	0.13	NS
	Middle	BP-M	3.0	25.76	6.56	0.60	7.1	253	249		30	0.12	NS
	Surface	BP-S	0.5	26.81	6.64	3.21	39.1	252	243		20	ND	6.78
Lower Long Pond (07/11/2019)	Tributary	LLP-T	0.5	26.44	8.33	3.91	49.6	103	100	7	ND	ND	NS
	Deep	LLP-D	20.0	8.18	6.27	0.23	1.9	118	173		20	ND	NS
	Middle	LLP-M	12.0	9.20	6.49	0.20	1.8	99	127		20	ND	NS
	Surface	LLP-S	0.5	26.61	7.68	5.83	72.1	102	99		ND	ND	3.05
			2.0	26.61	7.44	5.54	69.0	103	100		NS	NS	NS
			3.5	25.01	7.19	1.86	19.4	89	89		NS	NS	NS
			5.0	19.09	6.95	0.36	3.7	87	99		NS	NS	NS
			6.5	15.79	6.85	0.30	2.8	85	102		NS	NS	NS
			8.0	14.08	6.73	0.24	2.2	81	104		NS	NS	NS
			9.5	11.33	6.68	0.22	2.0	86	114		NS	NS	NS
			11.0	9.91	6.51	0.30	2.0	87	122		NS	NS	NS
			12.5	9.18	6.44	0.28	2.0	93	130		NS	NS	NS
			14.0	8.77	6.33	0.26	2.0	99	144		NS	NS	NS
			15.5	8.41	6.42	0.21	1.8	107	154		NS	NS	NS
			17.0	8.20	6.31	0.21	1.8	115	169		NS	NS	NS
			18.5	8.19	6.28	0.20	1.8	116	170		NS	NS	NS
			20.0	8.18	6.27	0.23	1.9	118	173		NS	NS	NS
Sandy Pond (07/11/2019)	Tributary	SP-T	0.5	22.34	7.28	6.70	72.7	197	208	9	ND	ND	NS
	Deep	SP-D	20.0	10.20	6.18	0.25	2.8	134	181		ND	ND	NS
	Middle	SP-M	12.0	15.60	6.60	2.80	20.7	134	169		ND	ND	NS
	Surface	SP-S	0.5	27.66	7.01	9.77	120.9	185	176		ND	ND	0.88
			2.0	27.53	7.04	8.13	102.1	185	176		NS	NS	NS
			3.5	27.48	7.02	7.80	98.6	185	176		NS	NS	NS
			5.0	27.16	7.00	7.64	96.1	181	174		NS	NS	NS
			6.5	26.16	6.94	7.46	92.0	176	172		NS	NS	NS
			8.0	23.25	6.92	7.42	82.9	154	167		NS	NS	NS
			9.5	19.51	6.87	5.30	61.4	151	167		NS	NS	NS
			11.0	17.02	6.72	2.94	32.8	137	164		NS	NS	NS
			12.5	14.61	6.56	1.42	15.1	134	168		NS	NS	NS
			14.0	13.07	6.51	0.58	5.5	132	171		NS	NS	NS
			15.5	12.48	6.44	0.52	4.3	130	172		NS	NS	NS
			17.0	12.17	6.33	0.51	5.6	131	175		NS	NS	NS
			18.5	11.77	6.25	0.31	2.8	134	180		NS	NS	NS

Ayer Pond Water Quality Monitoring
May 2019

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (05/22/2019)	Deep	UFP-D	5.0	17.96	8.50	9.50	99.9	132	153	Bottom	10	ND	NS
	Middle	UFP-M	2.5	17.54	8.30	8.80	95.6	133	156		ND	ND	NS
	Surface	UFP-S	0.5	18.61	8.50	10.08	104.3	134	154		ND	ND	ND
Flannagan Pond (05/22/2019)	Tributary	FP-T	0.5	18.09	8.39	6.56	70.1	135	156	Bottom	20	ND	NS
	Deep	FP-D	4.5	18.49	8.45	7.63	87.2	171	196		10	ND	NS
	Middle	FP-M	2.5	18.48	8.64	8.74	93.4	168	192		10	ND	NS
	Surface	FP-S	0.5	18.59	8.60	9.24	98.0	168	191		ND	ND	ND
Grove Pond (05/22/2019)	Tributary	GP-T	0.5	16.88	8.02	6.17	65.9	269	318	Bottom	ND	ND	NS
	Deep	GP-D	6.0	18.13	8.01	6.91	73.9	266	306		ND	ND	NS
	Middle	GP-M	3.0	18.21	8.13	7.14	75.8	267	306		ND	ND	NS
	Surface	GP-S	0.5	18.16	8.20	7.19	77.3	268	308		ND	ND	5.00
Balch Pond (05/22/2019)	Tributary	BP-T	0.5	18.2	9.40	8.47	89.8	181	210	Bottom	ND	ND	NS
	Deep	BP-D	6.0	17.78	8.45	2.74	28.5	175	204		20	ND	NS
	Middle	BP-M	3.0	17.92	8.70	7.56	80.0	174	201		10	ND	NS
	Surface	BP-S	0.5	18.20	8.80	7.69	81.5	172	200		ND	ND	ND
Lower Long Pond (05/22/2019)	Tributary	LLP-T	0.5	18.59	8.48	6.45	71.1	26	29	NS	ND	ND	NS
	Deep	LLP-D	20.0	7.69	6.86	0.12	1.0	94	140		ND	ND	NS
	Middle	LLP-M	12.0	10.82	7.09	2.50	22.1	78	107		10	ND	NS
	Surface	LLP-S	0.5	18.16	7.81	8.40	87.1	80	92		ND	ND	ND
			2.0	18.01	7.77	7.90	83.6	80	92		NS	NS	NS
			3.5	17.85	7.72	7.75	81.7	79	92		NS	NS	NS
			5.0	15.75	7.63	6.73	68.7	76	92		NS	NS	NS
			6.5	14.49	7.45	6.33	61.7	73	93		NS	NS	NS
			8.0	13.12	7.33	5.04	53.9	74	96		NS	NS	NS
			9.5	11.90	7.25	4.06	34.8	76	102		NS	NS	NS
			11.0	11.12	7.17	2.66	24.8	78	106		NS	NS	NS
			12.5	10.71	7.11	2.30	21.0	78	107		NS	NS	NS
			14.0	9.87	7.10	1.24	12.2	81	115		NS	NS	NS
			15.5	9.32	6.99	0.79	10.9	82	116		NS	NS	NS
			17.0	8.32	7.04	0.30	2.6	88	129		NS	NS	NS
			18.5	7.70	7.01	0.18	1.5	92	136		NS	NS	NS
			20.0	7.69	6.86	0.12	1.0	94	140		NS	NS	NS
Sandy Pond (05/22/2019)	Tributary	SP-T	0.5	17.89	7.51	4.85	53.2	117	136	11	ND	ND	NS
	Deep	SP-D	20.0	11.07	7.25	3.41	31.3	118	161		ND	ND	NS
	Middle	SP-M	12.0	13.04	7.50	8.61	83.5	125	159		ND	ND	NS
	Surface	SP-S	0.5	17.28	7.54	8.80	92.7	135	159		ND	ND	1
			2.0	17.23	7.51	8.49	88.3	136	159		NS	NS	NS
			3.5	17.19	7.53	8.46	87.6	135	158		NS	NS	NS
			5.0	17.12	7.41	8.45	87.7	135	160		NS	NS	NS
			6.5	17.10	7.49	8.46	87.8	135	159		NS	NS	NS
			8.0	16.62	7.54	8.55	87.6	132	158		NS	NS	NS
			9.5	15.92	7.53	8.49	87.5	130	159		NS	NS	NS
			11.0	14.09	7.57	8.88	87.2	125	157		NS	NS	NS
			12.5	13.61	7.49	8.27	77.3	123	158		NS	NS	NS
			14.0	13.07	7.47	7.43	66.3	123	158		NS	NS	NS
			15.5	12.27	7.44	6.58	65.2	120	159		NS	NS	NS
			17.0	11.40	7.30	4.71	46.1	118	159		NS	NS	NS
			18.5	11.09	7.28	3.93	35.1	119	161		NS	NS	NS

Ayer Pond Water Quality Monitoring
July 2018

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (07/20/2018)	Deep	UFP-D	5.0	23.57	6.72	1.55	18.3	220	226	Bottom	30	ND	NS
	Middle	UFP-M	2.5	23.96	6.92	2.04	24.4	222	226		20	ND	NS
	Surface	UFP-S	0.5	25.15	6.92	2.14	25.9	228	228		20	ND	1.70
Flannagan Pond (07/20/2018)	Tributary	FP-T	0.5	26.67	7.08	5.43	68.0	228	236	Bottom	20	ND	NS
	Deep	FP-D	4.5	25.89	7.21	4.20	52.0	294	299		20	ND	NS
	Middle	FP-M	2.5	25.9	7.34	5.45	67.0	283	290		20	ND	NS
	Surface	FP-S	0.5	27.4	7.34	6.06	76.4	284	296		20	ND	2.30
Grove Pond (07/20/2018)	Tributary	GP-T	0.5	23.89	6.98	1.95	23.1	473	483	Bottom	50	ND	NS
	Deep	GP-D	6.0	22.60	7.10	0.50	6.0	420	440		20	ND	NS
	Middle	GP-M	3.0	23.80	7.27	4.00	50.0	415	423		30	ND	NS
	Surface	GP-S	0.5	26.58	7.27	5.63	69.7	447	487		20	ND	1.60
Balch Pond (07/20/2018)	Tributary	BP-T	0.5	27.65	7.32	4.30	54.0	283	296	Bottom	50	ND	NS
	Deep	BP-D	6.0	24.82	7.05	1.00	14.0	290	291		40	ND	NS
	Middle	BP-M	3.0	24.94	7.19	3.35	40.0	279	279		150	ND	NS
	Surface	BP-S	0.5	25.24	7.20	3.60	44.0	279	281		30	ND	5.9
Lower Long Pond (07/20/2018)	Tributary	LLP-T	0.5	25.62	7.42	4.23	52.0	125	124	10	20	ND	NS
	Deep	LLP-D	20.0	8.07	6.48	0.33	2.8	90	133		40	ND	NS
	Middle	LLP-M	12.0	15.40	6.80	0.38	3.9	100	120		30	ND	NS
	Surface	LLP-S	0.5	25.91	7.11	5.31	65.3	123	126		20	ND	ND
			2.0	25.79	7.09	5.33	65.5	123	125		NS	NS	NS
			3.5	25.69	7.09	5.27	64.3	123	125		NS	NS	NS
			5.0	25.59	7.08	5.20	63.7	124	125		NS	NS	NS
			6.5	25.05	7.02	4.08	45.5	122	123		NS	NS	NS
			8.0	24.14	6.97	3.10	37.0	119	120		NS	NS	NS
			9.5	20.91	6.90	1.74	20.5	114	120		NS	NS	NS
			11.0	17.68	6.82	0.37	4.0	109	120		NS	NS	NS
			12.5	15.07	6.79	0.39	3.9	101	121		NS	NS	NS
			14.0	12.46	6.76	0.41	3.8	92	121		NS	NS	NS
			15.5	11.00	6.69	0.43	3.9	90	122		NS	NS	NS
			17.0	9.53	6.62	0.44	3.9	87	123		NS	NS	NS
			18.5	8.80	6.55	0.39	3.4	89	128		NS	NS	NS
			20.0	8.07	6.48	0.33	2.8	90	133		NS	NS	NS
Sandy Pond (07/20/2018)	Tributary	SP-T	0.5	19.77	7.00	0.77	8.3	214	237	10	20	ND	NS
	Deep	SP-D	20.0	11.52	7.14	3.66	34.6	147	198		ND	ND	NS
	Middle	SP-M	12.0	22.08	7.43	6.81	79.5	200	206		ND	ND	NS
	Surface	SP-S	0.5	26.91	7.37	6.59	82.5	213	221		ND	ND	0.4
			2.0	26.80	7.40	6.63	82.9	215	223		NS	NS	NS
			3.5	26.88	7.41	6.64	82.7	215	222		NS	NS	NS
			5.0	26.95	7.42	6.64	82.4	214	220		NS	NS	NS
			6.5	26.68	7.44	6.54	81.5	215	221		NS	NS	NS
			8.0	26.40	7.45	6.44	80.6	215	221		NS	NS	NS
			9.5	25.65	7.44	6.77	83.1	215	218		NS	NS	NS
			11.0	24.90	7.43	7.09	85.6	214	215		NS	NS	NS
			12.5	21.95	7.42	6.75	77.3	196	207		NS	NS	NS
			14.0	19.00	7.40	6.40	69.0	177	199		NS	NS	NS
			15.5	16.62	7.32	6.09	63.5	166	197		NS	NS	NS
			17.0	14.23	7.24	5.77	58.0	154	194		NS	NS	NS
			18.5	12.88	7.19	4.72	46.3	151	196		NS	NS	NS

Ayer Pond Water Quality Monitoring
November 2017

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (11/03/2017)	Deep	UFP-D	5.0	11.83	6.99	2.75	25.0	127	170	Bottom	30	ND	NS
	Middle	UFP-M	2.5	12.23	7.07	3.97	37.3	133	173		10	ND	NS
	Surface	UFP-S	0.5	12.83	7.06	4.07	38.6	133	173		ND	ND	0.89
Flannagan Pond (11/03/2017)	Tributary	FP-T	0.5	12.47	7.14	7.65	72.0	136	179	Bottom	10	ND	NS
	Deep	FP-D	4.5	13.28	7.20	7.29	70.6	190	245		80	0.21	NS
	Middle	FP-M	2.5	13.27	7.20	7.77	79.2	190	245		10	0.2	NS
	Surface	FP-S	0.5	13.34	7.20	7.80	74.6	190	245		ND	0.62	0.55
Grove Pond (11/03/2017)	Tributary	GP-T	0.5	12.30	7.09	5.60	52.4	223	293	Bottom	10	ND	NS
	Deep	GP-D	6.0	11.50	6.97	2.30	21.1	179	241		170	0.13	NS
	Middle	GP-M	3.0	11.72	7.01	2.60	24.0	186	244		10	ND	NS
	Surface	GP-S	0.5	12.51	6.98	3.24	30.4	186	244		10	ND	0.89
Balch Pond (11/03/2017)	Tributary	BP-T	0.5	15.42	7.22	5.80	58.0	186	229	Bottom	300	ND	NS
	Deep	BP-D	6.0	12.05	7.30	5.85	55.0	173	226		50	ND	NS
	Middle	BP-M	3.0	12.08	7.45	6.90	59.3	173	226		20	ND	NS
	Surface	BP-S	0.5	13.41	7.50	7.20	69.0	175	224		20	ND	1.53
Lower Long Pond (11/03/2017)	Tributary	LLP-T	0.5	13.96	7.35	4.70	45.1	97	122	8	10	ND	NS
	Deep	LLP-D	20.0	Could not reach bottom due to wind							10	ND	NS
	Middle	LLP-M	12.0	13.30	6.70	5.74	55.0	91	118		ND	ND	NS
	Surface	LLP-S	0.5	13.88	6.85	6.44	62.4	91	116		10	ND	2.97
			2.0	13.87	6.72	6.22	64.2	92	117		NS	NS	NS
			3.5	13.84	6.87	6.36	616.0	93	118		NS	NS	NS
			5.0	13.81	6.86	6.45	625.0	90	115		NS	NS	NS
			6.5	13.74	6.88	6.26	59.9	92	118		NS	NS	NS
			8.0	13.58	6.78	6.09	58.8	90	116		NS	NS	NS
			9.5	13.35	6.89	6.03	57.6	90	116		NS	NS	NS
			11.0	13.38	6.84	5.79	55.3	91	118		NS	NS	NS
			12.5	13.24	6.68	5.73	54.7	91	118		NS	NS	NS
			14.0	13.04	6.67	5.36	51.0	91	118		NS	NS	NS
			15.5	12.97	6.57	5.20	49.0	91	118		NS	NS	NS
			17.0	12.95	6.49	4.90	46.0	91	118		NS	NS	NS
			18.5	13.04	6.42	5.20	49.0	91	118		NS	NS	NS
			20.0	8.88	6.59	5.00	50.0	126	180		NS	NS	NS
Sandy Pond (11/03/2017)	Tributary	SP-T	0.5	12.56	7.15	3.58	33.0	119	157	8	20	ND	NS
	Deep	SP-D	20.0	Could not reach bottom due to wind							10	ND	NS
	Middle	SP-M	12.0	14.24	7.23	7.58	73.8	170	212		20	ND	NS
	Surface	SP-S	0.5	14.58	7.20	7.79	76.6	170	213		20	ND	3.26
			2.0	14.57	7.20	7.77	76.3	170	213		NS	NS	NS
			3.5	14.55	7.20	7.75	76.1	170	213		NS	NS	NS
			5.0	14.50	7.20	7.75	76.1	170	212		NS	NS	NS
			6.5	14.47	7.21	7.75	76.2	170	212		NS	NS	NS
			8.0	14.44	7.21	7.70	75.5	170	212		NS	NS	NS
			9.5	14.42	7.21	7.67	75.2	170	212		NS	NS	NS
			11.0	14.30	7.22	7.60	74.0	170	212		NS	NS	NS
			12.5	14.22	7.23	7.55	73.6	170	212		NS	NS	NS
			14.0	14.17	7.22	7.52	73.0	170	212		NS	NS	NS
			15.5	14.15	7.21	7.49	72.7	170	212		NS	NS	NS
			17.0	14.10	7.21	7.45	72.0	170	212		NS	NS	NS
			18.5	14.05	7.20	7.40	70.0	170	212		NS	NS	NS

Ayer Pond Water Quality Monitoring
August 2017

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (08/03/2017)	Deep	UFP-D	5.0	20	6.47	0.35	3.8	211	233	Bottom	20	ND	NS
	Middle	UFP-M	2.5	21.3	6.72	0.45	5.3	161	175		20	ND	NS
	Surface	UFP-S	0.5	22.82	7.01	3.42	40.0	174	182		10	ND	0.89
Flannagan Pond (08/03/2017)	Tributary	FP-T	0.5	22.81	6.87	5.02	58.4	186	194	Bottom	30	0.11	NS
	Deep	FP-D	4.5	25.06	7.04	2.04	24.7	256	257		40	0.10	NS
	Middle	FP-M	2.5	25.42	7.20	3.63	44.0	251	254		50	ND	NS
	Surface	FP-S	0.5	26.23	7.21	6.46	80.1	251	257		60	0.12	29.4
Grove Pond (08/03/2017)	Tributary	GP-T	0.5	23.64	6.80	2.92	34.5	369	379	Bottom	20	ND	NS
	Deep	GP-D	6.0	19.08	6.60	0.35	3.8	301	340		20	ND	NS
	Middle	GP-M	3.0	22.68	7.03	2.60	3.0	352	368		ND	ND	NS
	Surface	GP-S	0.5	23.93	7.12	5.40	64.0	355	362		ND	ND	ND
Balch Pond (08/03/2017)	Tributary	BP-T	0.5	25.77	7.02	3.35	41.0	265	269	Bottom	50	0.13	NS
	Deep	BP-D	6.0	21.80	6.86	1.65	17.2	258	273		30	0.11	NS
	Middle	BP-M	3.0	25.12	6.99	3.27	39.7	257	259		30	0.16	NS
	Surface	BP-S	0.5	26.30	7.00	4.29	53.0	258	265		20	0.24	1.34
Lower Long Pond (08/03/2017)	Tributary	LLP-T	0.5	23.95	7.27	3.08	36.0	117	119	10	40	ND	NS
	Deep	LLP-D	20.0	7.87	5.70	0.30	2.5	104	155		20	0.16	NS
	Middle	LLP-M	12.0	12.75	5.52	0.26	2.5	93	121		20	ND	NS
	Surface	LLP-S	0.5	24.21	6.99	6.00	72.5	107	108		ND	0.13	1.56
			2.0	24.16	6.87	6.21	74.0	107	109		NS	NS	NS
			3.5	23.21	6.75	5.19	60.5	105	109		NS	NS	NS
			5.0	22.30	6.63	5.04	60.6	105	110		NS	NS	NS
			6.5	21.13	6.41	1.53	18.2	99	107		NS	NS	NS
			8.0	18.91	6.36	0.35	3.6	97	108		NS	NS	NS
			9.5	16.30	6.21	0.26	2.6	95	112		NS	NS	NS
			11.0	13.46	5.53	0.24	2.3	93	119		NS	NS	NS
			12.5	12.04	5.50	0.28	2.6	93	123		NS	NS	NS
			14.0	10.68	5.52	0.27	2.3	93	128		NS	NS	NS
			15.5	9.55	5.57	0.27	2.4	97	137		NS	NS	NS
			17.0	8.68	5.60	0.33	2.8	97	141		NS	NS	NS
			18.5	7.90	5.66	0.29	2.5	99	146		NS	NS	NS
			20.0	7.87	5.70	0.30	2.5	104	155		NS	NS	NS
Sandy Pond (08/03/2017)	Tributary	SP-T	0.5	19.75	6.69	0.78	80.0	180	200	10	30	ND	NS
	Deep	SP-D	20.0	10.89	16.72	0.67	6.2	158	216		10	ND	NS
	Middle	SP-M	12.0	20.72	6.90	4.80	50.9	190	204		ND	ND	NS
	Surface	SP-S	0.5	25.34	6.85	7.68	94.0	209	210		ND	ND	1.05
			2.0	25.33	6.94	7.53	91.8	210	211		NS	NS	NS
			3.5	25.26	6.99	7.52	91.6	211	212		NS	NS	NS
			5.0	24.82	7.04	7.68	92.8	207	207		NS	NS	NS
			6.5	24.50	7.09	7.08	93.4	205	207		NS	NS	NS
			8.0	24.05	7.09	7.66	91.4	205	208		NS	NS	NS
			9.5	23.22	7.11	7.51	90.0	200	206		NS	NS	NS
			11.0	22.00	6.96	5.40	61.8	193	205		NS	NS	NS
			12.5	19.44	6.84	4.20	40.0	186	203		NS	NS	NS
			14.0	17.37	6.73	2.98	31.0	176	202		NS	NS	NS
			15.5	15.56	6.66	2.32	22.3	172	206		NS	NS	NS
			17.0	13.53	6.81	1.05	10.0	165	210		NS	NS	NS
			18.5	11.74	6.74	0.77	7.1	159	213		NS	NS	NS

Ayer Pond Water Quality Monitoring
May 2017

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow 5/18/17	Deep	UFP-D	5.0	13.63	7.46	7.91	78.1	167	204	Bottom Visible	20	ND	NS
	Middle	UFP-M	2.5	20.88	7.32	8.00	89.7	193	209		10	ND	NS
	Surface	UFP-S	0.5	21.35	7.63	8.08	91.2	196	211		ND	ND	0.84
Flannagan Pond 5/18/17	Tributary	FP-T	0.5	20.17	7.24	6.07	67.0	193	213	Bottom Visible	10	ND	NS
	Deep	FP-D	4.5	NS	NS	NS	NS	NS	NS		NS	NS	NS
	Middle	FP-M	2.5	NS	NS	NS	NS	NS	NS		NS	NS	NS
	Surface	FP-S	0.5	NS	NS	NS	NS	NS	NS		NS	NS	NS
Grove Pond 5/18/17	Tributary	GP-T	0.5	22.18	6.99	4.83	55.4	340	360	Bottom Visible	20	0.12	NS
	Deep	GP-D	6.0	14.65	7.43	10.10	99.3	281	346		10	ND	NS
	Middle	GP-M	3.0	18.99	7.50	9.42	101.5	304	342		ND	ND	NS
	Surface	GP-S	0.5	22.54	7.64	8.28	96.3	329	345		10	0.11	ND
Balch Pond 5/18/17	Tributary	BP-T	0.5	20.58	7.44	8.56	95.3	228	249	Bottom Visible	10	0.16	NS
	Deep	BP-D	6.0	16.56	7.30	10.42	107.6	220	256		10	0.11	NS
	Middle	BP-M	3.0	18.99	7.18	8.85	95.5	229	254		ND	ND	NS
	Surface	BP-S	0.5	20.56	7.17	8.22	91.5	234	255		ND	0.11	1.26
Lower Long Pond 5/18/17	Tributary	LLP-T	0.5	19.75	6.90	4.65	50.8	19	22	8	10	1.4	NS
	Deep	LLP-D	20.0	9.44	5.93	0.13	1.10	96	137		20	0.22	NS
	Middle	LLP-M	12.0	12.00	6.08	7.21	67.7	85	112		ND	0.14	NS
	Surface	LLP-S	0.5	20.26	7.07	7.77	88.6	95	105		ND	ND	1.47
			2.0	20.24	7.05	7.61	84.2	94	104		NS	NS	NS
			3.5	18.04	7.01	8.03	85.6	96	108		NS	NS	NS
			5.0	15.29	6.97	8.12	81.1	89	107		NS	NS	NS
			6.5	13.34	6.16	7.77	74.2	84	107		NS	NS	NS
			8.0	12.88	6.11	7.68	72.8	84	108		NS	NS	NS
			9.5	12.71	6.07	7.56	71.5	84	108		NS	NS	NS
			11.0	12.51	6.07	7.41	70.3	84	110		NS	NS	NS
			12.5	11.92	6.08	6.80	64.4	85	114		NS	NS	NS
			14.0	9.90	5.91	3.91	35.0	86	119		NS	NS	NS
			15.5	9.58	5.84	2.84	25.0	89	127		NS	NS	NS
			17.0	9.53	5.83	0.60	5.0	95	135		NS	NS	NS
			18.5	9.46	5.91	0.17	1.50	96	137		NS	NS	NS
			20.0	9.44	5.93	0.13	1.10	96	137		NS	NS	NS
Sandy Pond 5/18/17	Tributary	SP-T	0.5	18.85	6.91	3.38	36.5	141	161	10	20	ND	NS
	Deep	SP-D	20.0	11.89	7.00	8.95	72.5	140	195		ND	ND	NS
	Middle	SP-M	12.0	13.46	7.10	9.42	90.6	155	198		ND	ND	NS
	Surface	SP-S	0.5	18.58	7.16	9.37	99.0	175	199		ND	ND	1.47
			2.0	18.57	7.11	8.91	95.3	175	199		NS	NS	NS
			3.5	18.38	7.07	8.87	94.5	175	199		NS	NS	NS
			5.0	18.15	7.08	8.83	93.6	174	200		NS	NS	NS
			6.5	17.00	7.08	9.02	93.7	170	199		NS	NS	NS
			8.0	14.85	7.10	9.47	94.5	164	199		NS	NS	NS
			9.5	14.22	7.10	9.52	93.0	158	198		NS	NS	NS
			11.0	13.61	7.11	9.48	91.5	155	199		NS	NS	NS
			12.5	13.42	7.10	9.38	90.2	156	198		NS	NS	NS
			14.0	13.27	7.10	9.20	88.2	154	198		NS	NS	NS
			15.5	13.58	7.14	9.35	89.8	155	199		NS	NS	NS
			17.0	12.68	7.07	9.13	80.7	149	197		NS	NS	NS
			18.5	12.12	7.03	9.05	77.3	145	196		NS	NS	NS

Ayer Pond Water Quality Monitoring
October 2016

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow 10/06/16	Deep	UFP-D	5.0	14.11	7.02	6.47	63.1	214	270	Bottom Visible	10	ND	NS
	Middle	UFP-M	2.5	14.21	7.14	6.54	64.1	214	270		ND	ND	NS
	Surface	UFP-S	0.5	14.72	7.25	6.63	66.0	218	271		ND	ND	ND
Flannagan Pond 10/06/16	Tributary	FP-T	0.5	15.17	6.70	2.45	24.5	224	275	Bottom Visible	20	ND	NS
	Deep	FP-D	4.5	15.70	7.11	8.40	84.2	258	314		ND	ND	NS
	Middle	FP-M	2.5	15.74	7.15	8.53	86.0	260	315		10	ND	NS
	Surface	FP-S	0.5	16.12	7.18	8.68	88.3	261	315		ND	ND	ND
Grove Pond 10/06/16	Tributary	GP-T	0.5	12.16	6.96	1.77	16.6	449	595	Bottom Visible	30	ND	NS
	Deep	GP-D	6.0	14.48	7.20	4.97	48.0	363	455		10	ND	NS
	Middle	GP-M	3.0	14.55	7.28	4.73	46.6	359	448		10	ND	NS
	Surface	GP-S	0.5	15.00	7.35	4.64	46.5	365	452		ND	ND	2.30
Balch Pond 10/06/16	Tributary	BP-T	0.5	14.86	7.57	2.54	79.0	255	315	Bottom Visible	10	ND	NS
	Deep	BP-D	6.0	14.30	7.22	6.94	68.0	245	308		10	ND	NS
	Middle	BP-M	3.0	14.50	7.36	7.08	75.5	251	308		ND	ND	NS
	Surface	BP-S	0.5	15.96	7.41	8.74	88.6	255	308		10	ND	1.78
Lower Long Pond 10/06/16	Tributary	LLP-T	0.5	14.36	7.55	5.45	55.2	124	156	10	ND	ND	NS
	Deep	LLP-D	20.0	13.00	6.38	0.12	1.20	128	178		ND	ND	NS
	Middle	LLP-M	12.0	15.91	6.77	6.03	61.3	119	143		ND	ND	NS
	Surface	LLP-S	0.5	16.03	7.36	6.24	63.5	119	144		ND	ND	1.05
			2.0	16.05	7.21	6.14	62.1	119	143		NS	NS	NS
			3.5	16.03	7.04	6.06	61.5	119	144		NS	NS	NS
			5.0	16.07	7.04	5.98	60.7	119	143		NS	NS	NS
			6.5	15.98	6.97	5.91	60.2	119	144		NS	NS	NS
			8.0	15.96	6.89	6.00	60.8	119	143		NS	NS	NS
			9.5	15.95	6.81	6.09	61.6	119	144		NS	NS	NS
			11.0	15.92	6.78	6.07	61.4	119	143		NS	NS	NS
			12.5	15.89	6.76	6.05	61.3	119	143		NS	NS	NS
			14.0	15.87	6.72	6.00	60.6	119	143		NS	NS	NS
			15.5	15.89	6.70	5.87	59.3	118	143		NS	NS	NS
			17.0	15.72	6.69	5.80	58.7	118	144		NS	NS	NS
			18.5	13.62	6.47	0.19	1.80	126	158		NS	NS	NS
			20.0	13.00	6.38	0.12	1.20	128	178		NS	NS	NS
Sandy Pond 10/06/16	Tributary	SP-T	0.5	12.63	6.51	1.51	15.1	190	248	9.5	10	ND	NS
	Deep	SP-D	20.0	17.20	7.06	7.11	73.9	194	228		10	ND	NS
	Middle	SP-M	12.0	17.33	7.06	7.30	76.1	194	228		10	ND	NS
	Surface	SP-S	0.5	17.60	6.77	7.71	81.0	195	227		ND	ND	1.68
			2.0	17.59	6.91	7.40	77.6	195	228		NS	NS	NS
			3.5	17.52	6.95	7.34	76.8	194	227		NS	NS	NS
			5.0	17.46	6.97	7.34	76.4	194	227		NS	NS	NS
			6.5	17.43	6.99	7.32	77.0	195	228		NS	NS	NS
			8.0	17.40	7.02	7.32	76.5	194	227		NS	NS	NS
			9.5	17.39	7.02	7.28	75.9	195	228		NS	NS	NS
			11.0	17.36	7.05	7.32	76.2	194	227		NS	NS	NS
			12.5	17.30	7.06	7.28	75.9	193	227		NS	NS	NS
			14.0	17.28	7.05	7.04	73.5	193	227		NS	NS	NS
			15.5	17.25	7.06	7.03	72.9	194	228		NS	NS	NS
			17.0	17.24	7.06	7.05	73.7	193	227		NS	NS	NS
			18.5	17.24	7.06	7.08	73.6	193	227		NS	NS	NS

Ayer Pond Water Quality Monitoring
July 2016

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (7/12/16)	Deep	UFP-D	5.0	20.58	6.50	0.20	2.2	266	291	3.5	30	ND	NS
	Middle	UFP-M	2.5	21.18	6.90	1.33	15.0	255	275		20	ND	NS
	Surface	UFP-S	0.5	21.32	7.24	1.72	19.4	255	274		20	ND	2.37
Flannagan Pond (7/12/16)	Tributary	FP-T	0.5	18.06	6.61	2.01	21.3	257	295	4.5	40	0.43	NS
	Deep	FP-D	4.5	22.49	6.81	3.10	36.2	299	313		10	ND	NS
	Middle	FP-M	2.5	22.56	6.95	3.90	45.0	296	311		10	ND	NS
	Surface	FP-S	0.5	22.66	7.12	4.76	55.1	297	311		20	ND	4.61
Grove Pond (7/12/16)	Tributary	GP-T	0.5	20.32	6.80	0.74	8.2	516	567	5.5	40	ND	NS
	Deep	GP-D	6.0	20.76	6.63	0.14	1.6	433	471		20	ND	NS
	Middle	GP-M	3.0	21.18	6.71	0.80	8.5	445	480		20	ND	NS
	Surface	GP-S	0.5	22.28	7.03	4.9	56.0	465	493		ND	ND	3.04
Balch Pond	Tributary	BP-T	0.5	24.96	7.11	4.46	53.9	309	309	6	30	ND	NS
	Deep	BP-D	6.0	22.68	6.90	1.53	17.7	295	308		ND	ND	NS
	Middle	BP-M	3.0	24.72	7.78	7.21	86.9	303	304		ND	ND	NS
	Surface	BP-S	0.5	24.77	7.89	7.71	92.8	303	304		ND	ND	1.98
Lower Long Pond	Tributary	LLP-T	0.5	26.04	7.13	4.74	58.3	144	141	8	ND	ND	NS
	Deep	LLP-D	23.0	9.81	5.99	-0.06	-0.6	107	150		ND	ND	NS
	Middle	LLP-M	12.0	16.32	6.04	0.05	0.5	116	136		ND	ND	NS
	Surface	LLP-S	0.5	25.71	6.77	6.00	79.6	144	142		ND	ND	1.38
			2.0	25.68	6.70	5.96	73.3	143	141		NS	NS	NS
			3.5	24.38	6.68	5.78	69.7	140	141		NS	NS	NS
			5.0	24.01	6.50	4.93	58.9	160	143		NS	NS	NS
			6.5	22.74	6.39	4.30	50.0	135	140		NS	NS	NS
			8.0	22.14	6.24	2.76	29.5	133	140		NS	NS	NS
			9.5	20.98	6.15	0.92	10.5	130	140		NS	NS	NS
			11.0	18.66	6.10	0.16	1.8	127	137		NS	NS	NS
			12.5	15.71	6.01	0.01	0.1	111	135		NS	NS	NS
			14.0	13.50	6.01	-0.05	-0.5	106	136		NS	NS	NS
			15.5	13.30	6.03	-0.03	-0.3	105	137		NS	NS	NS
			17.0	12.70	5.97	-0.06	-0.6	104	136		NS	NS	NS
			18.5	12.42	5.96	-0.01	-0.1	103	135		NS	NS	NS
			20.0	10.10	6.08	-0.06	-0.6	108	151		NS	NS	NS
Sandy Pond	Tributary	SP-T	0.5	25.44	6.25	6.48	786.0	235	230	11	ND	ND	NS
	Deep	SP-D	20.0	17.50	6.57	0.83	8.8	198	219		ND	ND	NS
	Middle	SP-M	12.0	23.70	7.31	7.22	85.2	217	222		ND	ND	NS
	Surface	SP-S	0.5	25.62	7.19	7.31	89.5	226	223		ND	ND	1.19
			2.0	25.59	7.27	7.42	90.8	226	224		NS	NS	NS
			3.5	25.61	7.30	7.23	88.8	225	223		NS	NS	NS
			5.0	25.64	7.31	7.22	88.4	227	224		NS	NS	NS
			6.5	25.59	7.33	7.24	88.0	226	223		NS	NS	NS
			8.0	24.93	7.35	7.46	90.1	223	223		NS	NS	NS
			9.5	24.01	7.34	7.40	88.0	219	223		NS	NS	NS
			11.0	23.87	7.32	7.27	86.2	218	223		NS	NS	NS
			12.5	23.67	7.31	7.17	84.7	217	222		NS	NS	NS
			14.0	22.82	7.27	7.10	83.2	216	222		NS	NS	NS
			15.5	23.41	7.13	7.07	83.2	215	222		NS	NS	NS
			17.0	20.23	6.98	6.73	75.0	200	217		NS	NS	NS
			18.5	17.41	6.67	0.86	9.1	196	221		NS	NS	NS

Ayer Pond Water Quality Monitoring
August 2015

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.075 (mg/L)	Chlorophyll-a (ug/L)
Pine Meadow (8/25/15)	Deep	UFP-D	5.0	20.4	6.3	3.4	42.0	171	188	N/A	41	<0.1	NS
	Middle	UFP-M	2.5	21.0	6.4	4.3	56.0	174	188		<10	<0.1	NS
	Surface	UFP-S	0.5	23.4	6.4	5.9	68.5	183	190		10	<0.1	5.04
Flannagan Pond (8/25/15)	Tributary	FP-T	0.5	21.0	6.8	5.7	65.2	218	236	4 (BOTTOM)	25	<0.1	NS
	Deep	FP-D	5.0	23.2	6.8	8.0	93.5	234	237		606	0.232	NS
	Middle	FP-M	2.5	23.5	6.9	8.2	96.2	224	228		132	<0.1	NS
	Surface	FP-S	0.5	26.0	7.0	8.2	98.8	230	230		23	<0.1	31.6
Grove Pond (8/26/15)	Tributary	GP-T	0.5	19.4	7.0	3.6	39.9	395	446	5 (BOTTOM)	21	<0.1	NS
	Deep	GP-D	5.0	19.9	6.6	0.5	5.5	329	364		34	<0.1	NS
	Middle	GP-M	2.5	20.1	6.6	2.1	19.9	329	363		18	<0.1	NS
	Surface	GP-S	0.5	22.4	6.9	7.3	84.1	341	360		<10	<0.1	4.82
Balch Pond (8/26/15)	Tributary	BP-T	0.5	23.5	7.0	4.2	49.4	220	227	6 (BOTTOM)	24	<0.1	NS
	Deep	BP-D	6.0	22.4	6.5	3.7	42.7	228	239		39	<0.1	NS
	Middle	BP-M	3.0	22.9	6.6	4.9	56.5	211	220		27	<0.1	NS
	Surface	BP-S	0.5	23.9	6.6	5.5	65.1	216	222		18	<0.1	9.98
Lower Long Pond (8/26/15)	Tributary	LLP-T	0.5	22.9	6.0	2.9	33.3	114	119	8	<10	<0.1	NS
	Deep	LLP-D	23.0	7.5	6.0	1.1	9.1	264	396		18	<0.1	NS
	Middle	LLP-M	12.0	20.2	5.9	0.8	9.4	109	120		14	<0.1	NS
	Surface	LLP-S	0.5	25.0	6.3	6.1	73.5	119	119		<10	<0.1	ND
	LLP		2.0	25.0	6.3	6.7	78.9	120	120		NS	NS	NS
			3.5	24.8	6.3	6.6	79.7	120	120		NS	NS	NS
			5.0	24.2	6.2	6.4	76.4	118	119		NS	NS	NS
			6.5	22.3	6.1	6.5	74.4	112	118		NS	NS	NS
			8.0	21.5	6.0	3.6	35.6	110	118		NS	NS	NS
			9.5	21.0	5.9	2.3	25.0	110	119		NS	NS	NS
			11.0	19.2	5.9	0.5	5.9	108	121		NS	NS	NS
			12.5	17.1	5.8	0.5	5.5	109	129		NS	NS	NS
			14.0	13.3	5.9	0.6	5.2	114	147		NS	NS	NS
			15.5	11.6	6.0	0.5	4.9	122	164		NS	NS	NS
			17.0	9.2	6.1	0.5	4.6	176	249		NS	NS	NS
			18.5	8.4	6.1	0.5	4.6	241	357		NS	NS	NS
			20.0	9.0	6.1	0.5	4.5	171	247		NS	NS	NS
Sandy Pond (8/25/15)	Tributary	SP-T	1.5	20.6	6.10	2.0	NS	NS	NS	10	<10	<0.1	NS
	Deep	SP-D	20.0	11.4	7.10	0.3	4.2	138	176		50	0.318	NS
	Middle	SP-M	12.0	22.4	7.00	6.9	NS	NS	NS		21	<0.1	NS
	Surface	SP-S	0.5	24.9	7.30	8.7	106.1	177	177		<10	<0.1	4.84
	SP		2.0	25.5	7.60	8.7	106.8	176	174		NS	NS	NS
			3.5	25.3	7.60	8.8	107.0	178	175		NS	NS	NS
			5.0	24.7	7.70	9.0	108.3	175	175		NS	NS	NS
			6.5	23.9	7.70	9.3	109.4	169	173		NS	NS	NS
			8.0	23.5	7.50	9.2	108.4	168	174		NS	NS	NS
			9.5	23.3	7.30	9.2	107.1	167	173		NS	NS	NS
			11.0	23.0	7.00	8.9	103.5	167	173		NS	NS	NS
			12.5	22.7	6.50	7.8	90.8	166	174		NS	NS	NS
			14.0	22.0	6.50	4.8	56.4	161	171		NS	NS	NS
			15.5	20.4	6.40	0.5	4.7	154	169		NS	NS	NS
			17.0	18.6	6.60	0.4	3.5	140	170		NS	NS	NS
			18.5	16.5	6.60	0.4	4.1	140	167		NS	NS	NS

Ayer Pond Water Quality Monitoring
May 2016

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (5/12/16)	Deep	UFP-D	5.0	16.81	8.00	9.64	98.6	196	233	N/A	<10	<0.1	NS
	Middle	UFP-M	2.5	16.81	7.96	9.39	97.0	230	194		<10	<0.1	NS
	Surface	UFP-S	0.5	16.82	7.91	9.50	98.2	230	194		<10	<0.1	1.7
Flannagan Pond (5/12/16)	Tributary	FP-T	0.5	14.76	7.10	5.90	58.3	184	228	N/A	<10	<0.1	NS
	Deep	FP-D	5.0	17.01	7.37	8.17	84.7	220	259		<10	<0.1	NS
	Middle	FP-M	2.5	17.13	7.40	8.16	84.7	220	259		<10	<0.1	NS
	Surface	FP-S	0.5	17.21	7.40	8.33	86.7	220	259		<10	<0.1	4.3
Grove Pond (5/12/16)	Tributary	GP-T	0.5	17.60	7.08	7.20	75.4	398	464	N/A	<10	<0.1	NS
	Deep	GP-D	5.0	17.36	7.78	8.08	63.8	370	435		<10	<0.1	NS
	Middle	GP-M	2.5	17.49	7.72	8.79	91.9	373	436		<10	<0.1	NS
	Surface	GP-S	0.5	18.15	7.80	8.87	93.9	383	441		<10	<0.1	1.2
Balch Pond (5/12/16)	Tributary	BP-T	0.5	18.17	7.35	9.26	98.4	229	261	N/A	<10	<0.1	NS
	Deep	BP-D	6.0	15.33	7.43	8.58	86.8	220	270		<10	<0.1	NS
	Middle	BP-M	3.0	17.37	7.25	9.09	94.6	231	270		<10	<0.1	NS
	Surface	BP-S	0.5	18.78	7.30	8.69	93.7	238	270		<10	<0.1	1.5
Lower Long Pond (5/13/16)	Tributary	LLP-T	0.5	17.09	5.89	4.70	48.6	21	25	7	<10	<0.1	NS
	Deep	LLP-D	23.0	8.40	5.93	0.16	1.4	93	136		<10	<0.1	NS
	Middle	LLP-M	12.0	12.26	6.27	7.03	65.6	98	130		<10	<0.1	NS
	Surface	LLP-S	0.5	18.64	6.75	8.56	91.7	114	129		<10	<0.1	0.6
			2.0	18.47	6.73	8.59	91.7	114	130		NS	NS	NS
			3.5	17.65	6.74	9.07	94.9	108	128		NS	NS	NS
			5.0	15.20	6.70	9.29	92.5	104	129		NS	NS	NS
			6.5	14.11	6.60	9.12	88.8	101	128		NS	NS	NS
			8.0	13.58	6.53	8.75	84.1	101	129		NS	NS	NS
			9.5	13.13	6.45	8.49	80.9	99	128		NS	NS	NS
			11.0	12.80	6.37	7.76	73.0	99	129		NS	NS	NS
			12.5	12.75	6.37	8.26	77.7	98	128		NS	NS	NS
			14.0	12.31	6.23	6.81	63.4	98	130		NS	NS	NS
			15.5	10.52	6.03	3.98	35.9	96	132		NS	NS	NS
			17.0	9.61	5.95	2.20	18.8	93	133		NS	NS	NS
			18.5	8.96	5.96	1.56	13.7	93	134		NS	NS	NS
			20.0	8.72	5.99	1.31	11.3	93	135		NS	NS	NS
Sandy Pond (5/13/16)	Tributary	SP-T	1.5	16.64	5.93	3.34	34.1	146	174	10	<10	<0.1	NS
	Deep	SP-D	20.0	11.41	6.33	4.50	40.0	151	203		<10	<0.1	NS
	Middle	SP-M	12.0	13.41	6.97	8.81	85.2	159	203		<10	<0.1	NS
	Surface	SP-S	0.5	17.19	7.08	9.45	98.2	175	206		<10	<0.1	3
			2.0	17.18	7.08	9.51	99.0	174	205		NS	NS	NS
			3.5	17.13	7.07	9.45	98.1	175	206		NS	NS	NS
			5.0	17.05	7.06	9.35	96.7	174	206		NS	NS	NS
			6.5	15.82	7.08	9.64	97.0	166	204		NS	NS	NS
			8.0	14.64	7.10	9.73	95.8	163	204		NS	NS	NS
			9.5	14.16	7.10	9.70	94.4	161	204		NS	NS	NS
			11.0	13.68	7.00	9.32	90.0	159	203		NS	NS	NS
			12.5	13.28	6.95	8.58	82.0	159	204		NS	NS	NS
			14.0	13.16	6.88	8.56	81.6	157	203		NS	NS	NS
			15.5	12.98	6.80	8.40	79.7	157	204		NS	NS	NS
			17.0	12.34	6.83	7.35	69.0	155	204		NS	NS	NS
			18.5	12.80	6.75	8.40	79.5	156	204		NS	NS	NS

Results:

Notes:

1. TSI for Total Phosphorus is based on the pond's average summer surface water concentration. For shallow ponds (Pine Meadow, Flannagan, Balch, and Grove) an average of the surface and middle samples are used. For deep ponds (Sandy and Lower Long) the surface sample result it used. Non-detects are conservatively calculated as at the reporting limit.

		AUGUST 2015 - Carlson TSI Scores					
Parameter	**TSI Relationship**	**Pine Meadow Pond**	**Flannagan Pond**	**Lower Long Pond**	**Sandy Pond**	**Balch Pond**	**Grove Pond**
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	47.2	43.9	51.3	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	46.5	64.5	ND	46.1	53.2	46.0
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	37.4	66.9	37.4	37.4	49.0	42.2

* Secchi disk TSI not available because disk was visible at pond bottom.

ND = Not detected

Oligotrophic Mesotrophic Eutrophic Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	10	77.5	22.5	14

		MAY 2016 - Carlson TSI Scores					
Parameter	**TSI Relationship**	**Pine Meadow Pond**	**Flannagan Pond**	**Lower Long Pond**	**Sandy Pond**	**Balch Pond**	**Grove Pond**
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	49.1	43.9	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	35.8	44.9	25.6	41.4	34.6	32.4
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	37.4	37.4	37.4	37.4	37.4	37.4

* Secchi disk TSI not available because disk was visible at pond bottom.

Oligotrophic Mesotrophic Eutrophic Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	10	10	10	10

		JULY 2016 - Carlson TSI Scores					
Parameter	**TSI Relationship**	**Pine Meadow Pond**	**Flannagan Pond**	**Lower Long Pond**	**Sandy Pond**	**Balch Pond**	**Grove Pond**
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	59.1	NA*	47.2	42.6	NA*	52.6
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	39.1	45.6	33.8	32.3	37.3	41.5
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	47.3	43.2	37.4	37.4	37.4	43.2

* Secchi disk TSI not available because disk was visible at pond bottom.

Oligotrophic Mesotrophic Eutrophic Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	20	15	10	15

		OCTOBER 2016 - Carlson TSI Scores					
Parameter	**TSI Relationship**	**Pine Meadow Pond**	**Flannagan Pond**	**Lower Long Pond**	**Sandy Pond**	**Balch Pond**	**Grove Pond**
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	43.9	44.7	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	ND	ND	31.1	35.7	36.3	38.8
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	37.4	37.4	37.4	37.4	37.4	37.4

* Secchi disk TSI not available because disk was visible at pond bottom.

ND = Not detected

Oligotrophic Mesotrophic Eutrophic Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	10	10	10	10

		MAY 2017 - Carlson TSI Scores					
Parameter	**TSI Relationship**	**Pine Meadow Pond**	**Flannagan Pond**	**Lower Long Pond**	**Sandy Pond**	**Balch Pond**	**Grove Pond**
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	47.2	43.9	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	28.9	NS	34.4	34.4	32.9	ND
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	37.4	NS	37.4	37.4	37.4	37.4

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	10		10	10

* Secchi disk TSI not available because disk was visible at pond bottom.
ND = Not detected Oligotrophic Mesotrophic Eutrophic Hypereutrophic

AUGUST 2017 - Carlson TSI Scores

Parameter	TSI Relationship	Pine Meadow Pond	Flannagan Pond	Lower Long Pond	Sandy Pond	Balch Pond	Grove Pond
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	43.9	43.9	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	29.5	63.8	35.0	31.1	33.5	ND
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	43.2	61.9	37.4	37.4	50.6	37.4

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	15	55	25	10

* Secchi disk TSI not available because disk was visible at pond bottom.
ND = Not detected Oligotrophic Mesotrophic Eutrophic Hypereutrophic

NOVEMBER 2017 - Carlson TSI Scores

Parameter	TSI Relationship	Pine Meadow Pond	Flannagan Pond	Lower Long Pond	Sandy Pond	Balch Pond	Grove Pond
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	47.2	47.2	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	29.5	24.7	41.3	42.2	34.8	29.5
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	37.4	37.4	37.4	37.4	47.3	37.4

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	10	10	20	10

* Secchi disk TSI not available because disk was visible at pond bottom.
ND = Not detected Oligotrophic Mesotrophic Eutrophic Hypereutrophic

JULY 2018 - Carlson TSI Scores

Parameter	TSI Relationship	Pine Meadow Pond	Flannagan Pond	Lower Long Pond	Sandy Pond	Balch Pond	Grove Pond
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	43.9	43.9	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	35.8	38.8	ND	21.6	48.0	35.2
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	47.3	47.3	37.4	37.4	69.0	50.6

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	20	20	90	25

* Secchi disk TSI not available because disk was visible at pond bottom.
ND = Not detected Oligotrophic Mesotrophic Eutrophic Hypereutrophic

MAY 2019 - Carlson TSI Scores

Parameter	TSI Relationship	Pine Meadow Pond	Flannagan Pond	Lower Long Pond	Sandy Pond	Balch Pond	Grove Pond
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	NA*	42.6	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	ND	ND	ND	30.6	ND	ND
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	37.4	37.4	37.4	37.4	37.4	37.4

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	10	10	10	10

* Secchi disk TSI not available because disk was visible at pond bottom.
ND = Not detected Oligotrophic Mesotrophic Eutrophic Hypereutrophic

JULY 2019 - Carlson TSI Scores

Parameter	TSI Relationship	Pine Meadow Pond	Flannagan Pond	Lower Long Pond	Sandy Pond	Balch Pond	Grove Pond
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	57.1	59.1	49.1	45.5	59.1	59.1
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	53.5	50.2	41.5	29.3	49.4	41.9
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	59.0	43.2	37.4	37.4	50.6	50.6

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	45	15	25	25

* Secchi disk TSI not available because disk was visible at pond bottom.
ND = Not detected Oligotrophic Mesotrophic Eutrophic Hypereutrophic

		SEPTEMBER 2019 - Carlson TSI Scores					
Parameter	**TSI Relationship**	**Pine Meadow Pond**	**Flannagan Pond**	**Lower Long Pond**	**Sandy Pond**	**Balch Pond**	**Grove Pond**
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	59.1	NA*	45.5	45.5	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	38.8	23.8	33.2	28.4	28.4	42.0
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	43.2	47.3	37.4	37.4	37.4	37.4

* Secchi disk TSI not available because disk was visible at pond bottom.

ND = Not detected

Oligotrophic | Mesotrophic | Eutrophic | Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	15	20	10	10

Year 1 Annual Report
Massachusetts Small MS4 General Permit
Reporting Period: May 1, 2018-June 30, 2019

Please DO NOT attach any documents to this form. Instead, attach all requested documents to an email when submitting the form

Unless otherwise noted, all fields are required to be filled out. If a field is left blank, it will be assumed the requirement or task has not been completed.

Part I: Contact Information

Name of Municipality or Organization: Town of Ayer

EPA NPDES Permit Number: MAR041179

Primary MS4 Program Manager Contact Information

Name: Mark Wetzel Title: Superintendent of Public Works

Street Address Line 1: 25 Brooks Street

Street Address Line 2: na

City: Ayer State: MA Zip Code: 01432

Email: mwetzel@ayer.ma.us Phone Number: (978) 772-8240

Fax Number: (978) 772-8244

Stormwater Management Program (SWMP) Information

SWMP Location (web address): https://www.ayer.ma.us/stormwater-department/pages/stormwater-management-program

Date SWMP was Last Updated: Jun 28, 2019

If the SWMP is not available on the web please provide the physical address and an explanation of why it is not posted on the web:

na

Part II: Self Assessment

First, in the box below, select the impairment(s) and/or TMDL(s) that are applicable to your MS4.

Impairment(s)

☒ Bacteria/Pathogens ☐ Chloride ☐ Nitrogen ☒ Phosphorus
☒ Solids/ Oil/ Grease (Hydrocarbons)/ Metals

TMDL(s)

In State: ☐ Assabet River Phosphorus ☐ Bacteria and Pathogen ☐ Cape Cod Nitrogen
☐ Charles River Watershed Phosphorus ☐ Lake and Pond Phosphorus

Out of State: ☐ Bacteria/Pathogens ☐ Metals ☐ Nitrogen ☐ Phosphorus

Clear Impairments and TMDLs

Next, check off all requirements below that have been completed. ***By checking each box you are certifying that you have completed that permit requirement fully.*** *If you have not completed a requirement leave the box unchecked. Additional information will be requested in later sections.*

Year 1 Requirements

- ☒ Develop and begin public education and outreach program
- ☒ Identify and develop inventory of all known locations where SSOs have discharged to the MS4 in the last 5 years
  - ○ The SSO inventory is attached to the email submission
  - ◉ The SSO inventory can be found at the following website:

    https://www.ayer.ma.us/stormwater-department/pages/stormwater-management-program
- ☒ Develop written IDDE plan including a procedure for screening and sampling outfalls
- ☒ IDDE ordinance complete
- ☒ Identify each outfall and interconnection discharging from MS4, classify into the relevant category, and priority rank each catchment for investigation
  - ○ The priority ranking of outfalls/interconnections is attached to the email submission
  - ◉ The priority ranking of outfalls/interconnections can be found at the following website:

    https://www.ayer.ma.us/stormwater-department/pages/stormwater-management-program
- ☒ Construction/ Erosion and Sediment Control (ESC) ordinance complete
- ☒ Develop written procedures for site inspections and enforcement of sediment and erosion control measures
- ☒ Develop written procedures for site plan review
- ☒ Keep a log of catch basins cleaned or inspected
- ☒ Complete inspection of all stormwater treatment structures

Annual Requirements

- ☒ Annual opportunity for public participation in review and implementation of SWMP
- ☒ Comply with State Public Notice requirements
- ☒ Keep records relating to the permit available for 5 years and make available to the public
- ☒ Properly store and dispose of catch basin cleanings and street sweepings so they do not discharge to receiving waters
- ☐ Annual training to employees involved in IDDE program
- ☒ All curbed roadways have been swept a minimum of one time per year

Bacteria/ Pathogens (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)

Annual Requirements

*Public Education and Outreach**

- ☐ Annual message encouraging the proper management of pet waste, including noting any existing ordinances where appropriate
- ☒ Permittee or its agents disseminate educational material to dog owners at the time of issuance or renewal of dog license, or other appropriate time
- ☐ Provide information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria

** Public education messages can be combined with other public education requirements as applicable (see Appendix H and F for more information)*

Phosphorus (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)

Annual Requirements

*Public Education and Outreach**

- ☐ Distribute an annual message in the spring (April/May) that encourages the proper use and disposal of grass clippings and encourages the proper use of slow-release and phosphorus-free fertilizers
- ☐ Distribute an annual message in the summer (June/July) encouraging the proper management of pet waste, including noting any existing ordinances where appropriate
- ☐ Distribute an annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter

** Public education messages can be combined with other public education requirements as applicable (see Appendix H and F for more information)*

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

- ☒ Increase street sweeping frequency of all municipal owned streets and parking lots subject to Permit part 2.3.7.a.iii.(c) to a minimum of two times per year (spring and fall)

Potential structural BMPs

- ☐ Any structural BMPs listed in Attachment 3 to Appendix F already existing or installed in the regulated area by the permittee or its agents shall be tracked and the permittee shall estimate the phosphorus removal by the BMP consistent with Attachment 1 to Appendix H. Document the BMP type, total area treated by the BMP, the design storage volume of the BMP and the estimated phosphorus removed in mass per year by the BMP in each each annual report

Solids, Oil and Grease (Hydrocarbons), or Metals

Annual Requirements

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

☒ Increase street sweeping frequency of all municipal owned streets and parking lots to a schedule to target areas with potential for high pollutant loads

☒ Prioritize inspection and maintenance for catch basins to ensure that no sump shall be more than 50 percent full; Clean catch basins more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings

Use the box below to input additional details on any unchecked boxes above or any additional information you would like to share as part of your self assessment:

Annual training to employees involved in the IDDE program was not given during Year 1 because the IDDE Program was being developed. Now that the IDDE Program has been developed, annual training will be implemented in Year 2.

The annual messages regarding proper management of pet waste for Bacteria/Pathogens and Phosphorus have been distributed for Year 2. Messages to septic owners, disposal of grass clippings, and disposal of leaf litter have been scheduled for Year 2.

There are no structural BMPs in the regulated area so no phosphorus removal is estimated.

Part III: Receiving Waters/Impaired Waters/TMDL

Have you made any changes to your lists of receiving waters, outfalls, or impairments since the NOI was submitted?

Yes ☐ No ☒

If yes, describe below, including any relevant impairments or TMDLs:

Part IV: Minimum Control Measures

Please fill out all of the metrics below. If applicable, include in the description who completed the task if completed by a third party.

MCM1: Public Education

Number of educational messages completed during the reporting period: 2

Below, report on the educational messages completed during the first year. For the measurable goal(s) please describe the method/measures used to assess the overall effectiveness of the educational program.

BMP:Business Message 1 of Permit Term

Message Description and Distribution Method:

Brochures/Pamphlets - stormwater educational pamphlets related to grease shall be distributed to restaurant owners.

Targeted Audience: Businesses, institutions and commercial facilities

Responsible Department/Parties: DPW

Measurable Goal(s):

Distribute one pamphlet, inspect storm drainage near restaurants for related pollutants.

Message Date(s): May 2019

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

BMP:Developers Message 1 of Permit Term

Message Description and Distribution Method:

Brochure/Pamphlet - Distribute pamphlet to active developments regarding NPDES requirements for construction sites.

Targeted Audience: Developers (construction)

Responsible Department/Parties: DPW

Measurable Goal(s):

Distribute one Pamphlet and inspect active developments for compliance.

Message Date(s): June 2019

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

Add an Educational Message

MCM2: Public Participation

Describe the opportunity provided for public involvement in the development of the Stormwater Management Program (SWMP) during the reporting period:

Annual review of the stormwater management plan by posting of SWMP on the Towns web-page. Also allowing the public to comment on stormwater management plan annually.

Was this opportunity different than what was proposed in your NOI? Yes ☐ No ☒

Describe any other public involvement or participation opportunities conducted during the reporting period:

Other public involvements and participation opportunities conducted during the reporting period include maintaining the Stormwater Hotline and the annual roadside cleanup called "A Cleaner Ayer". Along with promoting Devens regional household hazardous waste collection and mercury waste collection boxes. The Stormwater Committee is currently being reformed and did not meet during Year 1. The Town Engineer gave a presentation to the Board of Selectmen on June 18, 2019 on the MS4 permit activities conducted in Year 1 and anticipated in Year 2.

MCM3: Illicit Discharge Detection and Elimination (IDDE)

Sanitary Sewer Overflows (SSOs)

Below, report on the number of SSOs identified in the MS4 system and removed during this reporting period.

Number of SSOs identified: 1

Number of SSOs removed: 1

Below, report on the total number of SSOs identified in the MS4 system and removed to date. At a minimum, report SSOs identified since 2013.

Total number of SSOs identified: 2

Total number of SSOs removed: 2

MS4 System Mapping

Describe the status of your MS4 map, including any progress made during the reporting period (phase I map due in year 2):

Phase I of the MS4 map consists of all outfalls and receiving waters, open channel conveyances, interconnections with other MS4s and other storm sewer systems, municipally-owned stormwater treatment structures, water bodies identified by name and indication of all use impairments. Initial catchment delineations are in progress. A final Phase I map will be completed in Year 2.

Screening of Outfalls/Interconnections

If conducted, please submit any outfall monitoring results from this reporting period. Outfall monitoring results should include the date, outfall/interconnection identifier, location, weather conditions at time of sampling, precipitation in previous 48 hours, field screening parameter results, and results from all analyses.

- ○ The outfall screening data is attached to the email submission
- ○ The outfall screening data can be found at the following website:

Below, report on the number of outfalls/interconnections screened during this reporting period.

Number of outfalls screened:

Below, report on the percent of total outfalls/ interconnections screened to date.

Percent of total outfalls screened:

Catchment Investigations

If conducted, please submit all data collected during this reporting period as part of the dry and wet weather investigations. Also include the presence or absence of System Vulnerability Factors for each catchment.

- ○ The catchment investigation data is attached to the email submission
- ○ The catchment investigation data can be found at the following website:

Below, report on the number of catchment investigations completed during this reporting period.

Number of catchment investigations completed this reporting period:

Below, report on the percent of catchments investigated to date.

Percent of total catchments investigated:

Optional: Provide any additional information for clarity regarding the catchment investigations below:

IDDE Progress

If illicit discharges were found, please submit a document describing work conducted over this reporting period, and cumulative to date, including location source; description of the discharge; method of discovery; date of discovery; and date of elimination, mitigation, or enforcement OR planned corrective measures and schedule of removal.

- ○ The illicit discharge removal report is attached to the email submission
- ○ The illicit discharge removal report can be found at the following website:

Below, report on the number of illicit discharges identified and removed, along with the volume of sewage removed during this reporting period.

Number of illicit discharges identified:

Number of illicit discharges removed:

Estimated volume of sewage removed: [UNITS]

Below, report on the total number of illicit discharges identified and removed to date. At a minimum, report on the number of illicit discharges identified and removed since the effective date of the permit.

Total number of illicit discharges identified:

Total number of illicit discharges removed:

Optional: Provide any additional information for clarity regarding illicit discharges identified, removed, or planned to be removed below:

Employee Training

Describe the frequency and type of employee training conducted during the reporting period:

Please see comments in Part II Self Assessment, Annual Requirements on Page 3.

MCM4: Construction Site Stormwater Runoff Control

Below, report on the construction site plan reviews, inspections, and enforcement actions completed during this reporting period.

Number of site plan reviews completed: 3

Number of inspections completed: 10

Number of enforcement actions taken: 1

MCM5: Post-Construction Stormwater Management in New Development and Redevelopment

Ordinance Development

Describe the status of the post-construction ordinance required to be complete in year 2 of the permit term:

The Town will revise its existing bylaws for the new Permit at Spring Town Meeting. A consultant is assisting the Town in review of the existing bylaws and changes required by the new permit.

As-built Drawings

Describe the status of the measures the MS4 has utilized to require the submission of as-built drawings and ensure long term operation and maintenance of completed construction sites required to be complete in year 2 of the permit term:

As-built drawings are required for all subdivisions. Site Plans and ANR lots where stormwater BMPs are implemented require submission of long-term O&M plans. All inspection and maintenance of private drainage is recorded and submitted to the DPW.

Street Design and Parking Lots Report

Describe the status of the street design and parking lots assessment due in year 4 of the permit term, including any planned or completed changes to local regulations and guidelines:

Work for this requirement is anticipated to commence in Year 2.

Green Infrastructure Report

Describe the status of the green infrastructure report due in year 4 of the permit term, including the findings and progress towards making the practice allowable:

Work for this requirement is anticipated to commence in Year 2.

Retrofit Properties Inventory

Describe the status of the inventory, due in year 4 of the permit term, of permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas and report on any properties that have been modified or retrofitted:

Work for this requirement is anticipated to commence in Year 2.

MCM6: Good Housekeeping

Catch Basin Cleaning

Describe the status of the catch basin cleaning optimization plan:

The plan is included as an SOP in the IDDE Plan.

If complete, attach the catch basin cleaning optimization plan or the schedule to gather information to develop the optimization plan:

- ○ The catch basin cleaning optimization plan or schedule is attached to the email submission
- ◉ The catch basin cleaning optimization plan or schedule can be found at the following website:

https://www.ayer.ma.us/stormwater-department/pages/stormwater-management-program

Below, report on the number of catch basins inspected and cleaned, along with the total volume of material removed from the catch basins during this reporting period.

Number of catch basins inspected: 918

Number of catch basins cleaned: 918

Total volume or mass of material removed from all catch basins: 200* tons

Below, report on the total number of catch basins in the MS4 system, if known.

Total number of catch basins: 918

If applicable:

Report on the actions taken if a catch basin sump is more than 50% full during two consecutive routine inspections/cleaning events:

Per the Optimization Plan, the contributing drainage area will be investigated for sources which will be addressed. If no sources are found, the frequency of inspection and cleaning will be increased. Any locations will be identified upon completion of the Year 2 cleaning and inspection.

Street Sweeping

Describe the status of the written procedures for sweeping streets and municipal-owned lots:

A SOP has been included in the SWMP.
*Please note the amount of material removed includes catch basin cleanings and street sweepings.

Report on street sweeping completed during the reporting period using one of the three metrics below.

○ Number of miles cleaned:		
○ Volume of material removed:		tons
◉ Weight of material removed:	200*	tons

If applicable:

For rural uncurbed roadways with no catch basins, describe the progress of the inspection, documentation, and targeted sweeping plan:

Per the SOP, these streets are swept at the same frequencies as other streets.

Winter Road Maintenance

Describe the status of the written procedures for winter road maintenance including the storage of salt and sand:

A SOP has been included in the SWMP and will be implemented for Winter of Year 2.

Inventory of Permittee-Owned Properties

Describe the status of the inventory, due in year 2 of the permit term, of permittee-owned properties, including parks and open spaces, buildings and facilities, and vehicles and equipment, and include any updates:

The inventory is being developed by the DPW. It will be completed in Year 2.

O&M Procedures for Parks and Open Spaces, Buildings and Facilities, and Vehicles and Equipment

Describe the status of the operation and maintenance procedures, due in year 2 of the permit term, of permittee-owned properties (parks and open spaces, buildings and facilities, vehicles and equipment) and include maintenance activities associated with each:

The O&M procedures are being developed by the DPW and will be completed in Year 2.

Stormwater Pollution Prevention Plan (SWPPP)

Describe the status of any SWPPP, due in year 2 of the permit term, for permittee-owned or operated facilities including maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater:

Three SWPPP's are required and are currently under development. This includes the Public Works Yard, Transfer Station, and the Water Department. Two site inspections have taken place at the Transfer Station and the Water Department.

Below, report on the number of site inspections for facilities that require a SWPPP completed during this reporting period.

Number of site inspections completed: 0

Describe any corrective actions taken at a facility with a SWPPP:

O&M Procedures for Stormwater Treatment Structures

Describe the status of the written procedure for stormwater treatment structure maintenance:

The written procedure is included in the SWMP.

Additional Information

Monitoring or Study Results

Results from any other stormwater or receiving water quality monitoring or studies conducted during the reporting period not otherwise mentioned above, where the data is being used to inform permit compliance or permit effectiveness must be attached.

- ○ Not applicable
- ○ The results from additional reports or studies are attached to the email submission
- ◉ The results from additional reports or studies can be found at the following website(s):

https://www.ayer.ma.us/stormwater-department/pages/stormwater-management-program

If such monitoring or studies were conducted on your behalf or if monitoring or studies conducted by other entities were reported to you, a brief description of the type of information gathered or received shall be described below:

Water quality of Long Pond, Sandy Pond, Balch Pond, Grove Pond, Flannagan Pond, and Pine Meadow Pond is monitored in accordance with the "Biological Survey, Assessment and Management Recommendations for

Ayers Ponds" by Geosyntec Consultants. Basic field parameters are collected and lab samples for Total Phosphorus, Ammonia Nitrogen, and Chlorophyll-a.

Additional Information

Optional: Enter any additional information relevant to your stormwater management program implementation during the reporting period. Include any BMP modifications made by the MS4 if not already discussed above:

-The rain gardens at Pirone Park and the Ayer DPW were inspected and maintained. A Youthworks group (High School age students) worked for the DPW in the summer and were educated and assisted with the maintenance of the rain gardens.
-DPW maintains a list of stenciled storm drain locations. In previous years, DPW stenciled and/or marked storm drains for a total of over 800 storm drains. Storm drains will be re-stenciled as needed in Year 2.
-The DPW is completing reconstruction of Prospect and Oak Streets in Fall 2019 with new industry standard drainage (catch basins with sumps).
-The Town submitted a grant for reconstruction of West Main Street. New drainage including LID technologies were included in the proposed concept (deep sump catch basins, green street bumpouts, detention basin).
-The Town is hiring a consultant to design improvements to Groton Shirley Road. Storm drainage improvements will be included in the design. Additionally, sewer extension will be evaluated. This road is near James Brook which has bacteria impairments.
-The Town is providing "enhanced" public education messaging in FY2020, which consists of a social media message distributed each month and geared towards activities that could impact stormwater in the respective season (e.g. leaf litter disposal in October).

Activities Planned for Next Reporting Period

Please confirm that your SWMP has been, or will be, updated to comply with all applicable permit requirements including but not limited to the year 2 requirements summarized below. (Note: impaired waters and TMDL requirements are not listed below)

Yes, I agree ☒

- Complete system mapping Phase I
- Begin investigations of catchments associated with Problem Outfalls
- Develop or modify an ordinance or other regulatory mechanism for post-construction stormwater runoff from new development and redevelopment
- Establish and implement written procedures to require the submission of as-built drawings no later than two years after the completion of construction projects
- Develop, if not already developed, written operations and maintenance procedures
- Develop an inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment; review annually and update as necessary
- Establish a written program detailing the activities and procedures the permittee will implement so that the MS4 infrastructure is maintained in a timely manner
- Develop and implement a written SWPPP for maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater
- Enclose or cover storage piles of salt or piles containing salt used for deicing or other purposes
- Develop, if not already developed, written procedures for sweeping streets and municipal-owned lots
- Develop, if not already developed, written procedures for winter road maintenance including storage of salt and sand

- Develop, if not already developed, a schedule for catch basin cleaning
- Develop, if not already developed, a written procedure for stormwater treatment structure maintenance
- Develop a written catchment investigation procedure *(18 months)*

Annual Requirements

- Annual report submitted and available to the public
- Annual opportunity for public participation in review and implementation of SWMP
- Keep records relating to the permit available for 5 years and make available to the public
- Properly store and dispose of catch basin cleanings and street sweepings so they do not discharge to receiving waters
- Annual training to employees involved in IDDE program
- Update inventory of all known locations where SSOs have discharged to the MS4 in the last 5 years
- Continue public education and outreach program
- Update outfall and interconnection inventory and priority ranking and include data collected in connection with the dry weather screening and other relevant inspections conducted
- Implement IDDE program
- Review site plans of construction sites as part of the construction stormwater runoff control program
- Conduct site inspection of construction sites as necessary
- Inspect and maintain stormwater treatment structures
- Log catch basins cleaned or inspected
- Sweep all uncurbed streets at least annually

Provide any additional details on activities planned for permit year 2 below:

Activities required by Appendix H as identified in the SWMP.
Other required BMPs not listed above but included in the SWMP:
Annual Roadside Cleanup "A Cleaner Ayer"
Maintain the Stormwater Hotline
Promotion of Devens Household Hazaradous Waste Collection
Promotion of Mercury Waste Collection

Part V: Certification of Small MS4 Annual Report 2019

40 CFR 144.32(d) Certification

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 gather and evaluate 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, I certify that 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.

Name:	Daniel Van Schalkwyk	Title:	Town Engineer
Signature:	Dan Van Schalkwyk Digitally signed by Dan Van Schalkwyk Date: 2019.09.25 13:17:46 -04'00'	Date:	09/25/19

[Signatory may be a duly authorized representative]

Pond Monitoring Results

Town of AYER Public Works

Ayer Pond Water Quality Monitoring
May 2021

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (05/13/2021)	Deep	UFP-D	5.0	15.61	6.90	7.46	74.6	167	202	Bottom	20	ND	NS
	Middle	UFP-M	2.5	16.02	7.11	9.90	100.5	165	200		20	0.16	NS
	Surface	UFP-S	0.5	16.67	7.28	10.22	104.5	170	202		20	ND	0.50
Flannagan Pond (05/13/2021)	Tributary	FP-T	0.5	17.61	7.25	9.52	99.4	173	201	Bottom	20	ND	NS
	Deep	FP-D	4.5	16.01	7.05	9.08	91.1	167	202		50	ND	NS
	Middle	FP-M	2.5	16.02	7.21	9.27	93.9	163	197		20	ND	NS
	Surface	FP-S	0.5	16.3	7.31	9.52	97.3	165	197		20	ND	1.50
Grove Pond (05/13/2021)	Tributary	GP-T	0.5	15.76	7.05	8.27	83.2	251	305	Bottom	ND	ND	NS
	Deep	GP-D	6.0	15.80	6.82	9.01	90.5	244	293		10	ND	NS
	Middle	GP-M	3.0	16.11	7.00	8.95	90.9	240	289		10	ND	NS
	Surface	GP-S	0.5	17.01	7.20	9.14	94.4	245	289		ND	ND	ND
Balch Pond (05/13/2021)	Tributary	BP-T	0.5	17.23	7.36	9.08	94.3	177	207	Bottom	20	ND	NS
	Deep	BP-D	6.0	15.96	6.85	8.75	87.5	178	218		20	ND	NS
	Middle	BP-M	3.0	16.04	7.00	9.18	93.0	171	206		20	ND	NS
	Surface	BP-S	0.5	16.86	7.07	9.16	94.3	174	206		20	ND	1.6
Lower Long Pond (05/13/2021)	Tributary	LLP-T	0.5	14.88	7.82	7.99	79.2	44	56	8	ND	ND	NS
	Deep	LLP-D	20.0	7.50	6.41	1.66	12.3	84	127		10	ND	NS
	Middle	LLP-M	12.0	11.61	6.66	5.95	53.0	83	112		20	ND	NS
	Surface	LLP-S	0.5	15.79	7.74	9.50	95.7	85	103		ND	ND	0.7
			2.0	15.58	7.72	9.56	95.9	83	101		NS	NS	NS
			3.5	15.48	7.59	9.42	94.5	83	102		NS	NS	NS
			5.0	15.37	7.50	9.25	91.6	83	102		NS	NS	NS
			6.5	15.09	7.34	8.90	88.3	83	102		NS	NS	NS
			8.0	14.47	7.12	8.50	82.7	83	104		NS	NS	NS
			9.5	13.00	6.94	7.00	66.7	84	109		NS	NS	NS
			11.0	12.19	6.78	6.39	59.1	82	109		NS	NS	NS
			12.5	11.30	6.60	5.24	47.2	83	113		NS	NS	NS
			14.0	10.50	6.54	4.77	42.1	82	113		NS	NS	NS
			15.5	9.71	6.51	3.80	33.0	83	117		NS	NS	NS
			17.0	8.91	6.50	3.10	26.3	81	117		NS	NS	NS
			18.5	8.58	6.45	2.73	23.5	81	118		NS	NS	NS
			20.0	7.50	6.41	1.66	12.3	84	127		NS	NS	NS
Sandy Pond (05/13/2021)	Tributary	SP-T	0.5	14.63	6.95	5.48	53.8	115	143	10	ND	ND	NS
	Deep	SP-D	20.0	12.10	6.68	7.55	70.0	126	168		ND	ND	NS
	Middle	SP-M	12.0	14.42	6.80	9.47	92.7	132	166		ND	ND	NS
	Surface	SP-S	0.5	15.52	6.87	9.93	99.3	135	165		ND	ND	1
			2.0	15.44	7.00	9.85	98.6	135	165		NS	NS	NS
			3.5	15.31	6.97	9.81	97.9	134	164		NS	NS	NS
			5.0	15.22	6.92	9.75	97.0	135	166		NS	NS	NS
			6.5	15.00	6.89	9.76	96.7	133	164		NS	NS	NS
			8.0	14.57	6.86	9.77	95.6	132	165		NS	NS	NS
			9.5	14.51	6.83	9.70	95.0	131	164		NS	NS	NS
			11.0	14.45	6.84	9.83	95.2	131	165		NS	NS	NS
			12.5	13.52	6.83	9.50	90.4	129	165		NS	NS	NS
			14.0	12.71	6.86	9.05	84.9	128	168		NS	NS	NS
			15.5	12.57	6.79	8.72	81.1	218	168		NS	NS	NS
			17.0	12.25	6.75	8.21	75.3	127	168		NS	NS	NS
			18.5	12.18	6.68	7.69	71.5	126	166		NS	NS	NS

NS = Not Sampled
ND = Not Detected

Ayer Pond Water Quality Monitoring
September 2020

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (09/15/2020)	Deep	UFP-D	5.0	19.33	5.52	21.97	236.8	177	197	Bottom	20	ND	NS
	Middle	UFP-M	2.5	19.34	5.64	20.10	216.8	177	198		20	ND	NS
	Surface	UFP-S	0.5	19.41	6.44	14.06	158.0	177	199		ND	ND	ND
Flannagan Pond (09/15/2020)	Tributary	FP-T	0.5	19.38	6.40	18.20	200.2	177	198	Bottom	ND	ND	NS
	Deep	FP-D	4.5	20.43	5.13	18.58	197.8	247	272		40	ND	NS
	Middle	FP-M	2.5	20.75	5.37	4.07	45.3	280	305		20	ND	NS
	Surface	FP-S	0.5	20.53	5.93	22.40	249.6	246	269		20	ND	0.40
Grove Pond (09/15/2020)	Tributary	GP-T	0.5	15.42	5.58	3.39	34.8	438	537	4	30	ND	NS
	Deep	GP-D	6.0	18.39	5.56	9.07	96.9	414	474		30	ND	NS
	Middle	GP-M	3.0	18.52	5.75	11.24	124.5	415	474		20	ND	NS
	Surface	GP-S	0.5	19.06	5.90	16.70	180.6	421	476		10	ND	1.10
Balch Pond (09/15/2020)	Tributary	BP-T	0.5	19.22	5.72	13.21	143.2	236	266	n/a	30	ND	NS
	Deep	BP-D	6.0	19.56	5.00	12.08	138.4	252	280		20	ND	NS
	Middle	BP-M	3.0	19.42	5.15	15.01	163.3	232	259		30	ND	NS
	Surface	BP-S	0.5	19.86	5.67	15.60	173.8	234	260		10	ND	1.9
Lower Long Pond (09/15/2020)	Tributary	LLP-T	0.5	20.73	6.61	19.52	218.1	101	110	9	ND	ND	NS
	Deep	LLP-D	20.0	9.20	5.18	2.54	22.0	139	198		20	ND	NS
	Middle	LLP-M	12.0	17.20	5.19	3.01	32.8	93	112		ND	ND	NS
	Surface	LLP-S	0.5	20.95	7.45	18.33	211.4	99	108		ND	ND	ND
			2.0	20.87	6.63	17.94	201.1	99	108		NS	NS	NS
			3.5	20.81	6.08	18.11	203.2	100	109		NS	NS	NS
			5.0	20.77	5.85	18.01	201.3	99	108		NS	NS	NS
			6.5	20.72	5.65	17.63	197.8	99	107		NS	NS	NS
			8.0	20.69	5.54	17.12	191.0	99	108		NS	NS	NS
			9.5	20.59	5.50	16.71	187.2	100	109		NS	NS	NS
			11.0	18.65	5.29	4.01	45.1	95	108		NS	NS	NS
			12.5	16.70	5.16	2.60	27.6	91	110		NS	NS	NS
			14.0	14.21	5.11	2.44	23.6	88	112		NS	NS	NS
			15.5	11.25	5.26	2.48	22.6	103	140		NS	NS	NS
			17.0	10.34	5.32	2.57	22.8	111	154		NS	NS	NS
			18.5	9.40	5.29	2.56	22.3	127	81		NS	NS	NS
			20.0	9.20	5.18	2.54	22.0	139	198		NS	NS	NS
Sandy Pond (09/15/2020)	Tributary	SP-T	0.5	20.07	5.94	21.26	237.1	179	198	11	10	ND	NS
	Deep	SP-D	20.0	13.17	5.46	2.08	19.9	178	231		ND	ND	NS
	Middle	SP-M	12.0	21.70	5.33	19.05	217.0	175	185		10	ND	NS
	Surface	SP-S	0.5	22.10	6.12	19.92	229.3	175	185		ND	ND	ND
			2.0	21.97	6.18	19.97	228.1	174	184		NS	NS	NS
			3.5	21.91	5.82	19.69	225.5	173	184		NS	NS	NS
			5.0	21.87	5.35	20.03	228.7	174	185		NS	NS	NS
			6.5	21.83	5.26	20.04	229.2	174	185		NS	NS	NS
			8.0	21.81	5.26	19.60	224.1	173	184		NS	NS	NS
			9.5	21.78	5.30	19.64	223.3	173	185		NS	NS	NS
			11.0	21.73	5.32	19.51	223.3	173	185		NS	NS	NS
			12.5	21.60	5.35	18.80	214.0	174	185		NS	NS	NS
			14.0	21.58	5.33	18.77	213.0	172	184		NS	NS	NS
			15.5	18.16	5.31	4.09	45.8	166	191		NS	NS	NS
			17.0	16.58	5.26	2.55	26.2	161	192		NS	NS	NS
			18.5	13.74	5.29	2.19	21.2	156	200		NS	NS	NS

NS = Not Sampled
ND = Not Detected

Ayer Pond Water Quality Monitoring
July 2020

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (07/16/2020)	Deep	UFP-D	5.0	23.34	5.20	3.27	38.4	311	320	3.5	20	ND	NS
	Middle	UFP-M	2.5	24.53	5.65	5.97	73.9	196	198		20	ND	NS
	Surface	UFP-S	0.5	25.06	5.70	6.09	74.0	201	200		30	ND	8.40
Flannagan Pond (07/16/2020)	Tributary	FP-T	0.5	19.73	5.53	14.43	158.9	207	230	4	37	0.59	NS
	Deep	FP-D	4.5	25.80	5.51	3.29	42.9	288	281		20	ND	NS
	Middle	FP-M	2.5	25.84	5.47	8.49	104.9	263	259		ND	ND	NS
	Surface	FP-S	0.5	26.68	5.61	13.58	169.4	267	259		10	ND	4.10
Grove Pond (07/16/2020)	Tributary	GP-T	0.5	21.54	5.25	2.96	33.6	455	487	3	40	ND	NS
	Deep	GP-D	6.0	17.43	5.04	1.56	16.3	580	694		20	ND	NS
	Middle	GP-M	3.0	21.60	5.17	1.62	18.6	423	454		10	ND	NS
	Surface	GP-S	0.5	23.74	5.43	6.86	88.2	434	444		10	ND	5.40
Balch Pond (07/16/2020)	Tributary	BP-T	0.5	25.73	5.47	10.27	126.4	261	258	3.5	11	ND	NS
	Deep	BP-D	6.0	24.81	5.33	2.15	26.3	266	266		60	ND	NS
	Middle	BP-M	3.0	25.55	5.44	9.95	119.7	255	252		20	ND	NS
	Surface	BP-S	0.5	25.90	5.48	8.61	106.2	259	254		20	ND	4
Lower Long Pond (07/16/2020)	Tributary	LLP-T	0.5	25.22	7.73	10.22	121.1	107	107	7	ND	0.31	NS
	Deep	LLP-D	20.0	9.55	6.44	3.03	26.6	109	155		10	ND	NS
	Middle	LLP-M	12.0	10.90	6.35	2.80	23.7	83	115		ND	ND	NS
	Surface	LLP-S	0.5	27.28	7.02	13.65	167.7	108	106		ND	ND	ND
			2.0	25.82	6.89	13.73	173.9	107	106		NS	NS	NS
			3.5	25.76	6.78	11.96	148.1	107	105		NS	NS	NS
			5.0	25.71	6.69	11.52	143.1	108	106		NS	NS	NS
			6.5	24.99	6.44	6.71	80.7	107	107		NS	NS	NS
			8.0	16.39	6.26	2.24	20.9	86	104		NS	NS	NS
			9.5	13.55	6.22	2.38	22.5	83	107		NS	NS	NS
			11.0	11.17	6.29	2.85	26.2	86	117		NS	NS	NS
			12.5	10.46	6.39	2.80	23.9	83	115		NS	NS	NS
			14.0	9.43	6.40	2.35	29.1	88	124		NS	NS	NS
			15.5	9.49	6.39	3.42	29.9	101	144		NS	NS	NS
			17.0	9.51	6.36	2.32	29.5	103	146		NS	NS	NS
			18.5	9.51	6.41	3.14	27.7	109	154		NS	NS	NS
			20.0	9.55	6.44	3.03	26.6	109	155		NS	NS	NS
Sandy Pond (07/16/2020)	Tributary	SP-T	0.5	22.53	5.62	7.88	90.7	224	236	11.5	ND	ND	NS
	Deep	SP-D	20.0	12.60	5.20	4.60	44.8	135	176		ND	ND	NS
	Middle	SP-M	12.0	16.59	6.01	19.07	201.9	139	167		20	ND	NS
	Surface	SP-S	0.5	26.65	6.04	10.74	134.9	189	183		ND	ND	ND
			2.0	26.59	6.11	19.91	248.4	189	184		NS	NS	NS
			3.5	26.51	6.14	19.51	242.9	188	183		NS	NS	NS
			5.0	26.44	6.17	19.41	241.4	190	185		NS	NS	NS
			6.5	26.41	6.16	19.11	238.0	188	183		NS	NS	NS
			8.0	26.36	6.13	18.70	232.3	187	182		NS	NS	NS
			9.5	26.14	6.14	18.72	225.4	187	183		NS	NS	NS
			11.0	21.20	6.11	22.72	252.9	155	169		NS	NS	NS
			12.5	16.42	6.00	18.24	188.2	139	166		NS	NS	NS
			14.0	14.85	5.93	13.10	136.9	137	170		NS	NS	NS
			15.5	13.47	5.86	7.66	77.9	132	170		NS	NS	NS
			17.0	13.48	5.83	6.16	60.1	135	172		NS	NS	NS
			18.5	12.80	5.84	4.80	45.9	135	176		NS	NS	NS

NS = Not Sampled
ND = Not Detected

Ayer Pond Water Quality Monitoring
September 2019

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (09/10/2019)	Deep	UFP-D	5.0	18.47	6.77	0.85	8.9	167	191	3.5	10	0.1	NS
	Middle	UFP-M	2.5	18.56	6.86	1.38	14.8	150	171		20	0.13	NS
	Surface	UFP-S	0.5	18.71	6.95	2.08	22.3	150	171		10	ND	2.30
Flannagan Pond (09/10/2019)	Tributary	FP-T	0.5	18.01	6.70	2.04	21.5	206	237	Bottom	50	0.56	NS
	Deep	FP-D	4.5	20.42	6.71	2.65	29.9	209	230		250	ND	NS
	Middle	FP-M	2.5	20.34	6.78	4.61	50.8	211	232		20	ND	NS
	Surface	FP-S	0.5	20.28	6.84	5.03	55.6	211	232		20	ND	0.50
Grove Pond (09/10/2019)	Tributary	GP-T	0.5	17.93	6.57	2.22	23.2	405	468	Bottom	50	ND	NS
	Deep	GP-D	6.0	18.76	6.64	1.85	22.1	356	404		ND	ND	NS
	Middle	GP-M	3.0	18.77	6.74	2.34	24.7	348	396		ND	ND	NS
	Surface	GP-S	0.5	19.00	6.81	4.84	52.0	350	396		ND	ND	3.20
Balch Pond (09/10/2019)	Tributary	BP-T	0.5	19.55	6.85	4.54	49.1	209	233	Bottom	ND	ND	NS
	Deep	BP-D	6.0	19.76	6.65	2.76	29.9	212	236		20	ND	NS
	Middle	BP-M	3.0	19.73	6.76	5.98	65.9	205	227		10	ND	NS
	Surface	BP-S	0.5	19.81	6.76	6.86	75.3	204	227		10	ND	0.8
Lower Long Pond (09/10/2019)	Tributary	LLP-T	0.5	20.36	8.42	3.01	33.8	98	107	9	ND	ND	NS
	Deep	LLP-D	20.0	9.19	6.21	2.16	19.0	139	201		30	ND	NS
	Middle	LLP-M	12.0	17.20	7.04	1.69	17.3	91	109		ND	ND	NS
	Surface	LLP-S	0.5	20.68	7.75	4.61	51.3	95	104		ND	ND	1.3
			2.0	20.67	7.90	4.40	49.8	95	104		NS	NS	NS
			3.5	20.67	7.67	2.31	25.8	96	105		NS	NS	NS
			5.0	20.68	7.54	2.27	25.2	95	103		NS	NS	NS
			6.5	20.66	7.48	2.26	24.8	96	105		NS	NS	NS
			8.0	20.35	7.36	2.09	22.8	94	104		NS	NS	NS
			9.5	20.19	7.25	2.00	21.9	95	105		NS	NS	NS
			11.0	18.20	7.18	1.97	20.2	90	105		NS	NS	NS
			12.5	16.46	6.96	1.70	17.1	91	112		NS	NS	NS
			14.0	14.80	6.84	1.70	16.5	90	115		NS	NS	NS
			15.5	11.60	6.68	1.81	16.6	107	145		NS	NS	NS
			17.0	10.85	6.51	1.83	16.4	105	146		NS	NS	NS
			18.5	10.11	6.30	1.77	15.8	115	164		NS	NS	NS
			20.0	9.19	6.21	2.16	19.0	139	201		NS	NS	NS
Sandy Pond (09/10/2019)	Tributary	SP-T	0.5	16.58	6.92	1.53	15.4	192	229	9	ND	ND	NS
	Deep	SP-D	20.0	12.10	6.69	0.53	4.9	147	195		ND	ND	NS
	Middle	SP-M	12.0	21.41	7.03	6.91	77.2	165	177		ND	ND	NS
	Surface	SP-S	0.5	21.74	7.04	7.64	86.5	165	176		ND	ND	0.8
			2.0	21.73	7.08	7.53	85.3	166	177		NS	NS	NS
			3.5	21.73	7.07	7.43	84.4	165	177		NS	NS	NS
			5.0	21.72	7.08	7.35	83.7	166	176		NS	NS	NS
			6.5	21.73	7.07	7.35	83.0	166	177		NS	NS	NS
			8.0	21.72	7.06	7.43	84.1	165	176		NS	NS	NS
			9.5	21.64	7.05	7.31	82.5	166	177		NS	NS	NS
			11.0	21.62	7.03	7.34	83.1	164	176		NS	NS	NS
			12.5	21.77	6.98	5.54	55.1	160	177		NS	NS	NS
			14.0	17.93	6.88	0.93	9.3	157	182		NS	NS	NS
			15.5	16.50	6.83	0.68	6.7	150	182		NS	NS	NS
			17.0	13.01	6.80	0.60	5.8	149	185		NS	NS	NS
			18.5	12.80	6.72	0.58	5.3	147	195		NS	NS	NS

Ayer Pond Water Quality Monitoring
July 2019

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (07/11/2019)	Deep	UFP-D	5.0	20.81	6.24	1.45	16.1	314	341	4	140	0.28	NS
	Middle	UFP-M	2.5	22.13	6.48	3.63	32.8	309	328		60	0.1	NS
	Surface	UFP-S	0.5	25.2	6.88	6.60	78.1	174	173		30	ND	10.30
Flannagan Pond (07/11/2019)	Tributary	FP-T	0.5	25.29	6.67	5.07	62.4	184	183	3.5	20	ND	NS
	Deep	FP-D	4.5	26.90	6.45	3.06	37.3	250	241		20	ND	NS
	Middle	FP-M	2.5	26.79	6.51	3.37	42.2	250	241		20	ND	NS
	Surface	FP-S	0.5	27.21	6.73	6.06	75.9	250	240		10	ND	7.38
Grove Pond (07/11/2019)	Tributary	GP-T	0.5	25.57	6.77	4.04	48.7	432	428	3.5	60	ND	NS
	Deep	GP-D	6.0	24.15	6.38	0.52	5.7	357	376		20	ND	NS
	Middle	GP-M	3.0	22.73	6.52	0.55	5.1	356	373		40	0.11	NS
	Surface	GP-S	0.5	23.94	6.67	4.31	52.2	379	379		10	ND	3.18
Balch Pond (07/11/2019)	Tributary	BP-T	0.5	27.6	6.81	3.55	46.2	260	246	3.5	20	ND	NS
	Deep	BP-D	6.0	25.17	6.43	0.20	2.4	304	304		260	0.13	NS
	Middle	BP-M	3.0	25.76	6.56	0.60	7.1	253	249		30	0.12	NS
	Surface	BP-S	0.5	26.81	6.64	3.21	39.1	252	243		20	ND	6.78
Lower Long Pond (07/11/2019)	Tributary	LLP-T	0.5	26.44	8.33	3.91	49.6	103	100	7	ND	ND	NS
	Deep	LLP-D	20.0	8.18	6.27	0.23	1.9	118	173		20	ND	NS
	Middle	LLP-M	12.0	9.20	6.49	0.20	1.8	99	127		20	ND	NS
	Surface	LLP-S	0.5	26.61	7.68	5.83	72.1	102	99		ND	ND	3.05
			2.0	26.61	7.44	5.54	69.0	103	100		NS	NS	NS
			3.5	25.01	7.19	1.86	19.4	89	89		NS	NS	NS
			5.0	19.09	6.95	0.36	3.7	87	99		NS	NS	NS
			6.5	15.79	6.85	0.30	2.8	85	102		NS	NS	NS
			8.0	14.08	6.73	0.24	2.2	81	104		NS	NS	NS
			9.5	11.33	6.68	0.22	2.0	86	114		NS	NS	NS
			11.0	9.91	6.51	0.30	2.0	87	122		NS	NS	NS
			12.5	9.18	6.44	0.28	2.0	93	130		NS	NS	NS
			14.0	8.77	6.33	0.26	2.0	99	144		NS	NS	NS
			15.5	8.41	6.42	0.21	1.8	107	154		NS	NS	NS
			17.0	8.20	6.31	0.21	1.8	115	169		NS	NS	NS
			18.5	8.19	6.28	0.20	1.8	116	170		NS	NS	NS
			20.0	8.18	6.27	0.23	1.9	118	173		NS	NS	NS
Sandy Pond (07/11/2019)	Tributary	SP-T	0.5	22.34	7.28	6.70	72.7	197	208	9	ND	ND	NS
	Deep	SP-D	20.0	10.20	6.18	0.25	2.8	134	181		ND	ND	NS
	Middle	SP-M	12.0	15.60	6.60	2.80	20.7	134	169		ND	ND	NS
	Surface	SP-S	0.5	27.66	7.01	9.77	120.9	185	176		ND	ND	0.88
			2.0	27.53	7.04	8.13	102.1	185	176		NS	NS	NS
			3.5	27.48	7.02	7.80	98.6	185	176		NS	NS	NS
			5.0	27.16	7.00	7.64	96.1	181	174		NS	NS	NS
			6.5	26.16	6.94	7.46	92.0	176	172		NS	NS	NS
			8.0	23.25	6.92	7.42	82.9	154	167		NS	NS	NS
			9.5	19.51	6.87	5.30	61.4	151	167		NS	NS	NS
			11.0	17.02	6.72	2.94	32.8	137	164		NS	NS	NS
			12.5	14.61	6.56	1.42	15.1	134	168		NS	NS	NS
			14.0	13.07	6.51	0.58	5.5	132	171		NS	NS	NS
			15.5	12.48	6.44	0.52	4.3	130	172		NS	NS	NS
			17.0	12.17	6.33	0.51	5.6	131	175		NS	NS	NS
			18.5	11.77	6.25	0.31	2.8	134	180		NS	NS	NS

Ayer Pond Water Quality Monitoring
May 2019

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (05/22/2019)	Deep	UFP-D	5.0	17.96	8.50	9.50	99.9	132	153	Bottom	10	ND	NS
	Middle	UFP-M	2.5	17.54	8.30	8.80	95.6	133	156		ND	ND	NS
	Surface	UFP-S	0.5	18.61	8.50	10.08	104.3	134	154		ND	ND	ND
Flannagan Pond (05/22/2019)	Tributary	FP-T	0.5	18.09	8.39	6.56	70.1	135	156	Bottom	20	ND	NS
	Deep	FP-D	4.5	18.49	8.45	7.63	87.2	171	196		10	ND	NS
	Middle	FP-M	2.5	18.48	8.64	8.74	93.4	168	192		10	ND	NS
	Surface	FP-S	0.5	18.59	8.60	9.24	98.0	168	191		ND	ND	ND
Grove Pond (05/22/2019)	Tributary	GP-T	0.5	16.88	8.02	6.17	65.9	269	318	Bottom	ND	ND	NS
	Deep	GP-D	6.0	18.13	8.01	6.91	73.9	266	306		ND	ND	NS
	Middle	GP-M	3.0	18.21	8.13	7.14	75.8	267	306		ND	ND	NS
	Surface	GP-S	0.5	18.16	8.20	7.19	77.3	268	308		ND	ND	5.00
Balch Pond (05/22/2019)	Tributary	BP-T	0.5	18.2	9.40	8.47	89.8	181	210	Bottom	ND	ND	NS
	Deep	BP-D	6.0	17.78	8.45	2.74	28.5	175	204		20	ND	NS
	Middle	BP-M	3.0	17.92	8.70	7.56	80.0	174	201		10	ND	NS
	Surface	BP-S	0.5	18.20	8.80	7.69	81.5	172	200		ND	ND	ND
Lower Long Pond (05/22/2019)	Tributary	LLP-T	0.5	18.59	8.48	6.45	71.1	26	29	NS	ND	ND	NS
	Deep	LLP-D	20.0	7.69	6.86	0.12	1.0	94	140		ND	ND	NS
	Middle	LLP-M	12.0	10.82	7.09	2.50	22.1	78	107		10	ND	NS
	Surface	LLP-S	0.5	18.16	7.81	8.40	87.1	80	92		ND	ND	ND
			2.0	18.01	7.77	7.90	83.6	80	92		NS	NS	NS
			3.5	17.85	7.72	7.75	81.7	79	92		NS	NS	NS
			5.0	15.75	7.63	6.73	68.7	76	92		NS	NS	NS
			6.5	14.49	7.45	6.33	61.7	73	93		NS	NS	NS
			8.0	13.12	7.33	5.04	53.9	74	96		NS	NS	NS
			9.5	11.90	7.25	4.06	34.8	76	102		NS	NS	NS
			11.0	11.12	7.17	2.66	24.8	78	106		NS	NS	NS
			12.5	10.71	7.11	2.30	21.0	78	107		NS	NS	NS
			14.0	9.87	7.10	1.24	12.2	81	115		NS	NS	NS
			15.5	9.32	6.99	0.79	10.9	82	116		NS	NS	NS
			17.0	8.32	7.04	0.30	2.6	88	129		NS	NS	NS
			18.5	7.70	7.01	0.18	1.5	92	136		NS	NS	NS
			20.0	7.69	6.86	0.12	1.0	94	140		NS	NS	NS
Sandy Pond (05/22/2019)	Tributary	SP-T	0.5	17.89	7.51	4.85	53.2	117	136	11	ND	ND	NS
	Deep	SP-D	20.0	11.07	7.25	3.41	31.3	118	161		ND	ND	NS
	Middle	SP-M	12.0	13.04	7.50	8.61	83.5	125	159		ND	ND	NS
	Surface	SP-S	0.5	17.28	7.54	8.80	92.7	135	159		ND	ND	1
			2.0	17.23	7.51	8.49	88.3	136	159		NS	NS	NS
			3.5	17.19	7.53	8.46	87.6	135	158		NS	NS	NS
			5.0	17.12	7.41	8.45	87.7	135	160		NS	NS	NS
			6.5	17.10	7.49	8.46	87.8	135	159		NS	NS	NS
			8.0	16.62	7.54	8.55	87.6	132	158		NS	NS	NS
			9.5	15.92	7.53	8.49	87.5	130	159		NS	NS	NS
			11.0	14.09	7.57	8.88	87.2	125	157		NS	NS	NS
			12.5	13.61	7.49	8.27	77.3	123	158		NS	NS	NS
			14.0	13.07	7.47	7.43	66.3	123	158		NS	NS	NS
			15.5	12.27	7.44	6.58	65.2	120	159		NS	NS	NS
			17.0	11.40	7.30	4.71	46.1	118	159		NS	NS	NS
			18.5	11.09	7.28	3.93	35.1	119	161		NS	NS	NS

Ayer Pond Water Quality Monitoring
July 2018

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (07/20/2018)	Deep	UFP-D	5.0	23.57	6.72	1.55	18.3	220	226	Bottom	30	ND	NS
	Middle	UFP-M	2.5	23.96	6.92	2.04	24.4	222	226		20	ND	NS
	Surface	UFP-S	0.5	25.15	6.92	2.14	25.9	228	228		20	ND	1.70
Flannagan Pond (07/20/2018)	Tributary	FP-T	0.5	26.67	7.08	5.43	68.0	228	236	Bottom	20	ND	NS
	Deep	FP-D	4.5	25.89	7.21	4.20	52.0	294	299		20	ND	NS
	Middle	FP-M	2.5	25.9	7.34	5.45	67.0	283	290		20	ND	NS
	Surface	FP-S	0.5	27.4	7.34	6.06	76.4	284	296		20	ND	2.30
Grove Pond (07/20/2018)	Tributary	GP-T	0.5	23.89	6.98	1.95	23.1	473	483	Bottom	50	ND	NS
	Deep	GP-D	6.0	22.60	7.10	0.50	6.0	420	440		20	ND	NS
	Middle	GP-M	3.0	23.80	7.27	4.00	50.0	415	423		30	ND	NS
	Surface	GP-S	0.5	26.58	7.27	5.63	69.7	447	487		20	ND	1.60
Balch Pond (07/20/2018)	Tributary	BP-T	0.5	27.65	7.32	4.30	54.0	283	296	Bottom	50	ND	NS
	Deep	BP-D	6.0	24.82	7.05	1.00	14.0	290	291		40	ND	NS
	Middle	BP-M	3.0	24.94	7.19	3.35	40.0	279	279		150	ND	NS
	Surface	BP-S	0.5	25.24	7.20	3.60	44.0	279	281		30	ND	5.9
Lower Long Pond (07/20/2018)	Tributary	LLP-T	0.5	25.62	7.42	4.23	52.0	125	124	10	20	ND	NS
	Deep	LLP-D	20.0	8.07	6.48	0.33	2.8	90	133		40	ND	NS
	Middle	LLP-M	12.0	15.40	6.80	0.38	3.9	100	120		30	ND	NS
	Surface	LLP-S	0.5	25.91	7.11	5.31	65.3	123	126		20	ND	ND
			2.0	25.79	7.09	5.33	65.5	123	125		NS	NS	NS
			3.5	25.69	7.09	5.27	64.3	123	125		NS	NS	NS
			5.0	25.59	7.08	5.20	63.7	124	125		NS	NS	NS
			6.5	25.05	7.02	4.08	45.5	122	123		NS	NS	NS
			8.0	24.14	6.97	3.10	37.0	119	120		NS	NS	NS
			9.5	20.91	6.90	1.74	20.5	114	120		NS	NS	NS
			11.0	17.68	6.82	0.37	4.0	109	120		NS	NS	NS
			12.5	15.07	6.79	0.39	3.9	101	121		NS	NS	NS
			14.0	12.46	6.76	0.41	3.8	92	121		NS	NS	NS
			15.5	11.00	6.69	0.43	3.9	90	122		NS	NS	NS
			17.0	9.53	6.62	0.44	3.9	87	123		NS	NS	NS
			18.5	8.80	6.55	0.39	3.4	89	128		NS	NS	NS
			20.0	8.07	6.48	0.33	2.8	90	133		NS	NS	NS
Sandy Pond (07/20/2018)	Tributary	SP-T	0.5	19.77	7.00	0.77	8.3	214	237	10	20	ND	NS
	Deep	SP-D	20.0	11.52	7.14	3.66	34.6	147	198		ND	ND	NS
	Middle	SP-M	12.0	22.08	7.43	6.81	79.5	200	206		ND	ND	NS
	Surface	SP-S	0.5	26.91	7.37	6.59	82.5	213	221		ND	ND	0.4
			2.0	26.80	7.40	6.63	82.9	215	223		NS	NS	NS
			3.5	26.88	7.41	6.64	82.7	215	222		NS	NS	NS
			5.0	26.95	7.42	6.64	82.4	214	220		NS	NS	NS
			6.5	26.68	7.44	6.54	81.5	215	221		NS	NS	NS
			8.0	26.40	7.45	6.44	80.6	215	221		NS	NS	NS
			9.5	25.65	7.44	6.77	83.1	215	218		NS	NS	NS
			11.0	24.90	7.43	7.09	85.6	214	215		NS	NS	NS
			12.5	21.95	7.42	6.75	77.3	196	207		NS	NS	NS
			14.0	19.00	7.40	6.40	69.0	177	199		NS	NS	NS
			15.5	16.62	7.32	6.09	63.5	166	197		NS	NS	NS
			17.0	14.23	7.24	5.77	58.0	154	194		NS	NS	NS
			18.5	12.88	7.19	4.72	46.3	151	196		NS	NS	NS

Ayer Pond Water Quality Monitoring
November 2017

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (11/03/2017)	Deep	UFP-D	5.0	11.83	6.99	2.75	25.0	127	170	Bottom	30	ND	NS
	Middle	UFP-M	2.5	12.23	7.07	3.97	37.3	133	173		10	ND	NS
	Surface	UFP-S	0.5	12.83	7.06	4.07	38.6	133	173		ND	ND	0.89
Flannagan Pond (11/03/2017)	Tributary	FP-T	0.5	12.47	7.14	7.65	72.0	136	179	Bottom	10	ND	NS
	Deep	FP-D	4.5	13.28	7.20	7.29	70.6	190	245		80	0.21	NS
	Middle	FP-M	2.5	13.27	7.20	7.77	79.2	190	245		10	0.2	NS
	Surface	FP-S	0.5	13.34	7.20	7.80	74.6	190	245		ND	0.62	0.55
Grove Pond (11/03/2017)	Tributary	GP-T	0.5	12.30	7.09	5.60	52.4	223	293	Bottom	10	ND	NS
	Deep	GP-D	6.0	11.50	6.97	2.30	21.1	179	241		170	0.13	NS
	Middle	GP-M	3.0	11.72	7.01	2.60	24.0	186	244		10	ND	NS
	Surface	GP-S	0.5	12.51	6.98	3.24	30.4	186	244		10	ND	0.89
Balch Pond (11/03/2017)	Tributary	BP-T	0.5	15.42	7.22	5.80	58.0	186	229	Bottom	300	ND	NS
	Deep	BP-D	6.0	12.05	7.30	5.85	55.0	173	226		50	ND	NS
	Middle	BP-M	3.0	12.08	7.45	6.90	59.3	173	226		20	ND	NS
	Surface	BP-S	0.5	13.41	7.50	7.20	69.0	175	224		20	ND	1.53
Lower Long Pond (11/03/2017)	Tributary	LLP-T	0.5	13.96	7.35	4.70	45.1	97	122	8	10	ND	NS
	Deep	LLP-D	20.0	Could not reach bottom due to wind							10	ND	NS
	Middle	LLP-M	12.0	13.30	6.70	5.74	55.0	91	118		ND	ND	NS
	Surface	LLP-S	0.5	13.88	6.85	6.44	62.4	91	116		10	ND	2.97
			2.0	13.87	6.72	6.22	64.2	92	117		NS	NS	NS
			3.5	13.84	6.87	6.36	616.0	93	118		NS	NS	NS
			5.0	13.81	6.86	6.45	625.0	90	115		NS	NS	NS
			6.5	13.74	6.88	6.26	59.9	92	118		NS	NS	NS
			8.0	13.58	6.78	6.09	58.8	90	116		NS	NS	NS
			9.5	13.35	6.89	6.03	57.6	90	116		NS	NS	NS
			11.0	13.38	6.84	5.79	55.3	91	118		NS	NS	NS
			12.5	13.24	6.68	5.73	54.7	91	118		NS	NS	NS
			14.0	13.04	6.67	5.36	51.0	91	118		NS	NS	NS
			15.5	12.97	6.57	5.20	49.0	91	118		NS	NS	NS
			17.0	12.95	6.49	4.90	46.0	91	118		NS	NS	NS
			18.5	13.04	6.42	5.20	49.0	91	118		NS	NS	NS
			20.0	8.88	6.59	5.00	50.0	126	180		NS	NS	NS
Sandy Pond (11/03/2017)	Tributary	SP-T	0.5	12.56	7.15	3.58	33.0	119	157	8	20	ND	NS
	Deep	SP-D	20.0	Could not reach bottom due to wind							10	ND	NS
	Middle	SP-M	12.0	14.24	7.23	7.58	73.8	170	212		20	ND	NS
	Surface	SP-S	0.5	14.58	7.20	7.79	76.6	170	213		20	ND	3.26
			2.0	14.57	7.20	7.77	76.3	170	213		NS	NS	NS
			3.5	14.55	7.20	7.75	76.1	170	213		NS	NS	NS
			5.0	14.50	7.20	7.75	76.1	170	212		NS	NS	NS
			6.5	14.47	7.21	7.75	76.2	170	212		NS	NS	NS
			8.0	14.44	7.21	7.70	75.5	170	212		NS	NS	NS
			9.5	14.42	7.21	7.67	75.2	170	212		NS	NS	NS
			11.0	14.30	7.22	7.60	74.0	170	212		NS	NS	NS
			12.5	14.22	7.23	7.55	73.6	170	212		NS	NS	NS
			14.0	14.17	7.22	7.52	73.0	170	212		NS	NS	NS
			15.5	14.15	7.21	7.49	72.7	170	212		NS	NS	NS
			17.0	14.10	7.21	7.45	72.0	170	212		NS	NS	NS
			18.5	14.05	7.20	7.40	70.0	170	212		NS	NS	NS

Ayer Pond Water Quality Monitoring
August 2017

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (08/03/2017)	Deep	UFP-D	5.0	20	6.47	0.35	3.8	211	233	Bottom	20	ND	NS
	Middle	UFP-M	2.5	21.3	6.72	0.45	5.3	161	175		20	ND	NS
	Surface	UFP-S	0.5	22.82	7.01	3.42	40.0	174	182		10	ND	0.89
Flannagan Pond (08/03/2017)	Tributary	FP-T	0.5	22.81	6.87	5.02	58.4	186	194	Bottom	30	0.11	NS
	Deep	FP-D	4.5	25.06	7.04	2.04	24.7	256	257		40	0.10	NS
	Middle	FP-M	2.5	25.42	7.20	3.63	44.0	251	254		50	ND	NS
	Surface	FP-S	0.5	26.23	7.21	6.46	80.1	251	257		60	0.12	29.4
Grove Pond (08/03/2017)	Tributary	GP-T	0.5	23.64	6.80	2.92	34.5	369	379	Bottom	20	ND	NS
	Deep	GP-D	6.0	19.08	6.60	0.35	3.8	301	340		20	ND	NS
	Middle	GP-M	3.0	22.68	7.03	2.60	3.0	352	368		ND	ND	NS
	Surface	GP-S	0.5	23.93	7.12	5.40	64.0	355	362		ND	ND	ND
Balch Pond (08/03/2017)	Tributary	BP-T	0.5	25.77	7.02	3.35	41.0	265	269	Bottom	50	0.13	NS
	Deep	BP-D	6.0	21.80	6.86	1.65	17.2	258	273		30	0.11	NS
	Middle	BP-M	3.0	25.12	6.99	3.27	39.7	257	259		30	0.16	NS
	Surface	BP-S	0.5	26.30	7.00	4.29	53.0	258	265		20	0.24	1.34
Lower Long Pond (08/03/2017)	Tributary	LLP-T	0.5	23.95	7.27	3.08	36.0	117	119	10	40	ND	NS
	Deep	LLP-D	20.0	7.87	5.70	0.30	2.5	104	155		20	0.16	NS
	Middle	LLP-M	12.0	12.75	5.52	0.26	2.5	93	121		20	ND	NS
	Surface	LLP-S	0.5	24.21	6.99	6.00	72.5	107	108		ND	0.13	1.56
			2.0	24.16	6.87	6.21	74.0	107	109		NS	NS	NS
			3.5	23.21	6.75	5.19	60.5	105	109		NS	NS	NS
			5.0	22.30	6.63	5.04	60.6	105	110		NS	NS	NS
			6.5	21.13	6.41	1.53	18.2	99	107		NS	NS	NS
			8.0	18.91	6.36	0.35	3.6	97	108		NS	NS	NS
			9.5	16.30	6.21	0.26	2.6	95	112		NS	NS	NS
			11.0	13.46	5.53	0.24	2.3	93	119		NS	NS	NS
			12.5	12.04	5.50	0.28	2.6	93	123		NS	NS	NS
			14.0	10.68	5.52	0.27	2.3	93	128		NS	NS	NS
			15.5	9.55	5.57	0.27	2.4	97	137		NS	NS	NS
			17.0	8.68	5.60	0.33	2.8	97	141		NS	NS	NS
			18.5	7.90	5.66	0.29	2.5	99	146		NS	NS	NS
			20.0	7.87	5.70	0.30	2.5	104	155		NS	NS	NS
Sandy Pond (08/03/2017)	Tributary	SP-T	0.5	19.75	6.69	0.78	80.0	180	200	10	30	ND	NS
	Deep	SP-D	20.0	10.89	16.72	0.67	6.2	158	216		10	ND	NS
	Middle	SP-M	12.0	20.72	6.90	4.80	50.9	190	204		ND	ND	NS
	Surface	SP-S	0.5	25.34	6.85	7.68	94.0	209	210		ND	ND	1.05
			2.0	25.33	6.94	7.53	91.8	210	211		NS	NS	NS
			3.5	25.26	6.99	7.52	91.6	211	212		NS	NS	NS
			5.0	24.82	7.04	7.68	92.8	207	207		NS	NS	NS
			6.5	24.50	7.09	7.08	93.4	205	207		NS	NS	NS
			8.0	24.05	7.09	7.66	91.4	205	208		NS	NS	NS
			9.5	23.22	7.11	7.51	90.0	200	206		NS	NS	NS
			11.0	22.00	6.96	5.40	61.8	193	205		NS	NS	NS
			12.5	19.44	6.84	4.20	40.0	186	203		NS	NS	NS
			14.0	17.37	6.73	2.98	31.0	176	202		NS	NS	NS
			15.5	15.56	6.66	2.32	22.3	172	206		NS	NS	NS
			17.0	13.53	6.81	1.05	10.0	165	210		NS	NS	NS
			18.5	11.74	6.74	0.77	7.1	159	213		NS	NS	NS

Ayer Pond Water Quality Monitoring
May 2017

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow 5/18/17	Deep	UFP-D	5.0	13.63	7.46	7.91	78.1	167	204	Bottom Visible	20	ND	NS
	Middle	UFP-M	2.5	20.88	7.32	8.00	89.7	193	209		10	ND	NS
	Surface	UFP-S	0.5	21.35	7.63	8.08	91.2	196	211		ND	ND	0.84
Flannagan Pond 5/18/17	Tributary	FP-T	0.5	20.17	7.24	6.07	67.0	193	213	Bottom Visible	10	ND	NS
	Deep	FP-D	4.5	NS	NS	NS	NS	NS	NS		NS	NS	NS
	Middle	FP-M	2.5	NS	NS	NS	NS	NS	NS		NS	NS	NS
	Surface	FP-S	0.5	NS	NS	NS	NS	NS	NS		NS	NS	NS
Grove Pond 5/18/17	Tributary	GP-T	0.5	22.18	6.99	4.83	55.4	340	360	Bottom Visible	20	0.12	NS
	Deep	GP-D	6.0	14.65	7.43	10.10	99.3	281	346		10	ND	NS
	Middle	GP-M	3.0	18.99	7.50	9.42	101.5	304	342		ND	ND	NS
	Surface	GP-S	0.5	22.54	7.64	8.28	96.3	329	345		10	0.11	ND
Balch Pond 5/18/17	Tributary	BP-T	0.5	20.58	7.44	8.56	95.3	228	249	Bottom Visible	10	0.16	NS
	Deep	BP-D	6.0	16.56	7.30	10.42	107.6	220	256		10	0.11	NS
	Middle	BP-M	3.0	18.99	7.18	8.85	95.5	229	254		ND	ND	NS
	Surface	BP-S	0.5	20.56	7.17	8.22	91.5	234	255		ND	0.11	1.26
Lower Long Pond 5/18/17	Tributary	LLP-T	0.5	19.75	6.90	4.65	50.8	19	22	8	10	1.4	NS
	Deep	LLP-D	20.0	9.44	5.93	0.13	1.10	96	137		20	0.22	NS
	Middle	LLP-M	12.0	12.00	6.08	7.21	67.7	85	112		ND	0.14	NS
	Surface	LLP-S	0.5	20.26	7.07	7.77	88.6	95	105		ND	ND	1.47
			2.0	20.24	7.05	7.61	84.2	94	104		NS	NS	NS
			3.5	18.04	7.01	8.03	85.6	96	108		NS	NS	NS
			5.0	15.29	6.97	8.12	81.1	89	107		NS	NS	NS
			6.5	13.34	6.16	7.77	74.2	84	107		NS	NS	NS
			8.0	12.88	6.11	7.68	72.8	84	108		NS	NS	NS
			9.5	12.71	6.07	7.56	71.5	84	108		NS	NS	NS
			11.0	12.51	6.07	7.41	70.3	84	110		NS	NS	NS
			12.5	11.92	6.08	6.80	64.4	85	114		NS	NS	NS
			14.0	9.90	5.91	3.91	35.0	86	119		NS	NS	NS
			15.5	9.58	5.84	2.84	25.0	89	127		NS	NS	NS
			17.0	9.53	5.83	0.60	5.0	95	135		NS	NS	NS
			18.5	9.46	5.91	0.17	1.50	96	137		NS	NS	NS
			20.0	9.44	5.93	0.13	1.10	96	137		NS	NS	NS
Sandy Pond 5/18/17	Tributary	SP-T	0.5	18.85	6.91	3.38	36.5	141	161	10	20	ND	NS
	Deep	SP-D	20.0	11.89	7.00	8.95	72.5	140	195		ND	ND	NS
	Middle	SP-M	12.0	13.46	7.10	9.42	90.6	155	198		ND	ND	NS
	Surface	SP-S	0.5	18.58	7.16	9.37	99.0	175	199		ND	ND	1.47
			2.0	18.57	7.11	8.91	95.3	175	199		NS	NS	NS
			3.5	18.38	7.07	8.87	94.5	175	199		NS	NS	NS
			5.0	18.15	7.08	8.83	93.6	174	200		NS	NS	NS
			6.5	17.00	7.08	9.02	93.7	170	199		NS	NS	NS
			8.0	14.85	7.10	9.47	94.5	164	199		NS	NS	NS
			9.5	14.22	7.10	9.52	93.0	158	198		NS	NS	NS
			11.0	13.61	7.11	9.48	91.5	155	199		NS	NS	NS
			12.5	13.42	7.10	9.38	90.2	156	198		NS	NS	NS
			14.0	13.27	7.10	9.20	88.2	154	198		NS	NS	NS
			15.5	13.58	7.14	9.35	89.8	155	199		NS	NS	NS
			17.0	12.68	7.07	9.13	80.7	149	197		NS	NS	NS
			18.5	12.12	7.03	9.05	77.3	145	196		NS	NS	NS

Ayer Pond Water Quality Monitoring
October 2016

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow 10/06/16	Deep	UFP-D	5.0	14.11	7.02	6.47	63.1	214	270	Bottom Visible	10	ND	NS
	Middle	UFP-M	2.5	14.21	7.14	6.54	64.1	214	270		ND	ND	NS
	Surface	UFP-S	0.5	14.72	7.25	6.63	66.0	218	271		ND	ND	ND
Flannagan Pond 10/06/16	Tributary	FP-T	0.5	15.17	6.70	2.45	24.5	224	275	Bottom Visible	20	ND	NS
	Deep	FP-D	4.5	15.70	7.11	8.40	84.2	258	314		ND	ND	NS
	Middle	FP-M	2.5	15.74	7.15	8.53	86.0	260	315		10	ND	NS
	Surface	FP-S	0.5	16.12	7.18	8.68	88.3	261	315		ND	ND	ND
Grove Pond 10/06/16	Tributary	GP-T	0.5	12.16	6.96	1.77	16.6	449	595	Bottom Visible	30	ND	NS
	Deep	GP-D	6.0	14.48	7.20	4.97	48.0	363	455		10	ND	NS
	Middle	GP-M	3.0	14.55	7.28	4.73	46.6	359	448		10	ND	NS
	Surface	GP-S	0.5	15.00	7.35	4.64	46.5	365	452		ND	ND	2.30
Balch Pond 10/06/16	Tributary	BP-T	0.5	14.86	7.57	2.54	79.0	255	315	Bottom Visible	10	ND	NS
	Deep	BP-D	6.0	14.30	7.22	6.94	68.0	245	308		10	ND	NS
	Middle	BP-M	3.0	14.50	7.36	7.08	75.5	251	308		ND	ND	NS
	Surface	BP-S	0.5	15.96	7.41	8.74	88.6	255	308		10	ND	1.78
Lower Long Pond 10/06/16	Tributary	LLP-T	0.5	14.36	7.55	5.45	55.2	124	156	10	ND	ND	NS
	Deep	LLP-D	20.0	13.00	6.38	0.12	1.20	128	178		ND	ND	NS
	Middle	LLP-M	12.0	15.91	6.77	6.03	61.3	119	143		ND	ND	NS
	Surface	LLP-S	0.5	16.03	7.36	6.24	63.5	119	144		ND	ND	1.05
			2.0	16.05	7.21	6.14	62.1	119	143		NS	NS	NS
			3.5	16.03	7.04	6.06	61.5	119	144		NS	NS	NS
			5.0	16.07	7.04	5.98	60.7	119	143		NS	NS	NS
			6.5	15.98	6.97	5.91	60.2	119	144		NS	NS	NS
			8.0	15.96	6.89	6.00	60.8	119	143		NS	NS	NS
			9.5	15.95	6.81	6.09	61.6	119	144		NS	NS	NS
			11.0	15.92	6.78	6.07	61.4	119	143		NS	NS	NS
			12.5	15.89	6.76	6.05	61.3	119	143		NS	NS	NS
			14.0	15.87	6.72	6.00	60.6	119	143		NS	NS	NS
			15.5	15.89	6.70	5.87	59.3	118	143		NS	NS	NS
			17.0	15.72	6.69	5.80	58.7	118	144		NS	NS	NS
			18.5	13.62	6.47	0.19	1.80	126	158		NS	NS	NS
			20.0	13.00	6.38	0.12	1.20	128	178		NS	NS	NS
Sandy Pond 10/06/16	Tributary	SP-T	0.5	12.63	6.51	1.51	15.1	190	248	9.5	10	ND	NS
	Deep	SP-D	20.0	17.20	7.06	7.11	73.9	194	228		10	ND	NS
	Middle	SP-M	12.0	17.33	7.06	7.30	76.1	194	228		10	ND	NS
	Surface	SP-S	0.5	17.60	6.77	7.71	81.0	195	227		ND	ND	1.68
			2.0	17.59	6.91	7.40	77.6	195	228		NS	NS	NS
			3.5	17.52	6.95	7.34	76.8	194	227		NS	NS	NS
			5.0	17.46	6.97	7.34	76.4	194	227		NS	NS	NS
			6.5	17.43	6.99	7.32	77.0	195	228		NS	NS	NS
			8.0	17.40	7.02	7.32	76.5	194	227		NS	NS	NS
			9.5	17.39	7.02	7.28	75.9	195	228		NS	NS	NS
			11.0	17.36	7.05	7.32	76.2	194	227		NS	NS	NS
			12.5	17.30	7.06	7.28	75.9	193	227		NS	NS	NS
			14.0	17.28	7.05	7.04	73.5	193	227		NS	NS	NS
			15.5	17.25	7.06	7.03	72.9	194	228		NS	NS	NS
			17.0	17.24	7.06	7.05	73.7	193	227		NS	NS	NS
			18.5	17.24	7.06	7.08	73.6	193	227		NS	NS	NS

Ayer Pond Water Quality Monitoring
July 2016

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (7/12/16)	Deep	UFP-D	5.0	20.58	6.50	0.20	2.2	266	291	3.5	30	ND	NS
	Middle	UFP-M	2.5	21.18	6.90	1.33	15.0	255	275		20	ND	NS
	Surface	UFP-S	0.5	21.32	7.24	1.72	19.4	255	274		20	ND	2.37
Flannagan Pond (7/12/16)	Tributary	FP-T	0.5	18.06	6.61	2.01	21.3	257	295	4.5	40	0.43	NS
	Deep	FP-D	4.5	22.49	6.81	3.10	36.2	299	313		10	ND	NS
	Middle	FP-M	2.5	22.56	6.95	3.90	45.0	296	311		10	ND	NS
	Surface	FP-S	0.5	22.66	7.12	4.76	55.1	297	311		20	ND	4.61
Grove Pond (7/12/16)	Tributary	GP-T	0.5	20.32	6.80	0.74	8.2	516	567	5.5	40	ND	NS
	Deep	GP-D	6.0	20.76	6.63	0.14	1.6	433	471		20	ND	NS
	Middle	GP-M	3.0	21.18	6.71	0.80	8.5	445	480		20	ND	NS
	Surface	GP-S	0.5	22.28	7.03	4.9	56.0	465	493		ND	ND	3.04
Balch Pond	Tributary	BP-T	0.5	24.96	7.11	4.46	53.9	309	309	6	30	ND	NS
	Deep	BP-D	6.0	22.68	6.90	1.53	17.7	295	308		ND	ND	NS
	Middle	BP-M	3.0	24.72	7.78	7.21	86.9	303	304		ND	ND	NS
	Surface	BP-S	0.5	24.77	7.89	7.71	92.8	303	304		ND	ND	1.98
Lower Long Pond	Tributary	LLP-T	0.5	26.04	7.13	4.74	58.3	144	141	8	ND	ND	NS
	Deep	LLP-D	23.0	9.81	5.99	-0.06	-0.6	107	150		ND	ND	NS
	Middle	LLP-M	12.0	16.32	6.04	0.05	0.5	116	136		ND	ND	NS
	Surface	LLP-S	0.5	25.71	6.77	6.00	79.6	144	142		ND	ND	1.38
			2.0	25.68	6.70	5.96	73.3	143	141		NS	NS	NS
			3.5	24.38	6.68	5.78	69.7	140	141		NS	NS	NS
			5.0	24.01	6.50	4.93	58.9	160	143		NS	NS	NS
			6.5	22.74	6.39	4.30	50.0	135	140		NS	NS	NS
			8.0	22.14	6.24	2.76	29.5	133	140		NS	NS	NS
			9.5	20.98	6.15	0.92	10.5	130	140		NS	NS	NS
			11.0	18.66	6.10	0.16	1.8	127	137		NS	NS	NS
			12.5	15.71	6.01	0.01	0.1	111	135		NS	NS	NS
			14.0	13.50	6.01	-0.05	-0.5	106	136		NS	NS	NS
			15.5	13.30	6.03	-0.03	-0.3	105	137		NS	NS	NS
			17.0	12.70	5.97	-0.06	-0.6	104	136		NS	NS	NS
			18.5	12.42	5.96	-0.01	-0.1	103	135		NS	NS	NS
			20.0	10.10	6.08	-0.06	-0.6	108	151		NS	NS	NS
Sandy Pond	Tributary	SP-T	0.5	25.44	6.25	6.48	786.0	235	230	11	ND	ND	NS
	Deep	SP-D	20.0	17.50	6.57	0.83	8.8	198	219		ND	ND	NS
	Middle	SP-M	12.0	23.70	7.31	7.22	85.2	217	222		ND	ND	NS
	Surface	SP-S	0.5	25.62	7.19	7.31	89.5	226	223		ND	ND	1.19
			2.0	25.59	7.27	7.42	90.8	226	224		NS	NS	NS
			3.5	25.61	7.30	7.23	88.8	225	223		NS	NS	NS
			5.0	25.64	7.31	7.22	88.4	227	224		NS	NS	NS
			6.5	25.59	7.33	7.24	88.0	226	223		NS	NS	NS
			8.0	24.93	7.35	7.46	90.1	223	223		NS	NS	NS
			9.5	24.01	7.34	7.40	88.0	219	223		NS	NS	NS
			11.0	23.87	7.32	7.27	86.2	218	223		NS	NS	NS
			12.5	23.67	7.31	7.17	84.7	217	222		NS	NS	NS
			14.0	22.82	7.27	7.10	83.2	216	222		NS	NS	NS
			15.5	23.41	7.13	7.07	83.2	215	222		NS	NS	NS
			17.0	20.23	6.98	6.73	75.0	200	217		NS	NS	NS
			18.5	17.41	6.67	0.86	9.1	196	221		NS	NS	NS

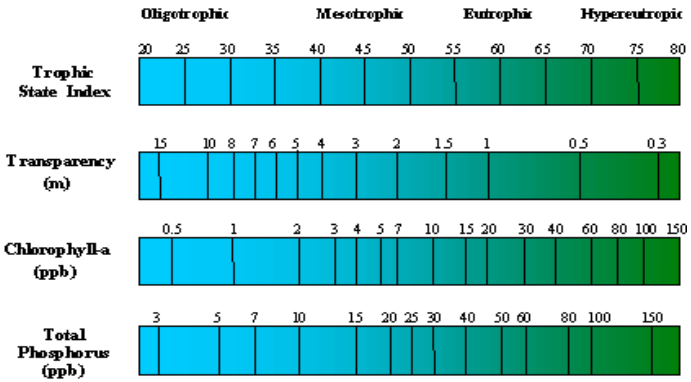
Ayer Pond Water Quality Monitoring
August 2015

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.075 (mg/L)	Chlorophyll-a (ug/L)
Pine Meadow (8/25/15)	Deep	UFP-D	5.0	20.4	6.3	3.4	42.0	171	188	N/A	41	<0.1	NS
	Middle	UFP-M	2.5	21.0	6.4	4.3	56.0	174	188		<10	<0.1	NS
	Surface	UFP-S	0.5	23.4	6.4	5.9	68.5	183	190		10	<0.1	5.04
Flannagan Pond (8/25/15)	Tributary	FP-T	0.5	21.0	6.8	5.7	65.2	218	236	4 (BOTTOM)	25	<0.1	NS
	Deep	FP-D	5.0	23.2	6.8	8.0	93.5	234	237		606	0.232	NS
	Middle	FP-M	2.5	23.5	6.9	8.2	96.2	224	228		132	<0.1	NS
	Surface	FP-S	0.5	26.0	7.0	8.2	98.8	230	230		23	<0.1	31.6
Grove Pond (8/26/15)	Tributary	GP-T	0.5	19.4	7.0	3.6	39.9	395	446	5 (BOTTOM)	21	<0.1	NS
	Deep	GP-D	5.0	19.9	6.6	0.5	5.5	329	364		34	<0.1	NS
	Middle	GP-M	2.5	20.1	6.6	2.1	19.9	329	363		18	<0.1	NS
	Surface	GP-S	0.5	22.4	6.9	7.3	84.1	341	360		<10	<0.1	4.82
Balch Pond (8/26/15)	Tributary	BP-T	0.5	23.5	7.0	4.2	49.4	220	227	6 (BOTTOM)	24	<0.1	NS
	Deep	BP-D	6.0	22.4	6.5	3.7	42.7	228	239		39	<0.1	NS
	Middle	BP-M	3.0	22.9	6.6	4.9	56.5	211	220		27	<0.1	NS
	Surface	BP-S	0.5	23.9	6.6	5.5	65.1	216	222		18	<0.1	9.98
Lower Long Pond (8/26/15)	Tributary	LLP-T	0.5	22.9	6.0	2.9	33.3	114	119	8	<10	<0.1	NS
	Deep	LLP-D	23.0	7.5	6.0	1.1	9.1	264	396		18	<0.1	NS
	Middle	LLP-M	12.0	20.2	5.9	0.8	9.4	109	120		14	<0.1	NS
	Surface	LLP-S	0.5	25.0	6.3	6.1	73.5	119	119		<10	<0.1	ND
	LLP		2.0	25.0	6.3	6.7	78.9	120	120		NS	NS	NS
			3.5	24.8	6.3	6.6	79.7	120	120		NS	NS	NS
			5.0	24.2	6.2	6.4	76.4	118	119		NS	NS	NS
			6.5	22.3	6.1	6.5	74.4	112	118		NS	NS	NS
			8.0	21.5	6.0	3.6	35.6	110	118		NS	NS	NS
			9.5	21.0	5.9	2.3	25.0	110	119		NS	NS	NS
			11.0	19.2	5.9	0.5	5.9	108	121		NS	NS	NS
			12.5	17.1	5.8	0.5	5.5	109	129		NS	NS	NS
			14.0	13.3	5.9	0.6	5.2	114	147		NS	NS	NS
			15.5	11.6	6.0	0.5	4.9	122	164		NS	NS	NS
			17.0	9.2	6.1	0.5	4.6	176	249		NS	NS	NS
			18.5	8.4	6.1	0.5	4.6	241	357		NS	NS	NS
			20.0	9.0	6.1	0.5	4.5	171	247		NS	NS	NS
Sandy Pond (8/25/15)	Tributary	SP-T	1.5	20.6	6.10	2.0	NS	NS	NS	10	<10	<0.1	NS
	Deep	SP-D	20.0	11.4	7.10	0.3	4.2	138	176		50	0.318	NS
	Middle	SP-M	12.0	22.4	7.00	6.9	NS	NS	NS		21	<0.1	NS
	Surface	SP-S	0.5	24.9	7.30	8.7	106.1	177	177		<10	<0.1	4.84
	SP		2.0	25.5	7.60	8.7	106.8	176	174		NS	NS	NS
			3.5	25.3	7.60	8.8	107.0	178	175		NS	NS	NS
			5.0	24.7	7.70	9.0	108.3	175	175		NS	NS	NS
			6.5	23.9	7.70	9.3	109.4	169	173		NS	NS	NS
			8.0	23.5	7.50	9.2	108.4	168	174		NS	NS	NS
			9.5	23.3	7.30	9.2	107.1	167	173		NS	NS	NS
			11.0	23.0	7.00	8.9	103.5	167	173		NS	NS	NS
			12.5	22.7	6.50	7.8	90.8	166	174		NS	NS	NS
			14.0	22.0	6.50	4.8	56.4	161	171		NS	NS	NS
			15.5	20.4	6.40	0.5	4.7	154	169		NS	NS	NS
			17.0	18.6	6.60	0.4	3.5	140	170		NS	NS	NS
			18.5	16.5	6.60	0.4	4.1	140	167		NS	NS	NS

Ayer Pond Water Quality Monitoring
May 2016

POND (Sampling Date)	SAMPLE LOCATION	SAMPLE ID	Depth (ft)	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Conductivity (uS/cm)	Conductivity (uS/cm3)	Secchi Disk (ft)	Total Phosphorus RL=10 (ug/L)	Ammonia Nitrogen RL=0.1 (mg/L)	Chlorophyll-a RL=0.3 (ug/L)
Pine Meadow (5/12/16)	Deep	UFP-D	5.0	16.81	8.00	9.64	98.6	196	233	N/A	<10	<0.1	NS
	Middle	UFP-M	2.5	16.81	7.96	9.39	97.0	230	194		<10	<0.1	NS
	Surface	UFP-S	0.5	16.82	7.91	9.50	98.2	230	194		<10	<0.1	1.7
Flannagan Pond (5/12/16)	Tributary	FP-T	0.5	14.76	7.10	5.90	58.3	184	228	N/A	<10	<0.1	NS
	Deep	FP-D	5.0	17.01	7.37	8.17	84.7	220	259		<10	<0.1	NS
	Middle	FP-M	2.5	17.13	7.40	8.16	84.7	220	259		<10	<0.1	NS
	Surface	FP-S	0.5	17.21	7.40	8.33	86.7	220	259		<10	<0.1	4.3
Grove Pond (5/12/16)	Tributary	GP-T	0.5	17.60	7.08	7.20	75.4	398	464	N/A	<10	<0.1	NS
	Deep	GP-D	5.0	17.36	7.78	8.08	63.8	370	435		<10	<0.1	NS
	Middle	GP-M	2.5	17.49	7.72	8.79	91.9	373	436		<10	<0.1	NS
	Surface	GP-S	0.5	18.15	7.80	8.87	93.9	383	441		<10	<0.1	1.2
Balch Pond (5/12/16)	Tributary	BP-T	0.5	18.17	7.35	9.26	98.4	229	261	N/A	<10	<0.1	NS
	Deep	BP-D	6.0	15.33	7.43	8.58	86.8	220	270		<10	<0.1	NS
	Middle	BP-M	3.0	17.37	7.25	9.09	94.6	231	270		<10	<0.1	NS
	Surface	BP-S	0.5	18.78	7.30	8.69	93.7	238	270		<10	<0.1	1.5
Lower Long Pond (5/13/16)	Tributary	LLP-T	0.5	17.09	5.89	4.70	48.6	21	25	7	<10	<0.1	NS
	Deep	LLP-D	23.0	8.40	5.93	0.16	1.4	93	136		<10	<0.1	NS
	Middle	LLP-M	12.0	12.26	6.27	7.03	65.6	98	130		<10	<0.1	NS
	Surface	LLP-S	0.5	18.64	6.75	8.56	91.7	114	129		<10	<0.1	0.6
			2.0	18.47	6.73	8.59	91.7	114	130		NS	NS	NS
			3.5	17.65	6.74	9.07	94.9	108	128		NS	NS	NS
			5.0	15.20	6.70	9.29	92.5	104	129		NS	NS	NS
			6.5	14.11	6.60	9.12	88.8	101	128		NS	NS	NS
			8.0	13.58	6.53	8.75	84.1	101	129		NS	NS	NS
			9.5	13.13	6.45	8.49	80.9	99	128		NS	NS	NS
			11.0	12.80	6.37	7.76	73.0	99	129		NS	NS	NS
			12.5	12.75	6.37	8.26	77.7	98	128		NS	NS	NS
			14.0	12.31	6.23	6.81	63.4	98	130		NS	NS	NS
			15.5	10.52	6.03	3.98	35.9	96	132		NS	NS	NS
			17.0	9.61	5.95	2.20	18.8	93	133		NS	NS	NS
			18.5	8.96	5.96	1.56	13.7	93	134		NS	NS	NS
			20.0	8.72	5.99	1.31	11.3	93	135		NS	NS	NS
Sandy Pond (5/13/16)	Tributary	SP-T	1.5	16.64	5.93	3.34	34.1	146	174	10	<10	<0.1	NS
	Deep	SP-D	20.0	11.41	6.33	4.50	40.0	151	203		<10	<0.1	NS
	Middle	SP-M	12.0	13.41	6.97	8.81	85.2	159	203		<10	<0.1	NS
	Surface	SP-S	0.5	17.19	7.08	9.45	98.2	175	206		<10	<0.1	3
			2.0	17.18	7.08	9.51	99.0	174	205		NS	NS	NS
			3.5	17.13	7.07	9.45	98.1	175	206		NS	NS	NS
			5.0	17.05	7.06	9.35	96.7	174	206		NS	NS	NS
			6.5	15.82	7.08	9.64	97.0	166	204		NS	NS	NS
			8.0	14.64	7.10	9.73	95.8	163	204		NS	NS	NS
			9.5	14.16	7.10	9.70	94.4	161	204		NS	NS	NS
			11.0	13.68	7.00	9.32	90.0	159	203		NS	NS	NS
			12.5	13.28	6.95	8.58	82.0	159	204		NS	NS	NS
			14.0	13.16	6.88	8.56	81.6	157	203		NS	NS	NS
			15.5	12.98	6.80	8.40	79.7	157	204		NS	NS	NS
			17.0	12.34	6.83	7.35	69.0	155	204		NS	NS	NS
			18.5	12.80	6.75	8.40	79.5	156	204		NS	NS	NS

Oligotrophic - Low biological productivity. Oligotrophic lakes are very low in nutrients and algae, and typically have high water clarity and a nutrient-poor inorganic substrate. Oligotrophic lakes can produce and support relatively small populations of organisms (plants, fish, and wildlife). If the water body is thermally stratified, hypolimnetic (deep water) oxygen is usually abundant.
Mesotrophic - Moderate biological productivity and moderate water clarity. A mesotrophic water body is capable of producing and supporting moderate populations of living organisms (plant, fish, and wildlife). Mesotrophic water bodies may begin to exhibit periodic algae blooms and other symptoms of increased nutrient enrichment and biological productivity.
Eutrophic - High biologically productivity due to relatively high rates of nutrient input and nutrientrich organic sediments. Eutrophic lakes typically exhibit periods of oxygen deficiency and reduced water clarity. Nuisance levels of macrophytes and algae may result in recreational impairments.
Hypereutrophic - Dense growth of algae through summer. Dense macrophyte beds, but growthmay be light-limited due to dense algae and low water clarity. Summer fish kills are possible.



Carlson Scientific Publication:
http://onlinelibrary.wiley.com/doi/10.4319/lo.1977.22.2.0361/pdf

Trophic Status	TSI	TP[1] (ppb)	Secchi Disk (m)	Chl-a[2] (ppb)
Oligotrophic	<40	<12	>4	<2.6
Mesotrophic	40-50	12-24	4-2	2.6-7.3
Eutrophic	51-70	25-96	2-0.5	7.4-56
Hypereutrophic	>70	>96	<0.5	>56

1. For TP, ppb = ug/L
2. For Chl-a, ppb = mg/m3

Results:
Notes:
1. TSI for Total Phosphorus is based on the pond's average summer surface water concentration. For shallow ponds (Pine Meadow, Flannagan, Balch, and Grove) an average of the surface and middle samples are used. For deep ponds (Sandy and Lower Long) the surface sample result it used. Non-detects are conservatively calculated as at the reporting limit.

		AUGUST 2015 - Carlson TSI Scores					
Parameter	**TSI Relationship**	**Pine Meadow Pond**	**Flannagan Pond**	**Lower Long Pond**	**Sandy Pond**	**Balch Pond**	**Grove Pond**
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	47.2	43.9	51.3	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	46.5	64.5	ND	46.1	53.2	46.0
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	37.4	66.9	37.4	37.4	49.0	42.2

* Secchi disk TSI not available because disk was visible at pond bottom.
ND = Not detected
Oligotrophic Mesotrophic Eutrophic Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	10	77.5	22.5	14

		MAY 2016 - Carlson TSI Scores					
Parameter	**TSI Relationship**	**Pine Meadow Pond**	**Flannagan Pond**	**Lower Long Pond**	**Sandy Pond**	**Balch Pond**	**Grove Pond**
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	49.1	43.9	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	35.8	44.9	25.6	41.4	34.6	32.4
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	37.4	37.4	37.4	37.4	37.4	37.4

* Secchi disk TSI not available because disk was visible at pond bottom.
Oligotrophic Mesotrophic Eutrophic Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	10	10	10	10

		JULY 2016 - Carlson TSI Scores					
Parameter	**TSI Relationship**	**Pine Meadow Pond**	**Flannagan Pond**	**Lower Long Pond**	**Sandy Pond**	**Balch Pond**	**Grove Pond**
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	59.1	NA*	47.2	42.6	NA*	52.6
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	39.1	45.6	33.8	32.3	37.3	41.5
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	47.3	43.2	37.4	37.4	37.4	43.2

* Secchi disk TSI not available because disk was visible at pond bottom.

Oligotrophic Mesotrophic Eutrophic Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	20	15	10	15

	OCTOBER 2016 - Carlson TSI Scores					
Parameter	**TSI Relationship**	**Pine Meadow Pond**	**Flannagan Pond**	**Lower Long Pond**	**Sandy Pond**	**Balch Pond**	**Grove Pond**
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	43.9	44.7	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	ND	ND	31.1	35.7	36.3	38.8
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	37.4	37.4	37.4	37.4	37.4	37.4

* Secchi disk TSI not available because disk was visible at pond bottom.

ND = Not detected

Oligotrophic Mesotrophic Eutrophic Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	10	10	10	10

	MAY 2017 - Carlson TSI Scores					
Parameter	**TSI Relationship**	**Pine Meadow Pond**	**Flannagan Pond**	**Lower Long Pond**	**Sandy Pond**	**Balch Pond**	**Grove Pond**
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	47.2	43.9	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	28.9	NS	34.4	34.4	32.9	ND
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	37.4	NS	37.4	37.4	37.4	37.4

* Secchi disk TSI not available because disk was visible at pond bottom.

ND = Not detected

Oligotrophic Mesotrophic Eutrophic Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	10		10	10

	AUGUST 2017 - Carlson TSI Scores					
Parameter	**TSI Relationship**	**Pine Meadow Pond**	**Flannagan Pond**	**Lower Long Pond**	**Sandy Pond**	**Balch Pond**	**Grove Pond**
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	43.9	43.9	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	29.5	63.8	35.0	31.1	33.5	ND
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	43.2	61.9	37.4	37.4	50.6	37.4

* Secchi disk TSI not available because disk was visible at pond bottom.

ND = Not detected

Oligotrophic Mesotrophic Eutrophic Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	15	55	25	10

	NOVEMBER 2017 - Carlson TSI Scores					
Parameter	**TSI Relationship**	**Pine Meadow Pond**	**Flannagan Pond**	**Lower Long Pond**	**Sandy Pond**	**Balch Pond**	**Grove Pond**
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	47.2	47.2	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	29.5	24.7	41.3	42.2	34.8	29.5
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	37.4	37.4	37.4	37.4	47.3	37.4

* Secchi disk TSI not available because disk was visible at pond bottom.

ND = Not detected

Oligotrophic Mesotrophic Eutrophic Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	10	10	20	10

	JULY 2018 - Carlson TSI Scores					
Parameter	**TSI Relationship**	**Pine Meadow Pond**	**Flannagan Pond**	**Lower Long Pond**	**Sandy Pond**	**Balch Pond**	**Grove Pond**
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	43.9	43.9	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	35.8	38.8	ND	21.6	48.0	35.2
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	47.3	47.3	37.4	37.4	69.0	50.6

* Secchi disk TSI not available because disk was visible at pond bottom.

ND = Not detected

Oligotrophic Mesotrophic Eutrophic Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	20	20	90	25

MAY 2019 - Carlson TSI Scores

Parameter	TSI Relationship	Pine Meadow Pond	Flannagan Pond	Lower Long Pond	Sandy Pond	Balch Pond	Grove Pond
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	NA*	42.6	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	ND	ND	ND	30.6	ND	ND
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	37.4	37.4	37.4	37.4	37.4	37.4

* Secchi disk TSI not available because disk was visible at pond bottom.
ND = Not detected

Oligotrophic | Mesotrophic | Eutrophic | Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	10	10	10	10

JULY 2019 - Carlson TSI Scores

Parameter	TSI Relationship	Pine Meadow Pond	Flannagan Pond	Lower Long Pond	Sandy Pond	Balch Pond	Grove Pond
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	57.1	59.1	49.1	45.5	59.1	59.1
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	53.5	50.2	41.5	29.3	49.4	41.9
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	59.0	43.2	37.4	37.4	50.6	50.6

* Secchi disk TSI not available because disk was visible at pond bottom.
ND = Not detected

Oligotrophic | Mesotrophic | Eutrophic | Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	45	15	25	25

SEPTEMBER 2019 - Carlson TSI Scores

Parameter	TSI Relationship	Pine Meadow Pond	Flannagan Pond	Lower Long Pond	Sandy Pond	Balch Pond	Grove Pond
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	59.1	NA*	45.5	45.5	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	38.8	23.8	33.2	28.4	28.4	42.0
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	43.2	47.3	37.4	37.4	37.4	37.4

* Secchi disk TSI not available because disk was visible at pond bottom.
ND = Not detected

Oligotrophic | Mesotrophic | Eutrophic | Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	15	20	10	10

JULY 2020 - Carlson TSI Scores

Parameter	TSI Relationship	Pine Meadow Pond	Flannagan Pond	Lower Long Pond	Sandy Pond	Balch Pond	Grove Pond
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	59.1	57.1	49.1	41.9	59.1	61.3
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	51.5	44.4	18.8	18.8	44.2	47.1
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	50.6	27.4	37.4	37.4	47.3	37.4

* Secchi disk TSI not available because disk was visible at pond bottom.
ND = Not detected

Oligotrophic | Mesotrophic | Eutrophic | Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	25	5	20	10

SEPTEMBER 2020 - Carlson TSI Scores

Parameter	TSI Relationship	Pine Meadow Pond	Flannagan Pond	Lower Long Pond	Sandy Pond	Balch Pond	Grove Pond
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	45.5	42.6	NA*	57.1
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	ND	21.6	ND	ND	36.9	31.5
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	37.4	47.3	37.4	27.4	47.3	43.2

* Secchi disk TSI not available because disk was visible at pond bottom.
ND = Not detected

Oligotrophic | Mesotrophic | Eutrophic | Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	10	20	20	15

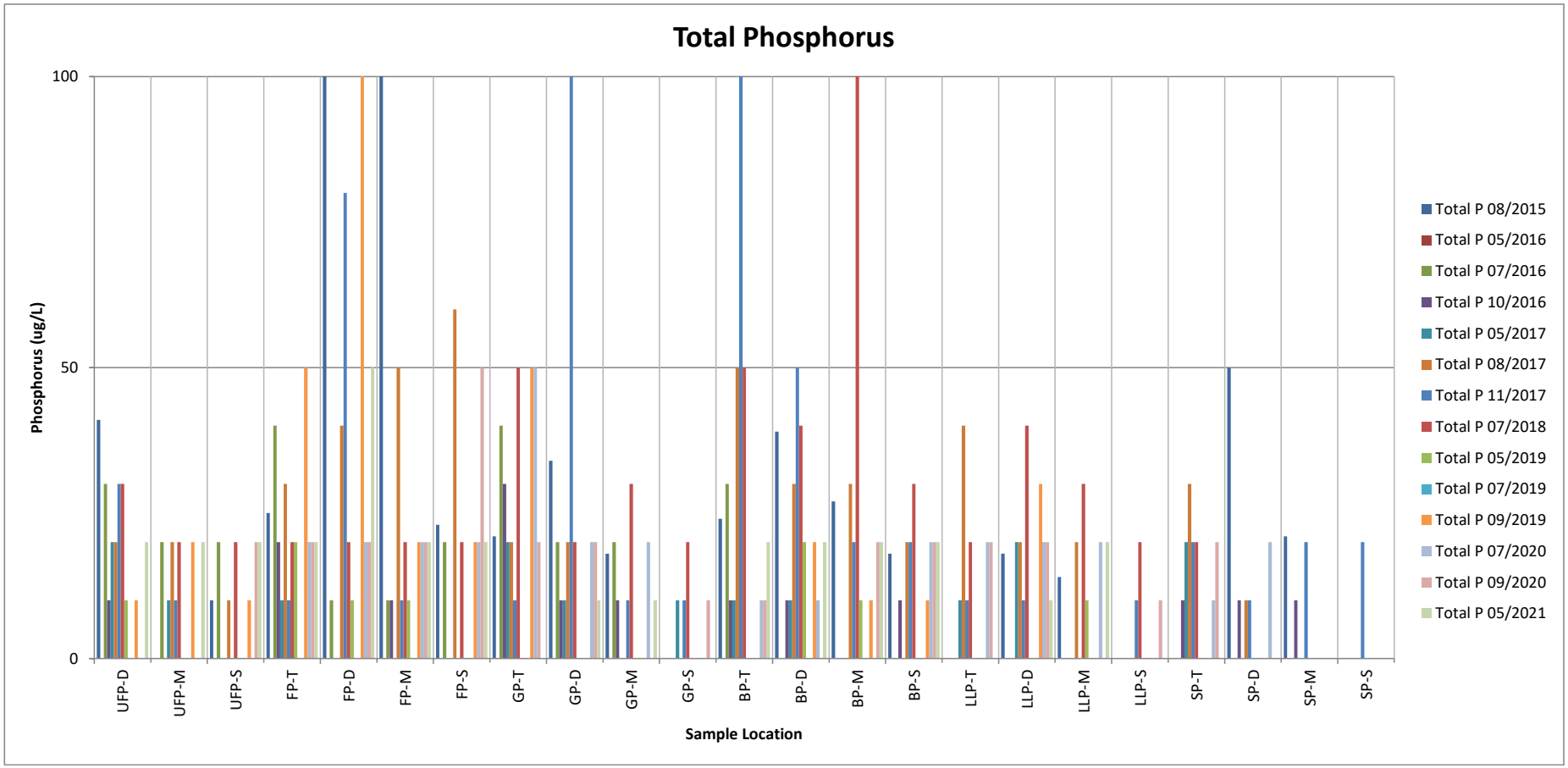
MAY 2021 - Carlson TSI Scores

Parameter	TSI Relationship	Pine Meadow Pond	Flannagan Pond	Lower Long Pond	Sandy Pond	Balch Pond	Grove Pond
Transparency	TSI = 60-14.41 ln Secchi Disk (m)	NA*	NA*	47.2	43.9	NA*	NA*
Chlorophyll-a	TSI = (9.81)(ln Chl-a)+30.6	23.8	34.6	27.1	30.6	35.2	ND
Total Phosporus	TSI = (14.42)(ln TP ug/L)+4.15	47.3	47.3	37.4	37.4	47.3	27.4

* Secchi disk TSI not available because disk was visible at pond bottom.
ND = Not detected

Oligotrophic | Mesotrophic | Eutrophic | Hypereutrophic

	Pine Meadow	Flannagan	Balch	Grove
Average Total P	20	20	20	5


Total Phosphorus
Phosphorus (ug/L)
100
50
0
UFP-D
UFP-M
UFP-S
FP-T
FP-D
FP-M
FP-S
GP-T
GP-D
GP-M
GP-S
BP-T
BP-D
BP-M
BP-S
LLP-T
LLP-D
LLP-M
LLP-S
SP-T
SP-D
SP-M
SP-S
Sample Location
Total P 08/2015
Total P 05/2016
Total P 07/2016
Total P 10/2016
Total P 05/2017
Total P 08/2017
Total P 11/2017
Total P 07/2018
Total P 05/2019
Total P 07/2019
Total P 09/2019
Total P 07/2020
Total P 09/2020
Total P 05/2021