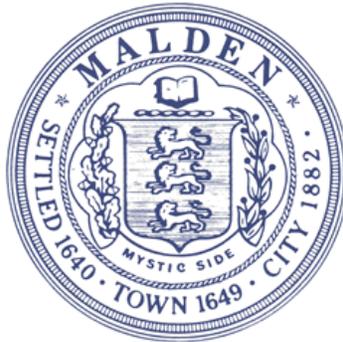


# Stormwater Management Program Plan

City of Malden

17 Pleasant Street, Malden Massachusetts 02148



EPA NPDES Permit Number MA041046

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- Attachment 2 - Historic Property Information
- Attachment 3 - BMP 1.1 - Residential Education and Outreach
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- Attachment 9 - BMP 1.7- Leaf Waste Education and Outreach
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- Attachment 36 - BMP 6.14 - Installation of Remaining Phosphorus Removal BMPs
- Attachment 37 – Annual Reports

# 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)

- Publicly available at the website below

“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 Gary Christenson, Mayor

Signature



---

Date

06/26/2019

# 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 Malden Engineering Department oversees the City's MS4 Stormwater NPDES discharge permit with various other City Departments including Public Works, Facilities and Permits and Inspections and Planning Services involved in the implementation of the program.

Questions concerning the City's stormwater system permit or comments on this Stormwater Management Program Plan may be directed to Yem Lip, P.E., Director and City Engineer, at (781)-397-7040 or [ylip@cityofmalden.org](mailto:ylip@cityofmalden.org).

# Small MS4 Authorization

The NOI was submitted on

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

---

Authorization to Discharge was granted on

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

# Stormwater Management Program Team

## SWMP Team Coordinator

Name	Yem Lip	Title	City Engineer
Department	Engineering Department		
Phone Number	781-397-7042	Email	ylip@cityofmalden.org
Responsibilities	MS4 Permit compliance and coordination of MS4 tasks between various City Departments		

## SWMP Team

Name	Robert Knox	Title	Director of Public Works
Department	Department of Public Works		
Phone Number	781-397-7160	Email	rknnox@cityofmalden.org
Responsibilities	Roadway and storm water collection and conveyance system maintenance		

---

Name	John DeSantis	Title	
Department	Department of Public Works		
Phone Number	781-397-7164	Email	jdesantis@cityof malden.org
Responsibilities	Field operations for maintenance of storm water collection and conveyance system		

---

Name	Eric Rubin	Title	Public Facilities Director
Department	Public Facilities		
Phone Number	781-397-7032	Email	sduffy@cityofmalden.org
Responsibilities	Maintenance of City Owned Facilities and grounds		

---

Name	Maria Louise	Title	Special Assistant to Mayor
Department	Mayors Office		
Phone Number	781-397-7000 ext 2005	Email	mlouise@cityofmalden.org
Responsibilities	Assists Mayor in oversight of various city departments responsible for NPDES discharge authorization compliance and report preparation.		

---

Name	Nelson Miller	Title	Building Commissioner
Department	Permits, Inspections and Planning Services		
Phone Number	781-397-7000 ext 2027	Email	building@CITYOFMALDEN.ORG
Responsibilities	Permits and Inspections		

# 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
Malden River (MA71-05)	23	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Chlordane, DDT and PCB in fish, Fecal Coliform, Foam/Flocs/Scum/Oil Slicks, pH, Secchi disk Transparency, Sediment Bioassays- Freshwater Chronic Toxicity, Taste, Odor
Lower Spot Pond Brook Channel	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Lower Spot Pond Brook Culvert	41	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fellsmere Pond	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
West End/Edgeworth Brook Culvert	33	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Malden/Medford Town Line Brook Culvert	18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Little Creek	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Town Line Brook Channel (MA93-51-Unnamed Tributary)	25	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fecal Coliform (EPA TMDL No. 50123), Taste, Odor
Town Line Brook Culvert	15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Linden Brook Culvert	36	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Forestdale Cemetery Culvert	6	<input type="checkbox"/>									
Saugus Branch Brook Culvert	29	<input type="checkbox"/>									
		<input type="checkbox"/>									
		<input type="checkbox"/>									
		<input type="checkbox"/>									
		<input type="checkbox"/>									

# 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.

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## 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)

SWMP Plan-Attachment 1-ESA Screening, SWMP Plan -Attachment 2-Historic Property Screening

- Publicly available at the website listed below

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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

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):

Not applicable at this time (June 2019)

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):

Not applicable at this time (June 2019)

# 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.

## **BMP: Residential Education and Outreach**

**BMP Number (Optional)** 1.1 \_\_\_\_\_

**Document Name and/or Web Address:** Residential Stormwater Pollution Prevention Guide/Lawn Fertilization Fact Sheet (Attachment 3)

**Description:**

Educate residents on stormwater pollution prevention through the use of informational brochures. Brochures will be posted on the City Website, with printed copies available at City Clerk, Public Works and Board of Health offices. General stormwater pollution prevention guide will be distributed in Year 2, while a fact sheet on lawn fertilization will be distributed in Year 4.

**Targeted Audience:** Residents

**Responsible Department/Parties:** Engineering, City Clerk, Public Works and Board of Health

**Measurable Goal(s):**

Quantify the number of times the brochure link on the website is selected and the number of printed brochures distributed to assess extent of dissemination and effectiveness of measure following each message, with a goal of reaching at least 10% of the residential population.

**Message Date(s):** Permit Years 2 and 4

---

## **BMP: Developer(Construction) Education and Outreach**

**BMP Number (Optional)** 1.2 \_\_\_\_\_

**Document Name and/or Web Address:** Construction Stormwater Guidance/Low Impact Development Brochure (Attachment 4)

**Description:**

Contractors/developers will be provided educational information on stormwater pollution prevention using brochures. Brochures will be posted on the City Website, with printed copies provided directly to contractors/developers subject to the city's Land Disturbance Permit as a part of the permit application/review process by the City Engineering Department, Planning Department and Conservation Commission. General Construction Stormwater Guidance will be issued in Year 2, while a fact sheet on Low Impact Development will be issued in Year 4.

**Targeted Audience:** Developers/Contractors

**Responsible Department/Parties:** Engineering, Planning and Conservation

**Measurable Goal(s):**

The purpose of this outreach effort is to eliminate construction related impacts to the MS4. The number of enforcement actions and/or violations of issued Land Disturbance Permit requirements will be tracked annually to evaluate the effectiveness following each education effort, with the goal of no enforcement actions or violations.

**Message Date(s):** Years 2 and 4

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**BMP: Business, Institution and Commercial Facility Education and Outreach**

**BMP Number (Optional)** 1.3

**Document Name and/or Web Address:** Pollution Prevention for Buisnesses/Stormwater Mangement for Small Businesses (Attachment 5)

**Description:**

Educate businesses, institutions and commercial facilities on stormwater pollution prevention through the use of informational brochures. Brochures will posted on the City Website, with printed copies available at City Clerk, Public Works and Board of Health offices. General pollution prevention guide will be disseminated in Year 2, while a stormwater management informational brochure will be utilized in Year 4.

**Targeted Audience:** Businesses, institutions and commercial facilities

**Responsible Department/Parties:** Engineering, City Clerk, Board of Health, Public Works

**Measurable Goal(s):**

Quantify the number of times the brochure link on the website is selected and the number of printed brochures distributed to assess extent of dissemination and effectiveness of measure following each message with a goal of reaching at least 50% of the target audience.

**Message Date(s):** Years 3 and 5

---

**BMP: Industrial Facility Education and Outreach**

**BMP Number (Optional)** 1.4

**Document Name and/or Web Address:** Stormwater Pollution Prevention Guide/Illicit Discharge Education Pamphlet (Attachment 6)

**Description:**

Educate Industrial facilities on stormwater pollution prevention through the use of informational brochures. Brochures will posted on the City Website, with printed copies available at City Clerk, Public Works and Board of Health offices. General pollution prevention guide will be disseminated in Year 3, while an illicit discharge educational brochure will be utilized in Year 5.

**Targeted Audience:** Industrial facilities

**Responsible Department/Parties:** Engineering, City Clerk, Board of Health, Public Works

**Measurable Goal(s):**

Quantify the number of times the brochure link on the website is selected and the number of printed brochures distributed to assess extent of dissemination and effectiveness of measure following each message with the goal of reaching at least 50% of the target audience.

**Message Date(s):** years 3 and 5

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**BMP: Pet Waste Education and Outreach**

**BMP Number (Optional)** 1.5

**Document Name and/or Web Address:**

**Description:**

Due to known impairments for phosphorus and bacteria in the Malden River and Town Line Brook, an informational pamphlet about pet waste will be mailed to each licensed dog holder each June/July. Pamphlets will also be made available in the clerks and Board of Health office, posted at the Trafton Park dog park as well as posted on the City's website.

**Targeted Audience:**

**Responsible Department/Parties:**

**Measurable Goal(s):**

The intent of this BMP is to reduce phosphorus and bacteria from pet waste in stormwater runoff. To assess the extent of dissemination and effectiveness of outreach effort following each message, the city will quantify the number of times the brochure link on the website is selected and the number of printed brochures distributed with the goal of reaching 100% of licensed pet owners.

**Message Date(s):**

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**BMP:Grass Clippings and Fertilizer Education and Outreach**

**BMP Number (Optional)** 1.6

**Document Name and/or Web Address:**

**Description:**

Malden picks up yard waste including grass clippings curbside from April through November. Residents can drop off yard waste at the DPW Yard at 356 Commercial Street Monday through Friday from 9am - 3 pm and Saturday from 8 am - noon year round. Due to known impairments for phosphorus in the Malden River, an informational pamphlet about grass clippings management and the proper use of fertilizers will be disseminated each spring. Pamphlets will also be made available in the Public Works, Board of Health Department as well as posted on the City's website.

**Targeted Audience:**

**Responsible Department/Parties:**

**Measurable Goal(s):**

The goal of this BMP is to reduce phosphorus and bacteria from yard waste and fertilizer use in stormwater

runoff to the Malden River. To assess the extent of dissemination and effectiveness of outreach effort following each message, the city will quantify the number of times the brochure link on the website is selected and the number of printed brochures distributed with the goal of reaching at least 10% of the target audience.

**Message Date(s):** March - April each year

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**BMP: Leaf Waste Education and Outreach**

**BMP Number (Optional)** 1.7

**Document Name and/or Web Address:** Leaf Waste Informational Brochure (Attachment 9)

**Description:**

Malden picks up yard waste including leaves curbside from April through November. Residents can drop off yard waste at the DPW Yard at 356 Commercial Street Monday through Friday from 9am - 3 pm and Saturday from 8 am - noon year round. Due to known impairments for phosphorus in the Malden River, an informational pamphlet about leaf waste management and will be disseminated each year between August and September. Pamphlets will also be made available in the Public Works, Board of Health Department as well as posted on the City's website.

**Targeted Audience:** All of Malden

**Responsible Department/Parties:** Engineering, Public Works, Board of Health

**Measurable Goal(s):**

Quantify the number of times the brochure link on the website is selected and the number of printed brochures distributed to assess extent of dissemination and effectiveness of measure following each message.

**Message Date(s):** Disseminate information between Aug-Sept of each year

---

**BMP: Septic System Owner Education and Outreach**

**BMP Number (Optional)** 1.8

**Document Name and/or Web Address:** Septic System Owner Informational Brochure (Attachment 10)

**Description:**

Provide a copy of MDEP's Guide "Caring for Your Septic System" to current owners of private septic systems located within the City of Malden. According to available records there are 54 properties located within the city that have an on-site septic system.

**Targeted Audience:** Private septic system owners in Malden River and Town Line Brook catchment areas.

**Responsible Department/Parties:** Engineering, Board of Health

**Measurable Goal(s):**

Document the number of septic system pumping records (required by 310 CMR 15.3561) each year prior to

and following the dissemination of the informational notice to septic system owners with a goal of distribution to 100% of septic system owners and a 10% annual increase in septic tank pumping for years 1 and 2.

**Message Date(s):** Information will be provided to septic system owners in Malden in 2020

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## **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) 2.1** \_\_\_\_\_

**Location of Plan and/or Web Address:**

**Responsible Department/Parties:**

**Measurable Goal(s):**

---

**BMP: Public Participation in Stormwater Management Program Development**

**BMP Number (Optional) 2.2** \_\_\_\_\_

**Description:**

**Responsible Department/Parties:**

**Measurable Goal(s):**

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**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.

**BMP: IDDE Legal Authority**

**BMP Number (Optional)** 3.1

**Completed** (by May 1, 2008)

**Ordinances Link or Reference:**

**Department Responsible for Enforcement:**

---

**BMP: Sanitary Sewer Overflow (SSO) Inventory**

**BMP Number (Optional)** 3.2

**Completed** (by year 1)

**Document Name and/or Web Address:**

**Description:**

An inventory of Sanitary Sewer Overflows that have discharged into the municipal storm drain system over the past 5 years shall be prepared and updated annually (Attachment 13). Additionally, the MS4 permit requires that the City report all SSOs that discharge to the MS4 to EPA within 24 hours and follow up with written notice within 5 days. MDEP also requires that the City report all SSOs from the City's system (not MWRA) as soon as possible, but no later than 24 hours, with written notice within 5 days, except backups into a property that are not caused by conditions in the Malden Sewer System, such as private service connections or plumbing blockages unrelated to the City's system. Written reports shall use the MDEP SSO/Bypass Notification Form (Attachment 14)

**Responsible Department/Parties:**

**Measurable Goal(s):**

Annually track (Attachment 13) 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 occurrence; 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.

<p>The MassDEP contacts for Malden are:</p> <p>Northeast Region (978) 694-3215 205B Lowell Street Wilmington, MA 01887</p> <p>24-hour Emergency Line 1-888-304-1133</p>	<p>The EPA contacts for Malden are:</p> <p>EPA New England (617) 918-1510 5 Post Office Square Boston, MA 02109</p>
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**BMP: Map of Storm Sewer System**

**BMP Number (Optional)** 3.3

**Phase I Completed**   
(by year 2)

**Phase II Completed**   
(by year 10)

**Document Location and/or Web Address:**

**Description:**

Prepare an accurate and continually updated map of the municipal storm drain system to facilitate effective operation and maintenance of the system, the monitoring of stormwater quality at discharge locations and for use in identifying illicit discharges and other sources of contaminants to the system during both dry and wet weather flow conditions.

**Responsible Department/Parties:**

**Measurable Goal(s):**

Map 100% of 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, and initial catchment delineations within 2 years (by June 30, 2029) of the permit's effective date. Map 100% of outfall spatial locations, pipes, manholes, catch basins, refined catchment delineations and municipal sanitary sewer system, within 10 years (by June 30, 2029) of the permit's effective date.

**BMP: IDDE Program**

**BMP Number (Optional)** 3.4

**Written Document Completed** (by year 1)

**Document Name and/or Web Address:**

**Description:**

Update existing IDDE plan for consistency with current MS4 permit to continually and systematically find

and eliminate sources of non-stormwater discharges to the municipal stormwater system and implement procedures to prevent such discharges.

**Responsible Department/Parties:** Engineering, Public Works

**Measurable Goal(s):**

Conduct 100% of outfall screening on High and Low Priority Outfalls within 3 years (by June 30, 2021) of the permit's effective date. Complete catchment investigations for 100% of the Problem Outfalls within 7 years (by June 30, 2025) of the permit's effective date. Complete 100% of all catchment investigations within 10 years (by June 30, 2029) 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:**

Attachment D of IDDE Plan (Attachment 16)

---

**BMP: Employee Training**

**BMP Number (Optional)** 3.5

**Description:**

IDDE Program Plan Employee Training Documentation maintained as an attachment to the IDDE Plan (Attachment K of IDDE Plan -SWMPP Attachment 16) for City employees and any consultant/contractors utilized for IDDE implementation.

**Responsible Department/Parties:** Engineering, Public Works

**Measurable Goal(s):**

Training occurs in June of each year or as needed in between annual training events..

# **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.

**BMP: Sediment and Erosion Control Ordinance**

**BMP Number (Optional)** 4.1

**Completed** (by May 1, 2008)

**Ordinances Link or Reference:** Malden City Ordinance Section 11.74.4, Stormwater Management and Land Disturbance Regulation, Construction Phase Erosion and Sediment Control Plan Form, Contents & Design Standards (Attachment 17)

**Department Responsible for Enforcement:** Engineering (adopted by City April 2009)

---

**BMP: Site Plan Review Procedures**

**BMP Number (Optional)** 4.2

**Written procedures completed** (by year 1)

**Document Name and/or Web Address:** City of Malden Construction Activity Land Disturbance Permit Requirements and Procedures (Attachment 18)

**Description:**

For construction activities resulting in the disturbance of one or more acres, or less than one acre but part of a larger common plan or development that would disturb one or more acres, that could potentially result in a discharge of stormwater to the City's storm drain system, a Land Disturbance Permit must be filed with the Engineering Department in accordance with City Ordinance 11.74 (Attachment 17). Written Site plan review procedures included within Attachment 19.

**Responsible Department/Parties:** Engineering

**Measurable Goal(s):**

Conduct site plan review of 100% of construction activity projects requiring a Land Disturbance Permit according to the procedures outlined above.

---

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

**BMP Number (Optional)** 4.3

**Completed** (by year 1)

**Document Name and/or Web Address:** City of Malden Construction Activity Land Disturbance Permit Requirements and Procedures (Attachment 18)

**Description:**

For construction activities resulting in the disturbance of one or more acres, or less than one acre but part of a larger common plan or development that would disturb one or more acres, that could potentially result in a discharge of stormwater to the City's storm drain system, a Land Disturbance Permit must be filed with the Engineering Department in accordance with City Ordinance 11.74 (Attachment 17). Written site inspection and enforcement procedures for sediment and erosion control measures are included within Attachment 18.

**Responsible Department/Parties:** Engineering

**Measurable Goal(s):**

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

---

# **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.

**BMP: Post-Construction Ordinance**

**BMP Number (Optional)** 5.1

**Completed** (by year 2)

**Town Ordinances Link or Reference:** Existing Malden City Ordinance Section 11.74, Stormwater Management and Land Disturbance Regulation (Attachment 17) shall be updated (Attachment 19-Pending) to comply with the 2018 Permit requirements by June 30, 2020 to include controls for other construction wastes and to ensure that any stormwater controls or management practices for new development and redevelopment meet the retention or treatment requirements of the permit and all applicable requirements of the Massachusetts Stormwater Handbook. The amended ordinance shall also require that new and redevelopment BMPs subject to the Land Disturbance permit that are located within the Malden River drainage catchment be optimized for phosphorus removal.

**Department Responsible for Enforcement:** Engineering

---

**BMP: Street Design and Parking Lot Guidelines Report**

**BMP Number (Optional)** 5.2

**Completed** (by year 4)

**Document Name and/or Web Address:** (Attachment 20 - Pending)

**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:** Engineering, Permits Inspections and Planning Services Dept.

**Measurable Goal(s):**  
Complete report and implement any recommendations by June 30, 2022 with progress reported annually.

---

**BMP: Green Infrastructure Report**

**BMP Number (Optional)** 5.3

**Completed** (by year 4)

**Document Name and/or Web Address:** (Attachment 21 - Pending)

**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:** Engineering, Permits Inspections and Planning Services Dept.

**Measurable Goal(s):**

Complete report and implement any recommendations by June 30, 2022 with progress reported annually.

**BMP: List of Municipal Retrofit Opportunities**

**BMP Number (Optional)** 5.4

**Completed** (by year 4)

**Document Name and/or Web Address:** (Attachment 22 - Pending)

**Description:**

Identify at least 5 permittee-owned properties that could be modified or retrofitted with BMPs to reduce impervious areas and update annually. The implementation of this BMP shall be integrated with BMP 6.11 to the extent feasible. The evaluation of suitable locations for municipal retrofit opportunities should prioritize the Malden River drainage catchment and at least one (1) BMP should be capable of reducing phosphorus within the Malden River drainage catchment for implementation as a demonstration project by June 30, 2024 (See BMP 6.12). Proposed retrofits in the Malden River drainage catchment shall prioritize infiltration where feasible.

**Responsible Department/Parties:** Engineering, Public Facilities Department

**Measurable Goal(s):**

The list of identified BMPs is completed by June 30, 2022 and updated as needed.

**BMP:Post Construction As-built Drawings**

**BMP Number (Optional)** 5.5

**Completed**

**Document Name and/or Web Address:** City of Malden Construction Activity Land Disturbance Permit Requirements and Procedures (Attachment 19)

**Description:**

Establish procedures to require submission of as-built drawings of both structural and non-structural site controls designed to manage post construction stormwater and ensure long term operation and maintenance will be a part of the City's SWMP for any private discharges to the Malden public drainage system.

**Responsible Department/Parties:** Engineering

**Measurable Goal(s):**

Obtain 100% of as-built drawings from construction activity projects requiring a Land Disturbance Permit within 2 years of project completion.

**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.

## PERMITTEE OWNED FACILITIES

### BMP: Parks and Open Spaces Operations and Maintenance Procedures

BMP Number (Optional) 6.1

Written Document Completed (by year 2)

Document Name and/or Web Address: (Attachment 23 - Pending)

**Description:**

Create and implement written O&M procedures including all requirements contained in 2.3.7.a.ii of the MS4 General Permit for all parks and open spaces. O&M procedures within the Malden River drainage catchment shall require that grass cuttings and leaf litter are properly managed and prohibit the blowing of organic waste onto impervious surfaces.

Responsible Department/Parties: Engineering, Public Facilities

**Measurable Goal(s):**

Implement the O&M procedures listed above on 100% of the parks and open spaces by 30 June 2020.

**Properties List (Optional):**

(Attachment 23 - Pending)

---

### BMP: Buildings and Facilities Operations and Maintenance Procedures

BMP Number (Optional) 6.2

Written Document Completed (by year 2)

Document Name and/or Web Address: (Attachment 24 - Pending)

**Description:**

Create and implement written O&M procedures including all requirements contained in 2.3.7.a.ii of the MS4 General Permit for all buildings and facilities.

Responsible Department/Parties: Engineering, Public Facilities

**Measurable Goal(s):**

Implement the O&M procedures listed above on 100% of buildings and facilities by 30 June 2020.

**Properties List (Optional):**

(Attachment 24 - Pending)

---

### BMP: Vehicles and Equipment Operations and Maintenance Procedures

**BMP Number (Optional)** 6.3

**Written Document Completed** (by year 2)

**Document Name and/or Web Address:** (Attachment 25 - Pending)

**Description:**

Create and implement written O&M procedures including all requirements contained in 2.3.7.a.ii of the MS4 General Permit for all vehicle and equipment operations.

**Responsible Department/Parties:** Engineering, Public Facilities

**Measurable Goal(s):**

Implement the O&M procedures listed above for 100% of vehicles and equipment according to the above document by 30 June 2020.

**Properties List (Optional):**

(Attachment 25 - Pending)

## INFRASTRUCTURE

### **BMP: Infrastructure Operations and Maintenance Procedures**

**BMP Number (Optional)** 6.4

**Written Procedure Completed** (by year 2)

**Document Name and/or Web Address:** (Attachment 26 - Pending)

**Description:**

Establish and implement program for repair and rehabilitation of MS4 infrastructure

**Responsible Department/Parties:** Engineering, Public Works

**Measurable Goal(s):**

100% of infrastructure is maintained to ensure proper function in accordance with the procedures above by 30 June 2020.

### **BMP: Catch Basin Cleaning Program**

**BMP Number (Optional)** 6.5

**Written Procedure Completed** (by year 1)

**Document Name and/or Web Address:** Malden Catch Basin Cleaning Schedule (Attachment 27)

**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:** Public Works

**Measurable Goal(s):**

All catch basins are cleaned such that no catch basin is more than 50% full at any given time.

**BMP: Street Sweeping Program**

**BMP Number (Optional)** 6.6

**Written Procedure Completed (by year 1)**

**Document Name and/or Web Address:**

Malden Street Sweeping Schedule (Attachment 28)  
<http://www.cityofmalden.org/content/malden-street-sweeping-schedule-listing-all-streets>

**Description:**

The MS4 general permit requires that the City annually sweep all streets and municipal parking lots. All Streets and municipal lots within the Malden River drainage catchment area must be swept in the spring and fall (after leaves drop) each year, while streets and lots within the remainder of the City must be swept at least once in the spring. Spring sweeping should be performed after winter road treatment is completed.

**Responsible Department/Parties:** Public Works

**Measurable Goal(s):**

Annually sweep 100% of all streets all municipal parking lots in accordance with the schedule referenced above (Attachment 28).

**BMP: Winter Road Maintenance Program**

**BMP Number (Optional)** 6.7

**Written Procedure Completed (by year 1)**

**Document Name and/or Web Address:** Winter Road Maintenance Program (Attachment 29)

**Description:**

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

**Responsible Department/Parties:** Public Works

**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)** 6.8

**Completed** (by year 1)

**Document Name and/or Web Address:** Stormwater Treatment Structures Inspection and Maintenance Procedures (Attachment 30)

**Description:**

Establish and implement inspection and maintenance procedures and frequencies. As of June 2019, the City has adopted a Standard Operating Procedure for inspecting constructed BMPs developed by the Central Massachusetts Regional Stormwater Coalition (Attachment 30)

**Responsible Department/Parties:** Engineering, Public Works

**Measurable Goal(s):**

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

**BMP: SWPPP**

**BMP Number (Optional)** 6.9

**Completed** (by year 2)

**Document Name and/or Web Address:** Stormwater Pollution Prevention Plans (SWPPPs) for City Facilities (Attachment 31-Pending)

**Description:**

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

**Responsible Department/Parties:** Engineering, Public Works

**Measurable Goal(s):**

Develop and implement SWPPPs for 100% of facilities by 30 June 2020.

**BMP: Malden River Catchment Phosphorus Source Identification Assessment**

**BMP Number (Optional)** 6.10

**Completed**

**Document Name and/or Web Address:** (Attachment 32 - Pending)

**Description:**

Conduct an assessment of phosphorus sources and prepare a Phosphorus Source Identification Report for the Malden River drainage catchment in accordance with the requirements established in Appendix H, Part II.1.B of the MS4 permit.

**Responsible Department/Parties:** Engineering

**Measurable Goal(s):**

Complete report by June 30, 2022 and include in the 2021/22 annual status report.

---

**BMP: Phosphorus Removal BMP Plan for City Owned Property in Malden River Catchment**

**BMP Number (Optional)** 6.11

**Completed**

**Document Name and/or Web Address:** (Attachment 33 - Pending)

**Description:**

Evaluate all City owned properties with potential for BMP or retrofit opportunities, or locations identified in Phosphorus Report (BMP 6.10) for the Malden River drainage catchment and develop a plan a schedule for installation, with at least one (1) BMP planned for the Malden River sub-catchment with highest phosphorus loads for installation as demonstration project by 30 June 2024. This effort shall be integrated within BMP 5.4 to the extent feasible.

**Responsible Department/Parties:** Engineering

**Measurable Goal(s):**

Complete phosphorus removal BMP plan and installation schedule by 30 June 2023.

---

**BMP: Malden River Catchment Phosphorus Removal BMP Demonstration Project Installation**

**BMP Number (Optional)** 6.12

**Completed**

**Document Name and/or Web Address:** (Attachment 34 - Pending)

**Description:**

Install phosphorus removal BMP in Malden River sub-catchment with highest phosphorus loading.

**Responsible Department/Parties:** Engineering, Public Works

**Measurable Goal(s):**

Complete installation by 30 June 2024.

---

**BMP: Malden River Catchment Phosphorus Removal BMP Monitoring**

**BMP Number (Optional)** 6.13

**Completed**

**Document Name and/or Web Address:** (Attachment 35 - Pending)

**Description:**

Track and estimate phosphorus removal for BMP 6.12

**Responsible Department/Parties:** Engineering

**Measurable Goal(s):**

Provide estimate of phosphorus removal for BMP 6.12 in each annual report beginning with the report due on September 30, 2025.

---

**BMP: Installation of Remaining Phosphorus Removal BMPs**

**BMP Number (Optional)** 6.14

**Completed**

**Document Name and/or Web Address:** (Attachment 36 - Pending)

**Description:**

Complete installation of remaining BMPs identified in the Malden River Catchment phosphorus removal plan and schedule (BMP 6.11).

**Responsible Department/Parties:** Engineering, Public Works

**Measurable Goal(s):**

Complete installation of all phosphorus removal BMPs proposed for implementation in the Malden River drainage catchment in accordance with the schedule established in the plan.

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# Annual Reports

Pursuant to the requirement established in Section 4.4 of the Massachusetts MS4 General Permit, the City shall prepare and submit an Annual Report. The Annual Report shall contain the following information:

1. A self-assessment review of compliance with the permit terms and conditions
2. An assessment of the appropriateness of the selected BMPS
3. The status of any plans or activities required by part 2.1 and/or part 2.2
4. An assessment of the progress towards achieving the measurable goals and objects of each control measure in part 2.3
5. All outfall screening and monitoring data collected by or on behalf of the City during the reporting period and cumulative for the permit term, including but not limited to all data collected pursuant to part 2.3.4. The City shall also provide a description of any additional monitoring data received by the permittee during the reporting period.
6. Description of activities for the next reporting cycle
7. Description of any changes in identified BMPs or measurable goals
8. Description of activities undertaken by any entity contracted for achieving any measurable goal or implementing any control measure.

Annual Reports shall be submitted electronically to [stormwater.reports@epa.gov](mailto:stormwater.reports@epa.gov) and [frederick.civian@mass.gov](mailto:frederick.civian@mass.gov). The first report under the MS4 General Permit that became effective on July 1, 2018 shall be submitted on or before September 29, 2019 covering the reporting period of May 1, 2018 through June 30, 2019. Annual Reports shall be submitted within 90 days following the period of July 1 through June 30 during each subsequent year.

A copy of the self-assessment review (Item 1 above) for each year shall also be included as a part of this Stormwater Management Program Plan and included in Attachment 37 of this document.

# Malden Stormwater Management Program Plan

## ATTACHMENT 1

*Endangered Species Act Information*

## **MALDEN NOI – ATTACHMENT 1**

### **EVALUATION IN SUPPORT OF ESA ELIGIBILITY DETERMINATION CRITERION C**

The City of Malden requested and obtained from the United States Department of the Interior Fish and Wildlife Service (USFWS) a list of Threatened and Endangered Species that may occur in the area of the Malden stormwater system through their Information for Planning and Consultation (IPaC) website. A copy of the list provided on 2 July 2018 is included within Attachment A, which identified two Threatened Species, the Northern Long-eared Bat (*Myotis septentrionalis*) and the Red Knot (*Calidris camutus rufa*). It is noted that the Red Knot is not listed as a species of concern for applicants applying for permit coverage within Appendix C of the Endangered Species Guidance of the MA MS4 General Permit. Further, a review of the most recent (2/05/16) listing of Federally Listed Endangered and Threatened Species in Massachusetts available through FWS only identified the Northern Long-eared Bat as being present within Middlesex County (copy included in Attachment A).

On 6 July 2018 Mr. David Simmons at the New England Field Office of FWS in Concord New Hampshire was contacted by Nangle Consulting Associates, Inc. (NCA) on behalf of the City of Malden and the two (2) threatened species identified within Attachment were reviewed specifically for the City of Malden. With regard to the discrepancy between the County listing and IPaC mapping for the Red Knot, Mr. Simmons indicated that they were generated differently and that the mapping included species that were nearby to the selected area. After reviewing the habitat characteristics, Mr. Simmons indicated that stormwater discharges from the City of Malden would have no affect on the species identified and should be ignored or considered not present. Mr. Simmons indicated that it would be sufficient to reference the verbal consultation and include a copy of the USFWS January 8, 2018 “No Species Present” letter with our permit with respect to the Red Knot, a copy of which is included within Attachment A.

Pursuant to USEPA and USFWS guidance, based upon a review of available information, a determination has been made that the stormwater discharges and discharge related activities will have “no affect” on any federally threatened or endangered listed species or designated critical habitat under the jurisdiction of the USFWS.

# **ATTACHMENT A**

**ESA Criterion C Determination**



# United States Department of the Interior



FISH AND WILDLIFE SERVICE  
New England Ecological Services Field Office  
70 Commercial Street, Suite 300  
Concord, NH 03301-5094  
Phone: (603) 223-2541 Fax: (603) 223-0104  
<http://www.fws.gov/newengland>

In Reply Refer To:

July 02, 2018

Consultation Code: 05E1NE00-2018-SLI-2259

Event Code: 05E1NE00-2018-E-05270

Project Name: City of Malden, MS4

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan ([http://www.fws.gov/windenergy/eagle\\_guidance.html](http://www.fws.gov/windenergy/eagle_guidance.html)). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
-

## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**New England Ecological Services Field Office**

70 Commercial Street, Suite 300

Concord, NH 03301-5094

(603) 223-2541

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## Project Summary

Consultation Code: 05E1NE00-2018-SLI-2259

Event Code: 05E1NE00-2018-E-05270

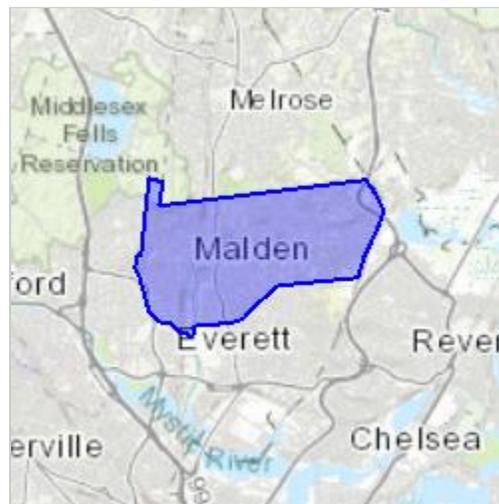
Project Name: City of Malden, MS4

Project Type: LAND - DRAINAGE

Project Description: Obtain General coverage for USEPA/MADEP MS4 storm water discharge permit for the City of Malden, Massachusetts

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/42.42860908113984N71.05777738240343W>



Counties: Middlesex, MA

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## Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

- 
1. [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.

### Mammals

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/9045">https://ecos.fws.gov/ecp/species/9045</a>	Threatened

### Birds

NAME	STATUS
Red Knot <i>Calidris canutus rufa</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1864">https://ecos.fws.gov/ecp/species/1864</a>	Threatened

### Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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**FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES IN  
MASSACHUSETTS**

<b>COUNTY</b>	<b>SPECIES</b>	<b>FEDERAL STATUS</b>	<b>GENERAL LOCATION/HABITAT</b>	<b>TOWNS</b>
Barnstable	Piping Plover	Threatened	Coastal Beaches	All Towns
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	All Towns
	Northeastern beach tiger beetle	Threatened	Coastal Beaches	Chatham
	Sandplain gerardia	Endangered	Open areas with sandy soils.	Sandwich and Falmouth.
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Bourne (north of the Cape Cod Canal)
	Red Knot <sup>1</sup>	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Berkshire	Bog Turtle	Threatened	Wetlands	Egremont and Sheffield
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Bristol	Piping Plover	Threatened	Coastal Beaches	Fairhaven, Dartmouth, Westport
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Fairhaven, New Bedford, Dartmouth, Westport
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Taunton
	Red Knot <sup>1</sup>	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Dukes	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	All Towns
	Piping Plover	Threatened	Coastal Beaches	All Towns
	Northeastern beach tiger beetle	Threatened	Coastal Beaches	Aquinnah and Chilmark
	Sandplain gerardia	Endangered	Open areas with sandy soils.	West Tisbury
	Red Knot <sup>1</sup>	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide

**FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES  
IN MASSACHUSETTS**

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Essex	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Gloucester, Essex and Manchester
	Piping Plover	Threatened	Coastal Beaches	Gloucester, Essex, Ipswich, Rowley, Revere, Newbury, Newburyport and Salisbury
	Red Knot <sup>1</sup>	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Franklin	Northeastern bulrush	Endangered	Wetlands	Montague, Warwick
	Dwarf wedgemussel	Endangered	Mill River	Whately
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Hampshire	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Hadley
	Puritan tiger beetle	Threatened	Sandy beaches along the Connecticut River	Northampton and Hadley
	Dwarf wedgemussel	Endangered	Rivers and Streams.	Hatfield, Amherst and Northampton
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Hampden	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Southwick
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Middlesex	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Groton
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Nantucket	Piping Plover	Threatened	Coastal Beaches	Nantucket
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Nantucket
	American burying beetle	Endangered	Upland grassy meadows	Nantucket
	Red Knot <sup>1</sup>	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide

**FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES  
IN MASSACHUSETTS**

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Plymouth	Piping Plover	Threatened	Coastal Beaches	Scituate, Marshfield, Duxbury, Plymouth, Wareham and Mattapoisett
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Kingston, Middleborough, Carver, Plymouth, Bourne, Wareham, Halifax, and Pembroke
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Plymouth, Marion, Wareham, and Mattapoisett.
	Red Knot <sup>1</sup>	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Suffolk	Piping Plover	Threatened	Coastal Beaches	Revere, Winthrop
	Red Knot <sup>1</sup>	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Worcester	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Leominster
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide

<sup>1</sup>Migratory only, scattered along the coast in small numbers

-Eastern cougar and gray wolf are considered extirpated in Massachusetts.

-Endangered gray wolves are not known to be present in Massachusetts, but dispersing individuals from source populations in Canada may occur statewide.

-Critical habitat for the Northern Red-bellied Cooter is present in Plymouth County.



# United States Department of the Interior



## FISH AND WILDLIFE SERVICE

New England Field Office  
70 Commercial Street, Suite 300  
Concord, NH 03301-5087  
<http://www.fws.gov/newengland>

January 8, 2018

To Whom It May Concern:

This project was reviewed for the presence of federally listed or proposed, threatened or endangered species or critical habitat per instructions provided on the U.S. Fish and Wildlife Service's New England Field Office website:

<http://www.fws.gov/newengland/EndangeredSpec-Consultation.htm> (accessed January 2018)

Based on information currently available to us, no federally listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under section 7 of the Endangered Species Act is not required. No further Endangered Species Act coordination is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

Thank you for your cooperation. Please contact David Simmons of this office at 603-227-6425 if we can be of further assistance.

Sincerely yours,

Thomas R. Chapman  
Supervisor  
New England Field Office

# Malden Stormwater Management Program Plan

## ATTACHMENT 2

*Historic Property Information*

## **MALDEN NOI – ATTACHMENT 2**

### **CERTIFICATION OF ELIGIBILITY WITH RESPECT TO HISTORIC PROPERTIES - CRITERON A**

No new or alteration of any existing control measures to manage stormwater discharge are proposed by the City of Malden. The City of Malden's stormwater system is authorized by the previous permit, which established that the eligibility criteria for protection of historic properties had been met, and no activities involving any subsurface land disturbance under an acre are proposed. As such, the City does not need to contact the State Historic Commission as the issuance of the permit will have "no potential to cause effects" (36CFR 800.3(1)(1) and there are no further obligations under the Section 106 Regulations.

# Malden Stormwater Management Program Plan

## ATTACHMENT 3

*MCM 1 Public Education and Outreach*

**BMP 1.1- Residential Education and Outreach**

# Stormwater Pollution Prevention Guide

## FOR HOMEOWNERS

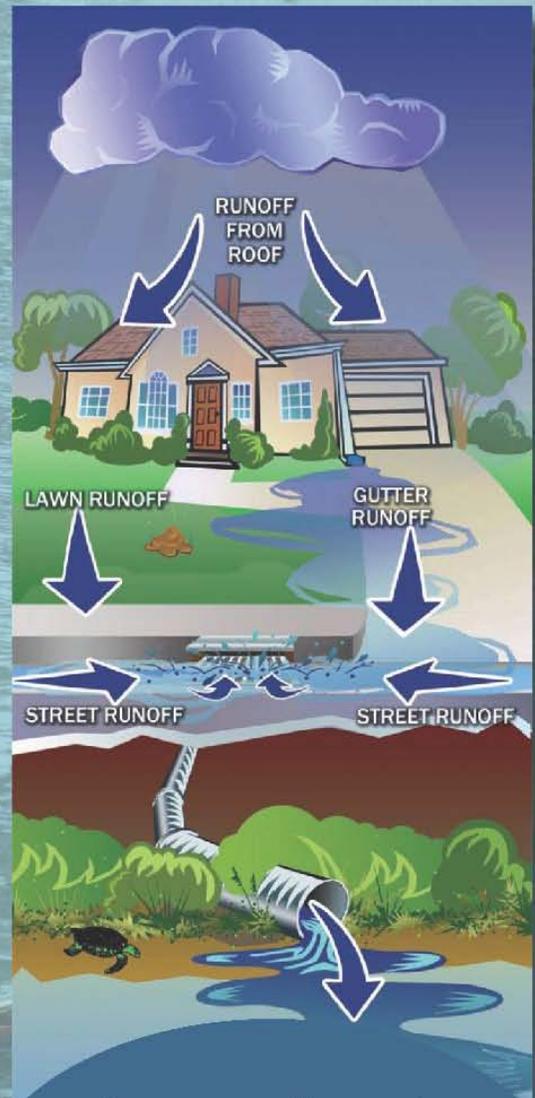
*The U.S. Environmental Protection Agency estimates that contaminants in stormwater runoff cause over half of the pollution in our nation's waterways.*

Stormwater pollution begins when rain or snowmelt washes over pavement and other impervious surfaces, picks up contaminants, and flows down stormdrains to the waterways we rely on for drinking and recreation.

Common pollutants include antifreeze, detergents, fertilizers, gasoline, household chemicals, motor oil, paints, pesticides, pet waste, road salt, solvents, and yard waste

### HELP KEEP OUR WATERWAYS CLEAN!

Please check the back of this page for tips on preventing stormwater pollution.  
*It's easier than you think!*



**Stormwater pollution** is the toxic mix of bacteria, chemicals, metals, nutrients and other contaminants that washes over pavement and other impervious surfaces and flows down stormdrains to the waterways we rely on for drinking and recreation.

**Let's work together to keep our waterways clean.**

Learn more at [www.neponsetstormwater.org](http://www.neponsetstormwater.org)





### PICK-UP AFTER YOUR DOG

Dog waste carries high levels of harmful *E. coli* bacteria and other pathogens, and is a major contributor to local water pollution.

- Pick up the poop! Always carry a **plastic bag** when you walk your dog, and dispose of pet waste in a **trash can**.

### LAWN & GARDEN

- Choose **organic lawn chemicals** whenever possible.

*Use lawn chemicals sparingly and never use more than the directions call for.*

- Sweep up **dry chemical spills** and dispose in trash.
- Don't pile **yard waste** near streams, wetlands, or stormdrains.
- Start a **compost pile**.
- Don't allow irrigation to **spray onto pavement**. Water that ends up on the pavement contributes to polluted runoff, and is wasted.
- Make sure that your **landscaper / irrigation contractor** follows rules for preventing stormwater runoff.
- Redirect **downspouts** toward grassy areas, trees and shrubs, so that runoff from your roof can soak into the ground.
- Use **pervious materials** in landscape designs. Bricks, pavers and stones allow water to slowly filter into the ground.
- Set a **rain barrel** under your downspout to capture water for another use.
- Plant **rain gardens** to help filter and soak up water before it runs onto the street.

### HOMES / BUSINESSES

- Use the **least toxic** products available for cleaning, etc.
- Avoid **liquid chemical spills** such as oil, gasoline, antifreeze, paint, etc. on paved areas.  
  
*If a liquid chemical spill occurs, clean with rags or absorbent material such as **sand or kitty litter**. Sweep up absorbents and dispose of in the trash.*
- Never use a **hose** to wash down the driveway or sidewalk. This washes pollutants into storm drains, and is a waste of water.
- Dispose of household hazardous waste through your local DPW / **Household Hazardous Waste Program**.
- Never pour **washwater or chemicals** down stormdrains.

- Store chemicals in **leak proof containers** inside a building or shed, or under cover, away from rainwater.
- **Avoid oversalting** walkways and driveways in the winter, and use non-toxic products whenever possible.
- Sweep up all **construction areas** on a regular basis and dispose of debris in the trash.

### WASHING CARS AND BOATS

- Park your vehicle in a spot where the soap will run off onto **grass**, rather than into the street and down the stormdrain. If practical, park your vehicle on your lawn when washing it.
- Use **organic or mild soaps** and detergents.
- Never clean or pressure wash the **undercarriage of a car** at home. The oil, grease and other pollutants from this activity can contaminate shallow groundwater.
- Always use a **hose nozzle with a trigger**, and shut it off when you're not using it to conserve water.
- Skip the home treatment and **wash your car professionally**, but use a car wash that recycles its water!

### AUTOMOTIVE REPAIR

- Store automotive parts, such as batteries, engines, transmissions, and parts that may have oily or greasy residue on them, under cover and off the ground, to **minimize rainwater contact**. Rainwater can wash pollutants off these parts and into stormdrains.
- Collect all used oil, antifreeze, and other vehicle fluids in containers with tight fitting lids and **recycle at a local service station**.

### SWIMMING POOLS AND HOT TUBS

- Never **discharge pool water** directly into a storm drain.
- Dechlorinate pool, hot tub or spa water with **neutralizing chemicals**, if water is to be discharged into the ground. If water cannot be dechlorinated, it must be collected by a pool maintenance company.

*For more information on hazardous waste disposal, call your local Department of Public Works.*

*For more information on reducing stormwater pollution, visit [www.neponsetstormwater.org](http://www.neponsetstormwater.org)*



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## **Stormwater Pollution Education: Fertilizing the Lawn**

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**When you fertilize the lawn, remember . . .  
you're not just fertilizing the lawn.**

It's hard to imagine that a green, flourishing lawn could pose a threat to the environment, but the fertilizers you apply to your lawn are potential pollutants! If applied improperly or in excess, fertilizer can be washed off your property and end up in lakes and streams. This causes algae to grow, which uses up oxygen that fish need to survive. So if you fertilize, please follow directions and use sparingly.



**Clean water is important to all of us.**

It's up to all of us to make it happen. In recent years, sources of water pollution like industrial wastes from factories have been greatly reduced. Now, more than 60 percent of water pollution comes from stormwater runoff, which picks up pollutants like leaking oil from cars, fertilizers from farms and gardens, and failing septic tanks. All these sources add up to a big pollution problem.

But each of us can do small things to help clean up our water - and that adds up to a pollution solution!

## Why do we need clean water?

Having clean water is of primary importance for our health and economy. Clean water provides recreation, commercial opportunities, fish habitat, drinking water, and adds beauty to our landscape. All of us benefit from clean water-and all of us have a role in getting and keeping our lakes, rivers, streams, marine, and ground waters clean.

## What's the problem with fertilizers?

Fertilizer is a "growing" problem for lakes, rivers, and streams, especially if it's not used carefully. If you use too much fertilizer or apply it at the wrong time, it can easily wash off your lawn or garden into storm drains and then flow into lakes or streams. Just like in your garden, fertilizer in lakes and streams makes plants grow. In water bodies, extra fertilizer can mean extra algae and aquatic plant growth. Too much algae causes water quality problems and makes boating, fishing, and swimming unpleasant. As algae decay, it uses up oxygen in the water that fish and other wildlife need.

### **Clean Water Tips: How can you fertilize and help keep our waters clean?**

- Use fertilizer sparingly. Many plants don't need as much fertilizer or need it as often as you might think.
- Don't fertilize before a rain storm.
- Consider using organic fertilizers. They release nutrients more slowly.

Have your soil tested before applying fertilizers to your lawn and gardens.

A standard soil test costs \$15. You may not need to add any fertilizer.

To order a soil test or for more information contact the  
UMass Extension Soil Testing Lab at 413-545-2311

<http://soiltest.umass.edu/ordering-information>

**Brought to you by the City of Malden**



# Malden Stormwater Management Program Plan

## ATTACHMENT 4

*MCM 1 Public Education and Outreach*

**BMP 1.2- Developer (Construction) Education and Outreach**

The most common source of pollution associated with construction activities is **sedimentation** caused by erosion.

Failure to maintain adequate Erosion and Sediment Controls (ESCs) at construction sites often results in sediment discharges into the storm drain system. In the Wachusett Reservoir watershed, most storm drains flow directly into lakes, streams and rivers – and then into the Wachusett Reservoir, a drinking water supply for 2.2 million Massachusetts residents.

Once this discharge reaches waterways, it creates problems such as turbidity (cloudiness of the water) and chemical changes to the water. These changes effect drinking water quality and can even kill fish and other aquatic wildlife.



Ideally, the only thing that should leave your project's site and enter a storm drain is rainwater – clean, uncontaminated rainwater. An effective stormwater management program is one in which ALL potential pollutants are recognized and a plan is designed to control or prevent them. As a result, you will ensure the safety of the public and preserve the quality of local waters.

For a more comprehensive list of Best Management Practices and stormwater guidance for the construction industry, go to the EPA's website at: [www.epa.gov](http://www.epa.gov) and search "construction stormwater."

**Wachusett Reservoir Watershed**  
Department of Conservation and Recreation  
Division of Water Supply Protection  
180 Beaman Street  
West Boylston, MA 01583  
508-792-7806  
[www.mass.gov/dcr/watersupply.htm](http://www.mass.gov/dcr/watersupply.htm)

May 2012



## General Construction and Site Supervision Stormwater Tips

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*The Wachusett  
Reservoir is only  
a storm drain  
away.*

*What goes in here ...*



*... comes out here.*

Allowing stormwater with sediment or pollutants to leave your construction site and enter into a storm drain or waterway is against federal, state, and some local laws!

As an owner, operator, or supervisor of a construction site, you may be held financially responsible for any environmental damage caused by your subcontractors or employees!

## Plan In Advance to Prevent Pollution:

- Remove existing vegetation only as needed.
- Schedule excavation, grading, and paving operations for dry weather periods.
- Designate a specific area of the site, well away from storm drains or waterways, for material storage and equipment maintenance.
- Educate your employees and subcontractors about stormwater management requirements and their pollution prevention responsibilities.
- Have extra erosion controls (such as hay bales and silt fence/silt socks) on site in case of any emergency.
- Develop and implement an effective combination of erosion and sediment controls for the site.

## Best Management Practices and good housekeeping can significantly reduce pollutant discharges from your construction site.

Please follow the suggestions below to keep local waterways free from pollutants.

- Protect all storm drain inlets and streams located near the site.
- Limit access to and from the site and stabilize construction entrances and exits.
- Sweep frequently.
- Protect stockpiles by storing under a roof, impermeable tarp, or plastic sheeting.
- Do not store or stockpile materials near a storm drain, wetland or stream.
- Perform major maintenance and repairs of vehicles off site.
- Wash out concrete mixers only in designated washout areas away from resources, and set up small mixers on tarps.
- Remove trash, debris, and wastes on a regular basis and ensure that dumpsters are covered.
- Clean up small spills immediately using dry cleanup methods, such as an absorbent. Sweep as soon as possible.
- Prevent erosion by implementing soil stabilization practices such as mulching, temporary or permanent seeding.
- Maintain all haybales and silt fence to make sure no materials are getting beyond them; replace if necessary.



You are subject to coverage under the EPA NPDES Construction General Permit (CGP) if greater than 1 acre of disturbance is proposed and stormwater may leave your site. This permit requires a Stormwater Pollution Prevention Plan (SWPPP) before ANY work begins.

The SWPPP is a plan to control stormwater discharges from your construction site. It is broader and more complicated than a typical erosion and sediment control plan, and contains more information. The SWPPP needs to be updated as work progresses, and the plan **MUST** be available on site.

For more information on SWPPP development and the CGP Notice of Intent process refer to: [www.epa.gov/npdes/stormwater/cgp](http://www.epa.gov/npdes/stormwater/cgp).

For any disturbance within the Wachusett Reservoir watershed greater than 1 acre, you most likely will also need to complete a BRP WM09 permit issued through the Mass Department of Environmental Protection as well ([www.mass.gov/dep/water/approvals/surffms.htm#npdes2](http://www.mass.gov/dep/water/approvals/surffms.htm#npdes2)).

**If you don't have Construction General Permit coverage, you could be fined up to \$32,500 per day!**

# What is Low Impact Development (LID)?

Ever wish you could simultaneously lower your site infrastructure costs, protect the environment, and increase your project's marketability? With LID techniques, you can. LID is an ecologically friendly approach to site development and storm water management that aims to mitigate development impacts to land, water, and air. The approach emphasizes the integration of site design and planning techniques that conserve the natural systems and hydrologic functions of a site.



Source: Prince George's County, DEER

Residential Lot with Bioretention  
Somerset Development  
Prince George's County, MD

## LID Benefits

In addition to the practice just making good sense, LID techniques can offer many benefits to a variety of stakeholders.

### Developers

- Reduce land clearing and grading costs
- Potentially reduce infrastructure costs (streets, curbs, gutters, sidewalks)
- Reduce storm water management costs
- Potentially reduce impact fees and increase lot yield
- Increase lot and community marketability

### Municipalities

- Protect regional flora and fauna
- Balance growth needs with environmental protection
- Reduces municipal infrastructure and utility maintenance costs (streets, curbs, gutters, sidewalks, storm sewer)
- Increase collaborative public/private partnerships

### Environment

- Preserve integrity of ecological and biological systems
- Protect site and regional water quality by reducing sediment, nutrient, and toxic loads to water bodies
- Reduce impacts to local terrestrial and aquatic plants and animals
- Preserve trees and natural vegetation

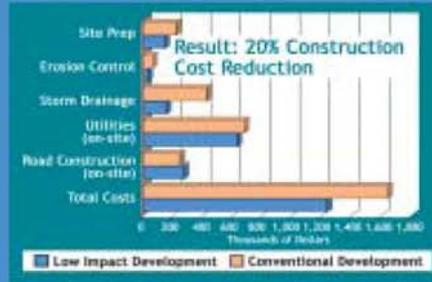
Cover Photo: R. Arendt

# Case Study

Kensington Estates is a conventional development on 24 acres consisting of 103 single-family homes in Pierce County, WA. A study was conducted to redesign the site using a new state storm water model and to illustrate the full range of LID practices and technologies available to developers.

Overall, the redesigned LID site could have:

- Resulted in construction cost savings of over 20%;
- Preserved 62% of the site in open space;
- Maintained the project density of 103 lots;
- Reduced the size of storm pond structures and eliminated catchments and piped storm conveyances; and
- Achieved "zero" effective impervious surfaces.



Cost Comparison: LID vs. Conventional Development

## For More Information

- Low Impact Development Center  
<http://www.lowimpactdevelopment.org>
- Prince George's County, Maryland  
<http://www.goprincegeorgescounty.com>
- NAHB Research Center Toolbase Services  
<http://www.toolbase.org>
- U.S. EPA  
<http://www.epa.gov/owow/nps/urban.html>



\*Assumes paving costs of \$15/sq. yd.

Printed on recycled paper with soy ink



# Builder's Guide to Low Impact Development

Would you be interested in saving upwards of \$70,000\* per mile in street infrastructure costs by eliminating one lane of on-street parking on residential streets?

Did you know that communities designed to maximize open space and preserve mature vegetation are highly marketable and command higher lot prices?

Are you aware that most homeowners perceive Low Impact Development practices, such as bioretention, as favorable since such practices are viewed as additional builder landscaping?

Did you know that by reducing impervious surfaces, disconnecting runoff pathways, and using on-site infiltration techniques, you can reduce or eliminate the need for costly storm water ponds?

# LID Site Planning and Design Concepts

Successful LID projects simultaneously reduce land development and infrastructure costs while protecting a property's natural resources and functions. During the development process, the designer, developer, and reviewing agency should work together to identify solutions that integrate the following concepts:

- Preserve Open Space and Minimize Land Disturbance;
- Protect and Incorporate Natural Systems (wetlands, stream/wildlife corridors, mature forests) as Design Elements;
- Utilize Neo-Traditional Street and Lot Layouts and Designs; and
- Decentralize and Micromanage Storm Water at its Source Using LID Storm Water Management Practices.

## LID and Storm Water Management

LID aims to mimic natural hydrology and processes by using small-scale, decentralized practices that infiltrate, evaporate, and transpire rainwater. Specifically, LID aims to:

- Minimize impervious surfaces;
- Disconnect hydrologic elements (roofs, downspouts, parking areas);
- Maintain or increase flow paths and times; and
- Utilize decentralized treatment practices.

### Retention Areas

Storm water directed to these shallow topographic depressions in the landscape is filtered, stored, and infiltrated into the ground using specialized vegetation and engineered soils.

### Grassed Swales

Water moving through these systems is slowed, filtered, and percolated into the ground. These systems are great as low-cost alternatives to curbs, gutters, and pipes.



LID Low Level Source Controls

### Preserve Open Space and Minimize Land Disturbance

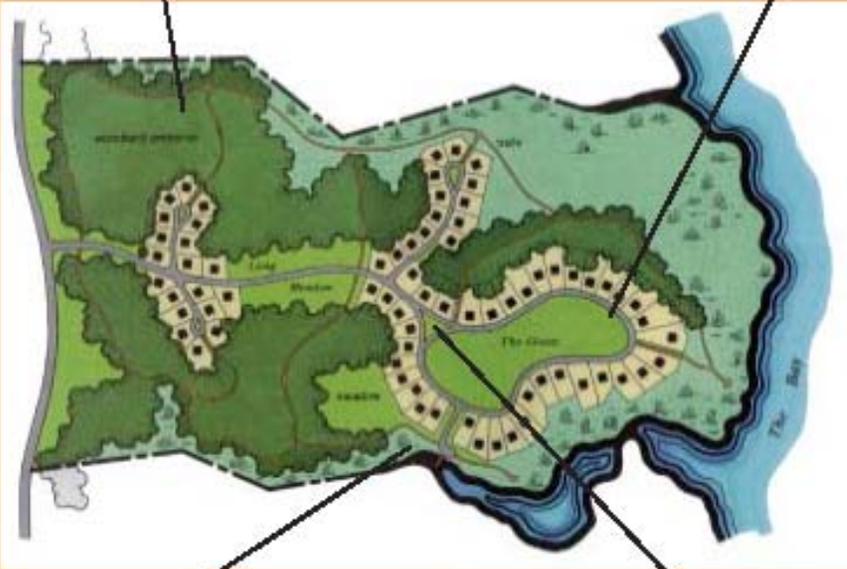
Source: EarthSource.com

Community Open Space  
Meadow Homes  
Waukesha, WI

### Decentralize and Micromanage Storm Water at its Source using LID Storm Water Management Practices

Source: Low Impact Development Center

Grassed Swales  
Somerset Development  
Prince George's County, MD



From Coleman et al. Design for Sustainability: A Practical Guide to Creating Open Space Networks, by Forest G. Akerman Copyright (c) 1996 by Idara Press. Reprinted by permission of Idara Press, Washington, D.C. and Cooke, CA.

### Protect and Incorporate Natural Systems as Design Elements

Source: Applied Ecological Services, Inc.

Wetland System  
Prairie Crossing  
Garylake, IL

### Utilize Neo-Traditional Street and Lot Layouts and Designs

Source: 1997, B.C.A.

Bowman Park  
Vermilion Community  
Vermilion, NC

# Malden Stormwater Management Program Plan

## ATTACHMENT 5

*MCM 1 Public Education and Outreach*

**BMP 1.3- Business/Commercial Facility Education and  
Outreach**

# Pollution Prevention for Businesses



## How Businesses Can Use Pollution Prevention for a Cleaner

### City of Malden

#### What is Pollution Prevention?

Pollution prevention (P2) is a combination of activities that reduce or eliminate the amount of possible chemical contaminants at the business or prevent these chemicals from entering the environment or waste stream.

A successful Pollution Prevention program will consider how to use raw materials, water energy, and other resources more efficiently, how to substitute less harmful substances for more hazardous ones, and examine whether toxic substances can be eliminated from the business.

*P2 can best be accomplished using these three methods:*

- *source reduction*
- *reuse/recycling*
- *energy recovery.*

Source reduction is the preferred method of P2 and allows for the most significant improvements in environmental protection by avoiding the generation of waste in the first place. Reuse/ recycling and energy recovery are also good tools to reduce potential environmental problems, and also can be used to lower the cost of business.

#### Why Is Pollution Prevention Important?

Any chemicals or wastes at your business that are exposed to rainwater will run off into the soil or into our town's storm drains, then into nearby lakes and streams.

Our municipal stormwater system was originally designed to carry runoff efficiently away from roads and buildings, then to deliver that runoff to ponds, lakes and streams. Since our storm drain system does not have any built-in treatment, whatever gets into our storm drains gets into our environment, with the potential to damage our local ponds and streams.

That's why P2 is so important: it reduces the amount of pollution going to our local waterways.

#### What Are the Business Benefits of Using Pollution Prevention?

P2's economic benefits include greater business efficiency, increased competitiveness, and reduced costs for regulatory monitoring and compliance. By preventing the generation of waste, P2 can also reduce or eliminate long term liabilities, clean-up, storage, and disposal costs.

And by preventing pollution there is a greater likelihood that your company will be in compliance with local, state, and federal statutes.

## **How Can A Business Start Using Pollution Prevention?**

P2 for your business can be accomplished through methods such as source reduction, reuse/recycling, and energy recovery. While each business is different, each of these methods can be implemented anywhere.

### ***Source Reduction***

- Incorporating environmental considerations into the designing of products, buildings, and manufacturing systems enables them to be more resource-efficient.
- Rethinking daily operations and maintenance activities can help industries eliminate wasteful management practices that increase costs and cause pollution.
- Controlling the amount of water used in cleaning or manufacturing can produce less wastewater.
- Re-engineering and redesigning a facility or certain operation can take advantage of newer, cleaner and more efficient process equipment.
- Buying the correct amount of raw material will decrease the amount of excess materials that are discarded (for example, paints that have a specified shelf life).

### ***Reuse/Recycling***

- Using alternative materials for cleaning, coating, lubrication, and other production processes can provide equivalent results while preventing costly hazardous waste generation, air emissions, and worker health risks.
- Using “green” products decreases the use of harmful or toxic chemicals (and are more energy efficient than other products).
- One company’s waste may be another company’s raw materials. Finding markets for waste can reduce solid waste, lessen consumption of virgin resources, increase income for sellers, and provide an economical resource supply for the buyers.

### ***Energy Recovery***

- Using energy, water, and other production inputs more efficiently keeps air and water clean, reduces emissions of greenhouse gases, cuts operating costs, and improves productivity.

#### ***What Are the Environmental Benefits of Using Pollution Prevention?***

*Using P2 can benefit your community both environmentally and economically. P2's health and environmental benefits include cleaner air and water, fewer greenhouse gas emissions, less toxic waste to manage, less solid waste going to landfills, greater workplace safety, and better stewardship of natural resources.*

*This can also lead to a reduction in workplace exposures to hazardous materials, which can positively affect your workers' health and productivity.*

## Storm Drain Stenciling

Maintenance and cleaning of catch basins not located on a public street are the responsibility of the property owner. No material should ever be dumped into a catch basin.

To help to educate employees and discourage illegal dumping, property owners may wish to stencil their catch basins with a "Don't Dump" message.

**When It Rains, It Drains.**  
**Protect Our Local Waterways.**



## Report Illegal Dumping

The dumping of any material into a catch basin is illegal in Malden. If you observed someone dumping, immediately report it to Malden Engineering at **781-397-7040**



**Boston Water and  
Sewer Commission**

Community Services Department

980 Harrison Avenue  
Boston, MA 02119-2540  
[www.bwsc.org](http://www.bwsc.org)

Martin J. Walsh  
*Mayor, City of Boston*

Henry F. Vitale  
*Executive Director/CFO  
and Treasurer*

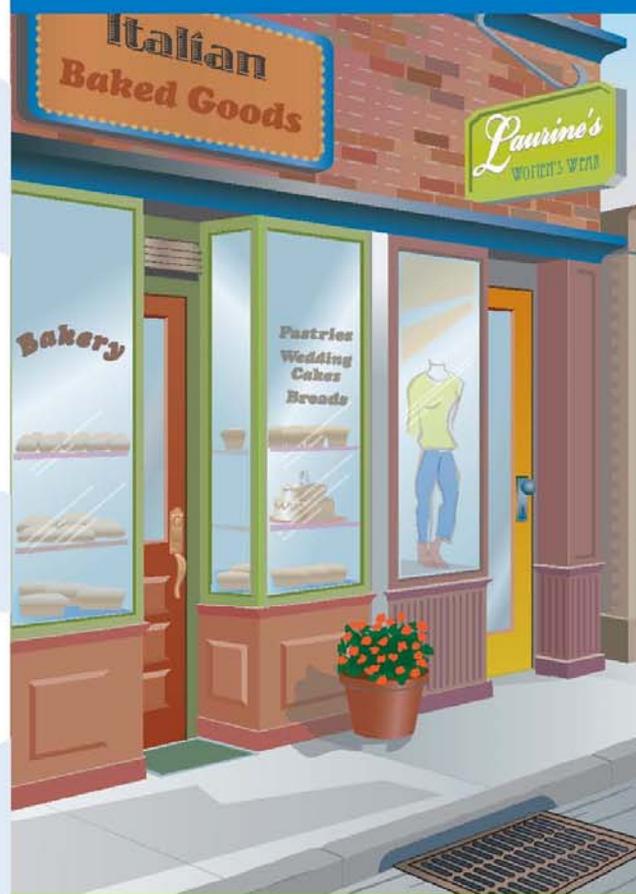


2014



Boston Water and Sewer Commission

# Stormwater Management for Small Businesses



## What Is Stormwater Pollution?

Stormwater is rain or snowmelt that flows over the ground. As stormwater runs over impervious surfaces, like driveways, roofs, sidewalks, and streets, it can pick up pollutants that have collected on these surfaces—such as motor oil, fertilizers, pesticides, and trash—and deposit them into catch basins.

Stormwater flows into the storm drain system and is discharged, without treatment, into nearby waterways,

Property owners are responsible for all pollutants leaving their property, including pollutants in stormwater. Here are some things you and your employees can do to prevent stormwater pollution.



## Property Maintenance Tips

- ▶ Sweep outdoor areas daily for trash and litter control. Do **not** dispose of trash in catch basins.
- ▶ Provide trash receptacles in highly visible locations and outdoor receptacles for cigarette butts, particularly in employee break areas.
- ▶ Keep the area surrounding your dumpster clean and the lid closed. Make sure the clean-out plug is properly secured to prevent leaking.
- ▶ If you must hose down an area, don't use detergents or chemical cleaners to wash sidewalks or driveways.
- ▶ Dispose of all waste wash water in a janitorial sink or a floor drain that is properly connected to the sewer system. Never pour wash water onto a parking lot, alleyway, sidewalk, or street, as these areas ultimately drain to local waterways.



## How to Dispose of Hazardous Waste

**Never dump hazardous waste**—including chemicals, automotive fluids, paint, and commercial waste—**into catch basins**. Dispose of hazardous waste properly.

If you are unsure as to how to dispose of a certain material, consult the manufacturer of the product or call the Massachusetts Hazardous Waste Hotline for Businesses at 617-292-5898.

## Reminders for Restaurants and Food Establishments

- ▶ Properly maintain any grease traps in your establishment, in accordance with Boston Water and Sewer Commission (BWSC) regulations.
- ▶ Dispose of cooking oil and grease properly either in a receptacle designed to contain grease or by hiring a waste hauler.
- ▶ Do not pour oil and grease into sinks, floor drains, catch basins, or onto the ground.
- ▶ Wash garbage cans, floor mats, and kitchen equipment in designated wash areas that drain to the sewer system.

## Help Prevent Stormwater Pollution

- ▶ Don't dump into catch basins.
- ▶ Keep property clear of trash and debris.
- ▶ Keep dumpster area clean.
- ▶ Provide trash receptacles for customers.
- ▶ Dispose of wash water properly.
- ▶ Stencil storm drains on your property.

**Don't Dump!**



**Protect Local Waterways.**

# Malden Stormwater Management Program Plan

## ATTACHMENT 6

*MCM 1 Public Education and Outreach*

**BMP 1.4- Industrial Facility Education and Outreach**

## **Erosion prevention, sediment control, and runoff management**

Where soils are exposed to water, wind, or ice, erosion can result.

Typical non-structural BMPs that can be implemented to limit erosion and control sediment include:

- Leaving as much vegetation onsite as possible
- Minimizing the length of time bare soil is exposed
- Diverting or preventing runoff from flowing across exposed areas
- Stabilizing disturbed soils as soon as possible

## **Dust control**

Dust comes from smokestacks and vents, stockpiles, cleared ground, gravel roads, and open areas.

Non-structural methods to control dust include:

- Storing all materials, products, and waste inside the facility
- Routine cleaning of vents and filters
- Spraying controlled amounts of uncontaminated stormwater to dampen dust-generating areas
- Regular sweeping

## **Eliminating unauthorized non-stormwater discharges (illicit discharges)**

Your site's stormwater system is designed to handle stormwater, but is not designed to handle illicit discharges like sewage and septic flows, washwater, spills and other dumped materials.

Non-structural BMPs for non-stormwater discharges include:

- Inspecting and testing floor drains, sinks, and process drains; eliminating connections to storm sewers, surface or subsurface drains
- Preventing mixing of non-stormwater and stormwater discharges; once mixed, the discharge cannot be managed as stormwater and requires different permits. Illicit discharges are not authorized under the industrial stormwater permit.

Brought to you by the City of

Malden



# **STORMWATER POLLUTION PREVENTION FOR INDUSTRIAL SITES**

Contaminated stormwater is a source of pollutants in many of our ponds, lakes, rivers and streams.

Storm drains carry runoff from streets, urban centers, and industrial sites, and open spaces into streams, creeks, and rivers.

Industrial operations are only one contributor to this problem, but they are known to be a source of heavy metals, oily wastes, and other substances.

Reducing or eliminating the exposure of industrial operations to rainfall and runoff is a proven way to reduce pollution into our surface waters.

## What Is a Stormwater Pollution Prevention Plan?

A Stormwater Pollution Prevention Plan (SWPPP) describes how you are going to reduce or eliminate stormwater pollution from your industrial operations.

Federal stormwater regulations require many kinds of industrial facilities to take steps to prevent storm water pollution.

Based upon SIC codes and stormwater exposure, your facility may need to be covered under the Multi Sector General Permit (MSGP.)

If so, you need to prepare a SWPPP that is in part a collection of Best Management Practices (pollution control measures) like the ones described in this brochure.

For more information on coverage under the Multi Sector General Permit, see <https://www.epa.gov/npdes/stormwater-discharges-industrial-activities#msgp>.



## How Do I Prevent Stormwater Pollution at My Industrial Operations?

### Salt Storage

Any facility using salt must manage it to prevent contact with stormwater.

Usual BMPs include covering salt piles and placing an impervious pad under salt storage and work areas.

Additional BMPs to manage salt storage:

- Use environmentally-friendly de-icing products
- Apply de-icing products sparingly
- Sweep up salt that is tracked out of the storage area
- Train employees about proper salt application and storage

### Employee training program

Employee training is crucial to making sure these BMPs actually reduce pollution. Training should occur at least once a year and can be achieved by through formal classes, in-house training sessions, webinars, and on-the-job training.

### Spill prevention and response procedure

A spill prevention and response procedure enables your staff to quickly and consistently respond to any spills that may occur.

Typical spill prevention and response procedures include:

- Identifying potential discharge locations
- Identifying monitoring locations or surface waters that may be impacted by emergency firefighting techniques
- Training employees in proper prevention and response techniques
- Developing and implementing proper material handling, storage, and cleanup procedures
- Posting contact information for all individuals who need to be notified in the event of a spill
- Promptly reporting and documenting any spills or leaks to appropriate individuals

# Malden Stormwater Management Program Plan

## ATTACHMENT 7

*MCM 1 Public Education and Outreach*

**BMP 1.5- Pet Waste Education and Outreach**

## What's the Problem with Dog Waste?

Dog waste left in our yards, forest areas and parks can have many adverse effects on the environment.

It's full of harmful bacteria and excess nutrients.

Besides being a neighborhood nuisance, dog waste can make people sick, especially children who are more likely to come into contact with it while playing.

Dog waste left on lawns can also kill or damage grass and other plants.

When dog waste is washed into ponds or streams, the waste decays, uses up oxygen in the water, and sometimes releases ammonia. This can kill fish!

Dog waste also contains nutrients that encourage weed and algae growth.

Too much of these nutrients turn water cloudy and green . . . imagine this in your backyard pond or stream!



Managing dog waste properly is something easy that everyone can do to make a difference in the quality of our surface waters.

**Brought to you by the  
City of Malden**



## **DOG WASTE AND SURFACE WATER QUALITY**

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### Did You Know?

There are over 1,500 licensed dogs in our city.

Each of these dogs produces about  $\frac{3}{4}$  pound of solid waste and over 7 billion bacteria daily!



Rainfall and snowmelt in the City of Malden goes untreated into our stormwater system, then directly into local streams, ponds and rivers.

As it flows, stormwater picks up contaminants and pollutants in its path.

That's why it's important to make sure that dog waste and its pollutants do not end up in the storm drains.

## What's So Bad About Dog Waste?

*Bacteria and other parasites found in pet waste, such as Giardia and Cryptosporidium, can survive for long periods when left on the ground.*

*During a rain storm, these pollutants can be washed into local rivers and ponds and into local drinking water supplies.*

Individual actions can result in significant water quality improvements when carried out by many people.

Unlike some forms of stormwater pollutants, individual people can easily and economically manage dog waste and help keep our waters safe and aesthetically pleasing.

## How You Can Help



**BRING IT** – Always bring a plastic bag when you walk your dog.

**BAG IT** – Use the bag as a glove to pick up the dog waste. Scoop it up and turn the bag inside out around the waste.

**DISPOSE IT** – Properly dispose of dog waste by putting it in a trash can. **Never throw dog waste down a storm drain.**

### **AND REMEMBER**

- Pick up after your pet in your yard
- Only bring your dog where dogs are allowed.
- City Ordinance 9.23(e) requires proper management of pet waste to prevent a nuisance.

# Malden Stormwater Management Program Plan

## ATTACHMENT 8

*MCM 1 Public Education and Outreach*

**BMP 1.6- Grass Clippings/Fertilizer Education and Outreach**

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## **Stormwater Pollution Education: Fertilizing the Lawn**

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**When you fertilize the lawn, remember . . .  
you're not just fertilizing the lawn.**

It's hard to imagine that a green, flourishing lawn could pose a threat to the environment, but the fertilizers you apply to your lawn are potential pollutants! If applied improperly or in excess, fertilizer can be washed off your property and end up in lakes and streams. This causes algae to grow, which uses up oxygen that fish need to survive. So if you fertilize, please follow directions and use sparingly.



**Clean water is important to all of us.**

It's up to all of us to make it happen. In recent years, sources of water pollution like industrial wastes from factories have been greatly reduced. Now, more than 60 percent of water pollution comes from stormwater runoff, which picks up pollutants like leaking oil from cars, fertilizers from farms and gardens, and failing septic tanks. All these sources add up to a big pollution problem.

But each of us can do small things to help clean up our water - and that adds up to a pollution solution!

## Why do we need clean water?

Having clean water is of primary importance for our health and economy. Clean water provides recreation, commercial opportunities, fish habitat, drinking water, and adds beauty to our landscape. All of us benefit from clean water-and all of us have a role in getting and keeping our lakes, rivers, streams, marine, and ground waters clean.

## What's the problem with fertilizers?

Fertilizer is a "growing" problem for lakes, rivers, and streams, especially if it's not used carefully. If you use too much fertilizer or apply it at the wrong time, it can easily wash off your lawn or garden into storm drains and then flow into lakes or streams. Just like in your garden, fertilizer in lakes and streams makes plants grow. In water bodies, extra fertilizer can mean extra algae and aquatic plant growth. Too much algae causes water quality problems and makes boating, fishing, and swimming unpleasant. As algae decay, it uses up oxygen in the water that fish and other wildlife need.

### **Clean Water Tips: How can you fertilize and help keep our waters clean?**

- Use fertilizer sparingly. Many plants don't need as much fertilizer or need it as often as you might think.
- Don't fertilize before a rain storm.
- Consider using organic fertilizers. They release nutrients more slowly.

Have your soil tested before applying fertilizers to your lawn and gardens.

A standard soil test costs \$15. You may not need to add any fertilizer.

To order a soil test or for more information contact the

UMass Extension Soil Testing Lab at 413-545-2311

<http://soiltest.umass.edu/ordering-information>

**Brought to you by the City of Malden**



## FACTSHEET

# Massachusetts Plant Nutrient Regulations: Non-Agricultural Turf and Lawns

### Why were plant nutrient regulations implemented?

In 2012, the Massachusetts Legislature passed *An Act Relative to the Regulation of Plant Nutrients* (Act).<sup>i</sup> The Act directed the Department of Agricultural Resources (MDAR) to develop regulations to ensure that plant nutrients are applied in an effective manner to provide sufficient nutrients for maintaining healthy agricultural and non-agricultural land (turf and lawns), while minimizing the impacts of the nutrients on surface and ground water resources to protect human health and the environment.

### What do the regulations involve?

The Act and regulations<sup>ii</sup> establish standards for applications of plant nutrients, including limitations on phosphorus-containing fertilizer, to non-agricultural turf and lawns. The regulations also enhance the ability of municipalities to maximize the credits relative to storm water discharge or similar permits issued by the United States Environmental Protection Agency (EPA). The regulations also address plant nutrient applications to agricultural land, which are summarized in a separate factsheet. The regulations became effective on June 5, 2015.

### Who will likely be impacted by these regulations?

In general, these regulations impact anyone who applies plant nutrients (including commercial fertilizer and various other plant nutrient materials) to both agricultural and non-agricultural land (lawns and turf). Record-keeping requirements for non-agricultural applications only apply to professional applicators.

### What do these regulations require?

Homeowners and professionals are required to obey plant nutrient application restrictions and follow University of Massachusetts Amherst Extension Guidelines (UMass Guidelines) for nutrient management when applying plant nutrients on non-agricultural turf and lawns.<sup>iii</sup>

### Specific restrictions and requirements for turf and lawns:

- Phosphorus-containing fertilizer may only be applied when a soil test indicates that it is needed or when a lawn is being established, patched or renovated.
- Do not apply plant nutrients to sidewalks or other impervious surfaces. Plant nutrients that land on these surfaces must be swept back onto the grass or cleaned up.
- No applications of plant nutrients shall be made:
  - between December 1 and March 1;
  - to frozen and/or snow covered soil;
  - to saturated soil, or soils that are frequently flooded;
  - within 20 feet of waterways if using a broadcast method, or 10 feet if using a more targeted application method, such as a drop spreader;

- within a Zone I of a public water supply well or within 100 feet of surface waters that are used for public drinking water supply.
- Plant nutrient applied shall not exceed UMass Guidelines for plant nutrient application rates to turf.
- In determining the amounts of phosphorus and nitrogen that may be applied, the amount known to have been applied with organic plant nutrient sources (such as natural organic fertilizer, compost, and biosolids) should be accounted for.
- The amount of phosphorus applied with organic sources shall not exceed the maintenance phosphorus rates for turf as specified in the UMass Guidelines. Soil testing provides the most accurate method for determining the phosphorus requirements.
- Application of biosolids shall comply with the regulatory requirements for land application of such materials (330 CMR 32.00).
- Soil tests for nutrient analysis shall be obtained from the UMass Extension Soil Testing Lab or a laboratory using methods and procedures recommended by UMass. A soil test is valid for 3 years.
- Record keeping of plant nutrient applications to lawn and turf is required for professional applicators. Information to be recorded, when applicable, includes site location and size, soil test results, date of application, type and amount of plant nutrients applied.

## **Retailer Requirements**

Retailers who sell phosphorus-containing fertilizer are required to:

- Display phosphorus-containing fertilizer products separate from non-phosphorus fertilizer products; and
- Post a sign displaying language informing the consumer about phosphorus-containing fertilizer restrictions for turf and lawns.<sup>iv</sup>

## **Enforcement**

MDAR has the statutory enforcement authority and may impose an administrative penalty for violations of any provisions in these regulations.

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<sup>i</sup> An Act Relative to the Regulation of Plant Nutrients:

<https://malegislature.gov/Laws/SessionLaws/Acts/2012/Chapter262>

<sup>ii</sup> 330 CMR 31.00 et seq.: <http://www.mass.gov/eea/docs/agr/pesticides/docs/plant-nutrient-regulations.pdf>

<sup>iii</sup> UMass Guidelines for Nutrient Management:

<http://ag.umass.edu/turf/publications-resources/nutrient-management-information>

<sup>iv</sup> 330 31.08 requires the following language: “PHOSPHORUS RUNOFF POSES A THREAT TO WATER QUALITY. THEREFORE, UNDER MASSACHUSETTS LAW, PHOSPHORUS CONTAINING FERTILIZER MAY ONLY BE APPLIED TO LAWN OR NON-AGRICULTURAL TURF WHEN (i) a Soil Test indicates that additional phosphorus is needed for the growth of that Lawn or Non-agricultural Turf; or (ii) is used for newly established Lawn or Non-agricultural Turf during the first growing season.”

# Malden Stormwater Management Program Plan

## ATTACHMENT 9

*MCM 1 Public Education and Outreach*

**BMP 1.7- Leaf Waste Education and Outreach**

# Malden Stormwater Management Program Plan

## ATTACHMENT 10

*MCM 1 Public Education and Outreach*

**BMP 1.8- Septic System Owner Education and Outreach**

The following information is being provided to you as City of Malden records indicate that you are an owner of a private septic system. The City currently maintains a permit issued jointly by the USEPA and the Massachusetts Department of Environmental Protection (MDEP) to discharge stormwater collected throughout the city to waters of the Commonwealth of Massachusetts and the United States. The City of Malden is required under that permit to provide owners of private septic systems information regarding the proper maintenance of a septic system in an effort to eliminate any potential for impacts to surface waters located within Malden. The following information being provided was prepared by MDEP and further information is available on their website through the link provided below. If you should have any questions or require any additional information, please contact the Malden Board of Health or Malden Engineering Department.

**OFFERED BY**

**Massachusetts Department of Environmental Protection**  
<https://www.mass.gov/guides/caring-for-your-septic-system>

**RELATED TO**

**Septic Systems & Title 5**

**GUIDE**

# **Guide Caring for Your Septic System**

Septic systems are individual wastewater treatment systems, usually for individual homes. They are typically used in rural or lot settings where central wastewater treatment is not efficient.

## **What is a Septic System?**

Septic systems are individual wastewater treatment systems (conventional septic systems, innovative/alternative (I/A) systems, or cesspools) that use the soil to treat small wastewater flows, usually from individual homes. They are

typically used in rural or large lot settings where centralized wastewater treatment is impractical.

There are many types of septic systems in use today. While all systems are individually designed for each site, most systems are based on the same principles.

A conventional septic system consists of a septic tank, a distribution box and a drainfield, all connected by pipes, called conveyance lines.

Your septic system treats your household wastewater by temporarily holding it in the septic tank where heavy solids and lighter scum are allowed to separate from the wastewater. This separation process is known as primary treatment. The solids stored in the tank are decomposed by bacteria and later removed, along with the lighter scum, by a professional septic tank pumper.

After partially treated wastewater leaves the tank, it flows into a distribution box, which separates this flow evenly into a network of drainfield trenches. Drainage holes at the bottom of each line allow the wastewater to drain into gravel trenches for temporary storage. This effluent then slowly seeps into the subsurface soil where it is further treated and purified (secondary treatment). A properly functioning septic system does not pollute the groundwater.

## **How often should I pump out my septic system?**

Regular maintenance is the most important thing in making sure your septic system works well.

Regular pumping helps prevent solids from escaping into the drainfield and clogging soil pores. **While pumping frequency is a function of use, MassDEP recommends that systems be pumped at least once every three years for homes not having a garbage disposal. If the home's system has a garbage disposal, it should be pumped every year.**

If you are a nonresidential system owner, you should determine how often to pump based on prior accumulation and pumping records. Often you can look

at pumping intervals to gauge your pumping schedule (i.e., previously did you wait too long before having your tank pumped and it was filled to capacity, or could you have waited a little longer to pump?).

An amazing number of system owners believe that if they haven't had any problems with their systems, they don't need to pump out their tanks. Unfortunately this is a serious and sometimes costly misconception. As your system is used, solid materials settle to the bottom of the tank, forming a sludge layer. Grease and lightweight materials float to the surface of the septic tank as scum.

Normally, properly designed tanks have enough space for up to three to five years' safe accumulation of sludge. When the sludge level increases beyond this point, sewage has less time to settle properly before leaving the tank. As the sludge level increases, more solid wastes escape into the soil absorption system (SAS). If the SAS becomes so clogged that it cannot absorb liquid at the rate at which it enters the tank, the plumbing will "back up" or unsanitary wastewater will bubble to the surface.

When hiring a pumper, be sure the local Board of Health has licensed them, and always make sure you get a paid receipt from the pumper that spells out the details of the transaction (how many gallons were pumped out of the tank, the date, the charges, and any other pertinent results). Retain this receipt for your records. The pumper sends a copy of this report to the local Board of Health.

**MassDEP recommends that a properly maintained septic system should be pumped out at least once every 3 years!**

## **Failing Septic Systems Can Be Hazardous to Your Health**

Septic systems that have been properly maintained helps prevent the spread of disease.

Failing systems can

- cause a serious health threat to your family and neighbors,
- degrade the environment, especially lakes, streams and groundwater,
- reduce the value of your property,
- be very expensive to repair,
- and put thousands of water supply users at risk if you live in a public water supply watershed and fail to maintain your system.

Be alert to these warning signs of a failing system:

- sewage surfacing over the drainfield (especially after storms),
- sewage back-ups in the house,
- lush, green growth over the drainfield,
- slow draining toilets or drains,
- sewage odors.

# Malden Stormwater Management Program Plan

## ATTACHMENT 11

*MCM 2 Public Participation in SWMP Development*

**BMP 2.2- Public Comments and Revisions**

# Malden Stormwater Management Program Plan

## ATTACHMENT 12

MCM 3 Illicit Discharge Detection and Elimination Program

**BMP 3.1- IDDE Ordinance**

# **Malden City Ordinance**

## **SECTION 11.73 MUNICIPAL STORM DRAINAGE SYSTEM**

### **.1 IN GENERAL**

The City shall maintain and, under the direction of the City Engineer, regulate use of a stormwater drainage system for the collection and dispersion of storm water runoff, snow melt runoff and surface water runoff and drainage. The City Engineer may promulgate rules and regulations to effectuate the provisions of this ordinance and may issue permits for use of the storm drainage system upon such terms and conditions as he may deem appropriate.

The City Engineer may suspend access to the municipal storm drainage system without notice whenever necessary to prevent the actual or threatened discharge of prohibited substances into the storm drainage system and, upon failure of any party to comply with such suspension order, may take all reasonable steps to prevent or minimize harm to the public health, safety, welfare or the environment.

### **.2 PROHIBITED ACTIVITIES**

No person shall dump, discharge, cause or allow to be discharged any non-stormwater discharge or pollutant into the municipal storm water drainage system. Pollutants shall include, without limitation, paints, varnishes, solvents, automotive fluids, pesticides, herbicides, fertilizers, sewage, fecal coliform and pathogens, dissolved and particulate metals, animal waste, rock, sand, salt, soils, construction wastes and residues, refuse, rubbish, garbage, litter, and other noxious or offensive matter of any kind.

No person shall construct, use, allow, maintain or continue any connection to the municipal storm water drainage system from indoor drains, sinks or toilets or which allows discharge of wastewater or wash water, whether or not said connection was approved before the effective date of this ordinance.

No person shall obstruct or interfere with the normal flow of stormwater into or out of the municipal storm drain system without prior written approval from the City Engineer.

### **.3 EXEMPTIONS**

Discharge into the municipal storm water system resulting from the following sources shall be exempt from the prohibited activities set forth in Section 11.73.2:

- .1 municipal activities, including but not limited to fire fighting, waterline flushing;
- .2 flow from potable water sources, springs, riparian habitats and wetlands, diverted stream flow and rising groundwater;
- .3 uncontaminated groundwater infiltration as defined in 40 CFR 35.2005(20), uncontaminated pumped groundwater, water from approved exterior foundation drains, crawl space pumps, air conditioning condensations and footing drains, but not including active groundwater dewatering systems;;
- .4 discharge from landscape irrigation, lawn watering or individual residential car washing
- .5 Discharge from swimming pools which contains one part per million or less of chlorine;
- .6 dye-testing, provided that prior verbal notification has been given to the City Engineer;
- .7 discharge for which prior written approval has been obtained from the City Engineer as necessary to protect public health, safety and welfare or the environment;
- .8 discharge permitted under a permit, waiver or order issued by any state or federal environmental agency, provided that said discharge is in full compliance with the requirements of permit, waiver or order and applicable laws and regulations.

#### .4 NOTIFICATION OF SPILLS

Any person in control, or in charge of emergency response, at any facility or operation in the city shall immediately, upon becoming aware of a release or threatened release of materials at the facility or operation which could result in discharge of pollutants to the municipal drainage system, take all necessary steps to insure containment and cleanup of the release.

Said person shall immediately notify the police and fire departments of the release of oil or hazardous materials.

The release of non-hazardous materials shall be reported to the City Engineer no later than the following business day.

The person charged with reporting discharge shall provide the City Engineer with written confirmation of all notifications within three business days of the discharge and shall retain, on site, a written record of the discharge and actions taken to prevent its recurrence. Said records shall be retained for no fewer than three years.

#### .5 ENFORCEMENT

The City Engineer may pursue civil and criminal remedies for violation of this ordinance or any permit or order issued pursuant thereto and may seek injunctive relief to restrain further violations or compel remediation of violations.

The City Engineer may issue written orders to compel compliance with the provisions of this ordinance and may require:

- .1 performance of monitoring, analyses and reporting to assure compliance; and
- .2 remediation of contamination resulting from violations.

Where remediation is ordered, the City Engineer shall specify the time within which such remediation shall be complete. Said order shall state that, failure to abate the violation or perform the required remediation within the specified time, may result in the city undertaking such work at the expense of the owner.

The city shall, within 30 days of completing abatement or remediation of a violation, notify the property owner of cost incurred in remediation, including administrative costs. If the amount due is not received within 30 days of notification or within thirty days following a final decision of a court of competent jurisdiction affirming or reducing the costs, the costs shall become a special assessment and shall constitute a lien on the owners property for the amount of said costs. Costs remaining unpaid more than 31 days after becoming due shall accrue interest at the rate provided by law.

# Malden Stormwater Management Program Plan

## ATTACHMENT 13

MCM 3 Illicit Discharge Detection and Elimination Program

**BMP 3.2- Sanitary Sewer Overflow Inventory**

**Table 4-1. SSO Inventory  
Malden, Massachusetts  
Revision Date: June 2019**

SSO Location <sup>1</sup>	Discharge Statement <sup>2</sup>	Date <sup>3</sup>	Time Start <sup>3</sup>	Time End <sup>3</sup>	Estimated Volume <sup>4</sup>	Description <sup>5</sup>	Mitigation Completed <sup>6</sup>	Mitigation Planned <sup>7</sup>
SMH 109.1	No discharge to MS4	9/28/2009			Unk. (Small)	Blocked main	9/29/2009	no
250 Cross St.	No discharge to MS4	9/28/2009			Unk.	Blocked lateral	9/29/2009	no
SMH near Neal	No discharge to MS4	12/17/2009			Unk	Blocked lateral	12/17/2009	no
Multiple Bsmt/SMH	Discharge to MS4 (large regional storm event)	3/15/2010			Unk. (large)	Large storm (MWRA capacity issue)	3/17/2010	no
Multiple Bsmt/SMH	Discharge to MS4 (large regional storm event)	3/29/2010			Unk. (large)	Large storm (MWRA capacity issue)	4/1/2010	no
74 Revere St.	No discharge to MS4	4/19/2012			500 gals.	Blocked lateral	4/19/2012	no

<sup>1</sup> Location (approximate street crossing/address and receiving water, if any)

<sup>2</sup> A clear statement of whether the discharge entered a surface water directly or entered the MS4

<sup>3</sup> Date(s) and time(s) of each known SSO occurrence (i.e., beginning and end of any known discharge)

<sup>4</sup> Estimated volume(s) of the occurrence

<sup>5</sup> Description of the occurrence indicating known or suspected cause(s)

<sup>6</sup> Mitigation and corrective measures completed with dates implemented

<sup>7</sup> Mitigation and corrective measures planned with implementation schedules

# Malden Stormwater Management Program Plan

## ATTACHMENT 14

MCM 3 Illicit Discharge Detection and Elimination Program  
**BMP 3.2- Sanitary Sewer Overflow MDEP Notification Forms**



**Massachusetts Department of Environmental Protection**  
 Bureau of Water Protection – Wastewater Management Program  
**Sanitary Sewer Overflow (SSO)/Bypass**  
**Notification Form**

FOR DEP USE ONLY

\_\_\_\_\_  
 Tax Identification Number

**A. Reporting Facility**

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. Facility Information

\_\_\_\_\_  
 Reporting Sewer Authority

\_\_\_\_\_  
 Permit #

2. Authorized Representative Transmitting Form:

\_\_\_\_\_  
 First Name

\_\_\_\_\_  
 Last Name

\_\_\_\_\_  
 Telephone No.

\_\_\_\_\_  
 Title

\_\_\_\_\_  
 E-mail Address

**B. Phone Notifications:**

See DEP Regional Office telephone and fax numbers at the end of this form.

1. **MassDEP staff** contacted:

\_\_\_\_\_  
 first name

\_\_\_\_\_  
 last name

Date/Time contacted:

\_\_\_\_\_  
 Date

\_\_\_\_\_  
 Time

am  pm

2. **EPA staff** contacted:

\_\_\_\_\_  
 first name

\_\_\_\_\_  
 last name

Date/Time EPA contacted:

\_\_\_\_\_  
 Date

\_\_\_\_\_  
 Time

am  pm

3. Board of Health contacted:

\_\_\_\_\_  
 First Name

\_\_\_\_\_  
 Last Name

Date/Time contacted:

\_\_\_\_\_  
 Date

\_\_\_\_\_  
 Time

am  pm

4. Others notified (select all that apply);

Conservation Commission

Harbormaster

Shellfish Warden

Division of Marine Fisheries

Downstream Drinking Water Supplier

Watershed Association

Beach Resource Manager  Other:

\_\_\_\_\_  
 (specify)

**C. SSO Information**

1. SSO Discovered:

\_\_\_\_\_  
 Date

\_\_\_\_\_  
 Time

am  pm

By: \_\_\_\_\_

2. SSO Stopped:

\_\_\_\_\_  
 Date

\_\_\_\_\_  
 Time

am  pm

3. SSO Discharge from:

Sanitary Sewer Manhole

Pump Station

Backup into Property

Other:

\_\_\_\_\_  
 (specify)

4. SSO Discharge to:

Ground Surface (no release to surface water)

Direct to Receiving Water

\_\_\_\_\_  
 (surface water)

Catch basin to Receiving Water

\_\_\_\_\_  
 (surface water)

Backup into Property Basement



**Massachusetts Department of Environmental Protection**  
 Bureau of Water Protection – Wastewater Management Program  
**Sanitary Sewer Overflow (SSO)/Bypass**  
**Notification Form**

FOR DEP USE ONLY

\_\_\_\_\_  
 Tax Identification Number

**C. SSO Information (cont.)**

Location: \_\_\_\_\_  
 (Description of discharge site or closest address)

5. Estimated SSO Volume at time of this Report: \_\_\_\_\_

Method of Estimating Volume: \_\_\_\_\_

6. Cause of SSO Event:

Rain Event     Pump Station Failure     Insufficient Capacity in System

Treatment Unit failure

Sewer System Blockage:     Pipe Collapse     Root Intrusion     Grease Blockage

Other: \_\_\_\_\_  
 (Specify)

7. Corrective Actions Taken:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Impact Area cleaned and/or disinfected:     Yes     No

\_\_\_\_\_  
 \_\_\_\_\_

Corrective Actions Completed:     Yes     No

\_\_\_\_\_

**D. Comments/Attachments/Follow-up**

I wish to provide (select all that apply):

Attachment     Additional comments below:     No additional comments or attachments

Additional comments and planned actions:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



**Massachusetts Department of Environmental Protection**  
Bureau of Water Protection – Wastewater Management Program  
**Sanitary Sewer Overflow (SSO)/Bypass**  
**Notification Form**

FOR DEP USE ONLY

\_\_\_\_\_  
Tax Identification Number

---

**E. Certification Statement**

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, 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.

\_\_\_\_\_  
Signature of Authorized Representative

\_\_\_\_\_  
Date Signed

Please keep a copy of this report for your records. When submitting additional information, include the MassDEP Incident Number from this report.

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**MassDEP Regional Office and EPA Telephone and Fax Numbers:**

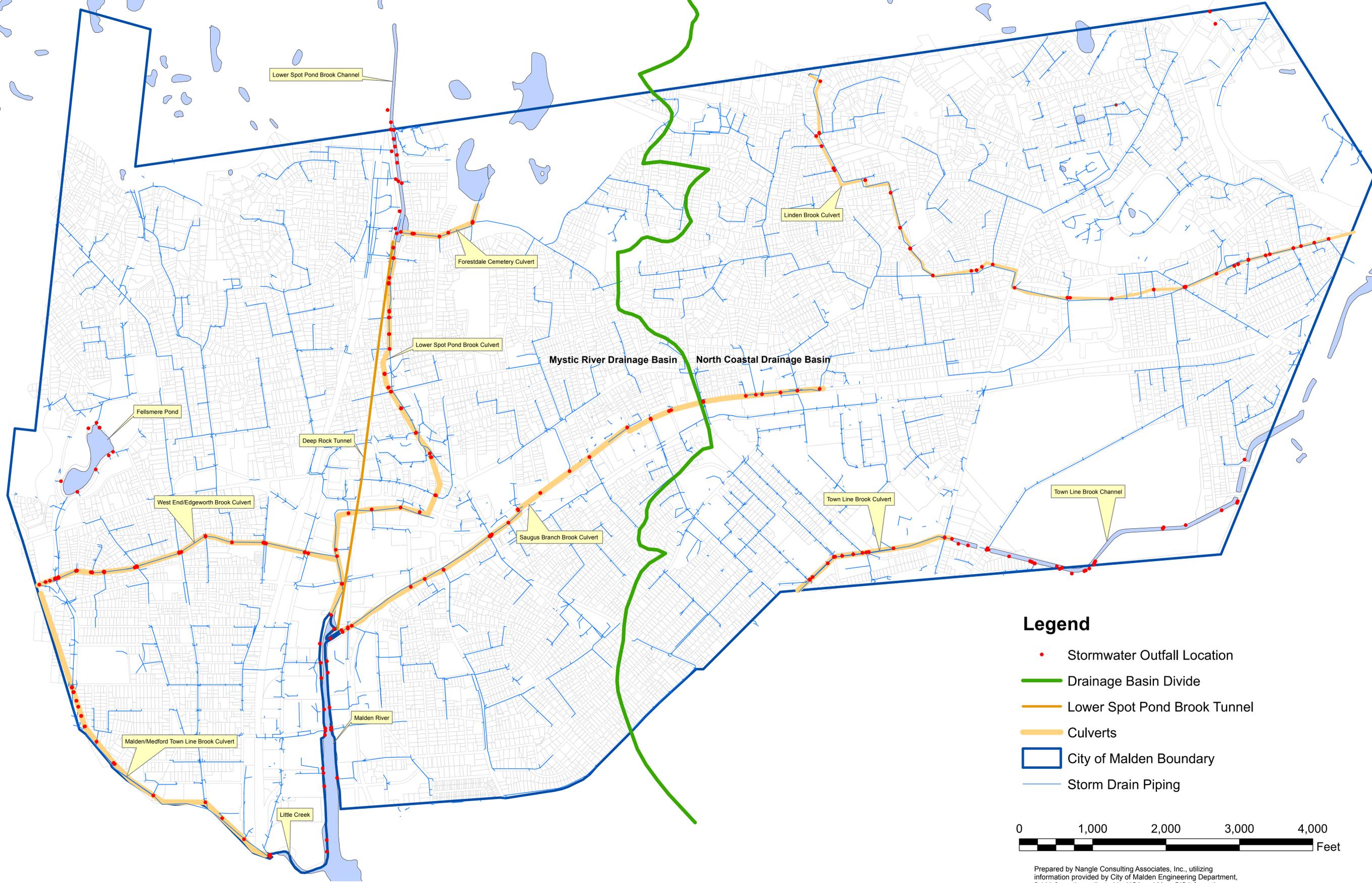
Northeast Region	Phone: 978-694-3215	Fax: 978-694-3499
Southeast Region	Phone: 508-946-2750	Fax: 508-947-6557
Central Region	Phone: 508-792-7650	Fax: 508-792-7621
Western Region	Phone: 413-784-1100	Fax: 413-784-1149
EPA	Phone: 617-918-1510	
EPA for Southeast Region, David Turin	Phone: 617-918-1598	Fax: 617-918-0598
EPA for Northeast, Central and Western Regions, Douglas Koopman	Phone: 617-918-1747	Fax: 617-918-0747
DEP 24-hour emergency	Phone: 888-304-1133	

# Malden Stormwater Management Program Plan

## ATTACHMENT 15

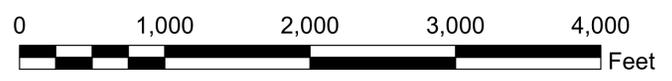
MCM 3 Illicit Discharge Detection and Elimination Program

**BMP 3.3- Map of Storm Drain System**



**Legend**

- Stormwater Outfall Location
- Drainage Basin Divide
- Lower Spot Pond Brook Tunnel
- Culverts
- City of Malden Boundary
- Storm Drain Piping



Prepared by Nangle Consulting Associates, Inc., utilizing information provided by City of Malden Engineering Department, field information collected by NCA and MassGIS information. Locations shown are approximate.

**City of Malden Stormwater Outfall Location Map - September 2018**

MALDEN, MASSACHUSETTS



# Malden Stormwater Management Program Plan

## ATTACHMENT 16

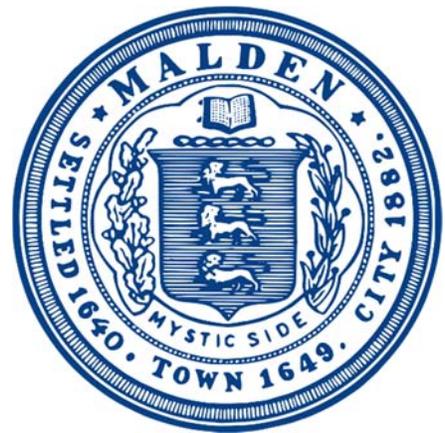
MCM 3 Illicit Discharge Detection and Elimination Program

**BMP 3.5- IDDE Program Plan**

# Illicit Discharge Detection and Elimination (IDDE) Plan

MALDEN  
MASSACHUSETTS

June 30, 2019



*This IDDE Plan was developed utilizing a template provided by USEPA Region 1 that was prepared by the Central Massachusetts Regional Stormwater Coalition along with the engineering firm Fuss & O'Neill. The template was developed under a stormwater technical assistant grant from MassDEP for municipalities to use when creating their own IDDE Program Plan.*

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- Attachment A – Legal Authority (IDDE Bylaw or Ordinance)
- Attachment B – Stormwater System Mapping
- Attachment C – SSO Notification Form
- Attachment D – Table 5-1, Outfall Inventory and Priority Ranking
- Attachment E – Outfall Inspection Forms
- Attachment F – Field Forms, Sample Bottle Labels
- Attachment G – Chain of Custody Form (Sample)
- Attachment H – Water Quality Analysis User’s Manuals and Standard Operating Procedures
- Attachment I – Manhole Inspection Form
- Attachment J – Source Isolation and Confirmation SOPs
- Attachment K – IDDE Employee Training Record

# 1 Introduction

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## 1.1 MS4 Program

This Illicit Discharge Detection and Elimination (IDDE) Plan has been developed by the city of Malden to address the requirements of the United States Environmental Protection Agency's (USEPA's) 2016 National Pollutant Discharge Elimination System (NPDES) General Permit, which became effective on 1 July 2018, for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts, hereafter referred to as the "current MS4 Permit" or the "MS4 Permit." The MS4 permit is administered jointly by USEPA and the Massachusetts Department of Environmental Protection (MassDEP), with EPA maintaining the primary responsibility for compliance. This IDDE Plan was developed by the city of Malden Engineering Department in consultation with Nangle Consulting Associates, Inc. utilizing a template provided by USEPA Region 1 that was prepared by the Central Massachusetts Regional Stormwater Coalition and the engineering firm Fuss & O'Neill. The template was developed under a stormwater technical assistant grant from MassDEP for municipalities to use when creating their own IDDE Program Plan.

The 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 city of Malden initially prepared an IDDE Plan in April of 2009, which was subsequently modified to address USEPA Region 1 requested revisions and finalized in June 2009. This new plan has been prepared to reflect the requirements now established within the currently effective MS4 Permit utilizing available resources and guidance provided by USEPA and MassDEP.

---

## 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 (MDEP) 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 Malden regulated area based on the 2014 Massachusetts Integrated List of Waters (most recent as of the date of this document). 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. Pursuant to Appendix H, Part III and Appendix F, Part A.III of the current MS4 permit, all catchments draining to the Malden River and Town Line Brook shall be designated as High Priority or Problem Catchments for the purposes of this IDDE plan.

**Table 1-1. Impaired Waters  
Malden, Massachusetts**

Water Body Name	Segment ID	Category	Impairment(s)	Associated Approved TMDL
Malden River	MA71-05	5	(Debris/Floatables/Trash*) Chlordane in Fish Tissue DDT in Fish Tissue Dissolved oxygen saturation Escherichia coli Fecal Coliform Foam/Flocs/Scum/Oil Slicks Oxygen, Dissolved PCB in Fish Tissue pH, High Phosphorus (Total) Secchi disk transparency Sediment Bioassays – Chronic Toxicity Freshwater Taste and Odor Total Suspended Solids (TSS)	None
Unnamed Tributary (locally known as Town Line Brook)	MA93-51	5	(Alteration in stream-side or littoral vegetative covers*) (Debris/Floatables/Trash*) (Other flow regime alterations*) (Physical substrate habitat alterations*) Fecal Coliform Taste and Odor	TMDL EPA NO. 50123 Adhere to requirements of current MS4 Permit Part A.III of Appendix F

\* TMDL not required (Non-pollutant)

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, which became effective on July 1, 2018.

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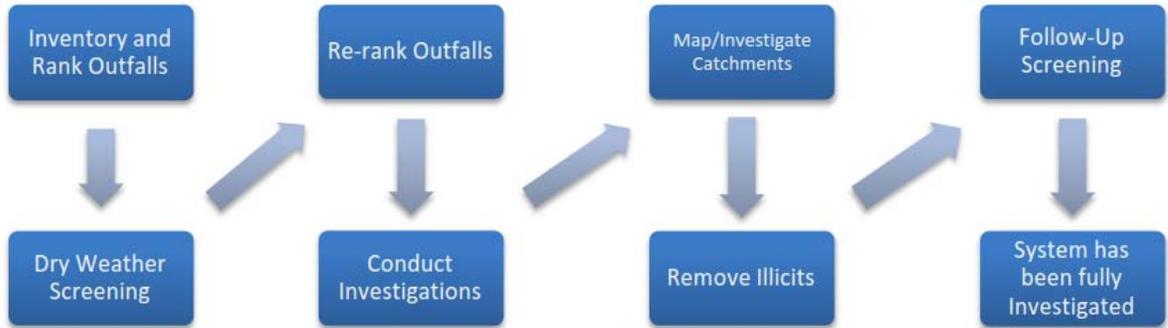
## 1.5 IDDE Program Goals, Framework, and Timeline

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
- Follow up 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 6/30/19	1.5 Years 12/31/19	2 Years 6/30/20	3 Years 6/30/21	7 Years 6/30/25	10 Years 6/30/29
Written IDDE Program Plan	X					
SSO Inventory	X					
Written Catchment Investigation Procedure		X				
Phase I Mapping			X			
Phase II Mapping						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 stormwater 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 city of Malden 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
- 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, the city of Malden has also conducted outfall sampling at various locations during both wet and dry weather. The results obtained from prior IDDE activities have been summarized in annual MS4 reports submitted to USEPA.

## 2 Authority and Statement of IDDE Responsibilities

---

### 2.1 Legal Authority

The city of Malden has adopted an ordinance pertaining to the municipal storm drain system (Malden City Ordinance, Section 11.73 Municipal Storm Drainage System, 30 April 2009), a copy of which is included within Attachment A. The Section 11.73 of the municipal ordinance provides Malden 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.

---

### 2.2 Statement of Responsibilities

The Malden City Engineering Department is the lead municipal department responsible for implementing the IDDE program pursuant to the provisions of City Ordinance 11.73. Other agencies or departments with responsibility for aspects of the program include:

- Department of Public Works – IDDE Investigations
- Department of Water Utilities – IDDE Investigations
- Permits, Inspections and Planning - Code Enforcement
- Health Department –Illicit Discharge public health assessment

## 3 Stormwater System Mapping

The city of Malden originally developed mapping of its stormwater system to meet the mapping requirements of the 2003 MS4 Permit. A copy of the existing stormwater system map is provided in Attachment B. The current MS4 Permit requires a more detailed stormwater 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 current MS4 Permit requires the storm system map to be updated in two phases as outlined below. The Malden Engineering Department is responsible for updating the stormwater system mapping pursuant to the current MS4 Permit. The city of Malden will report on the progress towards completion of the storm system map in each annual report.

---

### 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
- 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 city of Malden has completed the following updates to its stormwater mapping as of June 2019 towards meeting the Phase I requirements:

- Outfalls and receiving waters
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- 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

Malden will update its stormwater mapping by July 1, 2020 to include the remaining 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, 2029) and include the following information:

- Outfall spatial location (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).

Malden has completed the following updates to its stormwater mapping to meet the Phase II requirements although some field verification is required:

- Outfall spatial location (with a minimum accuracy of +/-30 feet)
- Pipes
- Manholes
- Catch basins
- Municipal Sanitary Sewer system

The city of Malden will update its stormwater mapping by July 1, 2029 to include the remaining following Phase II information.

---

### 3.3 Additional Recommended Mapping Elements

Although not a requirement of the current MS4 Permit, the city of Malden will make an effort subject to available resources to also include the following recommended elements in its storm drain system mapping, to the extent including those elements is an effective use of resources:

- Storm sewer material, size (pipe diameter), age (*partially completed 6/2019*)
- Sanitary sewer system material, size (pipe diameter), age (*partially completed 6/2019*)
- Privately owned stormwater treatment structures (*partially completed 6/2019*)
- Where a municipal sanitary sewer system exists, properties known or suspected to be served by a septic system, especially in high density urban areas
- Area where the permittee's MS4 has received or could receive flow from septic system discharges
- Seasonal high water table elevations impacting sanitary alignments
- Topography (*completed 6/2019*)
- Orthophotography (*completed 6/2019*)
- Alignments, dates and representation of work completed of past illicit discharge investigations (*ongoing 6/2019*)
- Locations of suspected confirmed and corrected illicit discharges with dates and flow estimates. (*completed 6/2019*)

## 4 Sanitary Sewer Overflows (SSOs)

The current 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 city of Malden has completed an inventory of SSOs that have discharged to the MS4 within the five (5) years prior to the effective date of the current 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.

Upon detection of an SSO, the city of Malden 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, Malden will provide oral notice to EPA within 24 hours, to MDEP as soon as possible, but no later than 24 hours and written notice to EPA and MDEP within five (5) days of becoming aware of the SSO occurrence. A copy of the MDEP notification form with contact numbers is included within **Attachment C**.

The inventory in **Table 4-1** will be updated by the Engineering Department 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  
Malden, Massachusetts  
Revision Date: June 2019**

SSO Location <sup>1</sup>	Discharge Statement <sup>2</sup>	Date <sup>3</sup>	Time Start <sup>3</sup>	Time End <sup>3</sup>	Estimated Volume <sup>4</sup>	Description <sup>5</sup>	Mitigation Completed <sup>6</sup>	Mitigation Planned <sup>7</sup>
SMH 109.1	No discharge to MS4	9/28/2009			Unk. (Small)	Blocked main	9/29/2009	no
250 Cross St.	No discharge to MS4	9/28/2009			Unk.	Blocked lateral	9/29/2009	no
SMH near Neal	No discharge to MS4	12/17/2009			Unk	Blocked lateral	12/17/2009	no
Multiple Bsmt/SMH	Discharge to MS4 (large regional storm event)	3/15/2010			Unk. (large)	Large storm (MWRA capacity issue)	3/17/2010	no
Multiple Bsmt/SMH	Discharge to MS4 (large regional storm event)	3/29/2010			Unk. (large)	Large storm (MWRA capacity issue)	4/1/2010	no
74 Revere St.	No discharge to MS4	4/19/2012			500 gals.	Blocked lateral	4/19/2012	no

<sup>1</sup> Location (approximate street crossing/address and receiving water, if any)

<sup>2</sup> A clear statement of whether the discharge entered a surface water directly or entered the MS4

<sup>3</sup> Date(s) and time(s) of each known SSO occurrence (i.e., beginning and end of any known discharge)

<sup>4</sup> Estimated volume(s) of the occurrence

<sup>5</sup> Description of the occurrence indicating known or suspected cause(s)

<sup>6</sup> Mitigation and corrective measures completed with dates implemented

<sup>7</sup> Mitigation and corrective measures planned with implementation schedules

## 5 Assessment and Priority Ranking of Outfalls

The current 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<sup>1</sup> or interconnection.<sup>2</sup> 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 Engineering Department 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:

---

<sup>1</sup> **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.

<sup>2</sup> **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  $\geq 0.5$  mg/L, surfactants  $\geq 0.25$  mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia  $\geq 0.5$  mg/L, surfactants  $\geq 0.25$  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.
- **Sewer conversion** – Contributing catchment areas that were once serviced by septic systems, but have been converted to sewer connections may have a high illicit discharge potential.
- **Surrounding density of aging septic systems** – Septic systems thirty years or older in residential land use areas are prone to have failures and may have a high illicit discharge potential.
- **Culverted streams** – Any river or stream that is culverted for distances greater than a simple roadway crossing may have a high 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.

A current summary of the preliminary rankings initial outfall and interconnection inventory and priority ranking to assess illicit discharge potential based on existing information is included with this plan as **Table 5-1** included within **Attachment D**. This table will be continually updated as additional information is obtained.

## 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 Engineering Department 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.

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### 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 the U.S. Geological Survey (USGS) Fresh Pond in Gate House, Cambridge, MA weather station (422302071083801). If the Fresh Pond Weather Station is not available or not reporting current weather data, then the USGS Muddy River at Brookline, MA weather station (01104683) will be used as a back-up.

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### 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 (using paper forms or digital form using a tablet or similar device) (see form in **Attachment E**)
  - 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.

Previous outfall screening/sampling conducted under the prior MS4 Permit may be used to satisfy the dry weather outfall/screening requirements of the current MS4 Permit only if the previous screening and sampling was substantially equivalent to that required by the current MS4 Permit, including the list of analytes outlined in Section 2.3.4.7.b.iii.4 of the current permit.

## 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

Equipment	Use/Notes
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<sup>3</sup> 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 **Attachment F** for Sample Labels and 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 (**Attachment G**) for laboratory samples
8. Deliver samples to lab.
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 current MS4 Permit parameters, other than indicator bacteria and any pollutants of concern. Analytic procedures and user's manuals for field test kits and field instrumentation are provided in **Attachment H**.

<sup>3</sup> 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: <i>E. coli</i> (freshwater) or Enterococcus (saline water)	EPA certified laboratory procedure (40 CFR § 136)	NA
Pollutants of Concern <sup>1</sup>	EPA certified laboratory procedure (40 CFR § 136)	NA

<sup>1</sup> 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.<sup>4</sup> 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.

<sup>4</sup> 40 CFR § 136: <http://www.ecfr.gov/cgi-bin/text-idx?SID=b3b41fdea0b7b0b8cd6c4304d86271b7&mc=true&node=pt40.25.136&rgn=div5>

**Table 6-3. Required Analytical Methods, Detection Limits, Hold Times, and Preservatives<sup>4</sup>**

Analyte or Parameter	Analytical Method	Detection Limit	Max. Hold Time	Preservative
Ammonia	<b>EPA:</b> 350.2, <b>SM:</b> 4500-NH3C	0.05 mg/L	28 days	Cool ≤6°C, H <sub>2</sub> SO <sub>4</sub> to pH <2, No preservative required if analyzed immediately
Surfactants	<b>SM:</b> 5540-C	0.01 mg/L	48 hours	Cool ≤6°C
Chlorine	<b>SM:</b> 4500-Cl G	0.02 mg/L	Analyze within 15 minutes	None Required
Temperature	<b>SM:</b> 2550B	NA	Immediate	None Required
Specific Conductance	<b>EPA:</b> 120.1, <b>SM:</b> 2510B	0.2 µs/cm	28 days	Cool ≤6°C
Salinity	<b>SM:</b> 2520	-	28 days	Cool ≤6°C
Indicator Bacteria: <i>E.coli</i> Enterococcus	<i>E.coli</i> <b>EPA:</b> 1603 <b>SM:</b> 9221B, 9221F, 9223 B <b>Other:</b> Colilert®, Colilert-18®  <i>Enterococcus</i> <b>EPA:</b> 1600 <b>SM:</b> 9230 C <b>Other:</b> Enterolert®	<i>E.coli</i> <b>EPA:</b> 1 cfu/100mL <b>SM:</b> 2 MPN/100mL <b>Other:</b> 1 MPN/100mL  <i>Enterococcus</i> <b>EPA:</b> 1 cfu/100mL <b>SM:</b> 1 MPN/100mL <b>Other:</b> 1 MPN/100mL	8 hours	Cool ≤10°C, 0.0008% Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>
Total Phosphorus	<b>EPA:</b> Manual-365.3, Automated Ascorbic acid digestion-365.1 Rev. 2, ICP/AES4-200.7 Rev. 4.4  <b>SM:</b> 4500-P E-F	<b>EPA:</b> 0.01 mg/L <b>SM :</b> 0.01 mg/L	28 days	Cool ≤6°C, H <sub>2</sub> SO <sub>4</sub> to pH <2
Total Nitrogen (Ammonia + Nitrate/Nitrite, methods are for Nitrate-Nitrite and need to be combined with Ammonia listed above.)	<b>EPA:</b> Cadmium reduction (automated)-353.2 Rev. 2.0, <b>SM:</b> 4500-NO <sub>3</sub> E-F	<b>EPA:</b> 0.05 mg/L <b>SM :</b> 0.05 mg/L	28 days	Cool ≤6°C, H <sub>2</sub> SO <sub>4</sub> 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 $\mu$ S/cm
Surfactants	>0.25 mg/L
Chlorine	>0.02 mg/L (detectable levels per the current MS4 Permit)
Indicator Bacteria <sup>5</sup> : <i>E.coli</i> <i>Enterococcus</i>	<i>E.coli</i> : 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  <i>Enterococcus</i> : 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 city of Malden 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 (by June 30, 2021) of the effective date of the permit.

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.

<sup>5</sup> 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.

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### 7.1 System Vulnerability Factors

The Engineering Department 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
- 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 than 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 than 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**

**Malden, Massachusetts  
Revision Date: Pending June 2019**

<b>Outfall ID</b>	<b>Receiving Water</b>	<b>1 History of SSOs</b>	<b>2 Common or Twin Invert Manholes</b>	<b>3 Common Trench Construction</b>	<b>4 Storm/Sanitary Crossings (Sanitary Above)</b>	<b>5 Sanitary Lines with Underdrains</b>	<b>6 Inadequate Sanitary Level of Service</b>	<b>7 Areas Formerly Served by Combined Sewers</b>	<b>8 Sanitary Infrastructure Defects</b>	<b>9 SSO Potential In Event of System Failures</b>	<b>10 Sanitary and Storm Drain Infrastructure &gt;40 years Old</b>	<b>11 Septic with Poor Soils or Water Table Separation</b>	<b>12 History of BOH Actions Addressing Septic Failure</b>
Sample ID	Water ID	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/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. Common or twin-invert manholes serving storm and sanitary sewer alignments
3. Common trench construction serving both storm and sanitary sewer alignments
4. Crossings of storm and sanitary sewer alignments where the sanitary system is shallower than the storm drain system
5. Sanitary sewer alignments known or suspected to have been constructed with an underdrain system
6. Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints
7. Areas formerly served by combined sewer systems
8. 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
9. Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs
10. Any sanitary sewer and storm drain infrastructure greater than 40 years old
11. 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 than poor owner maintenance)
12. 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 than poor owner maintenance)

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## 7.2 Dry Weather Manhole Inspections

The city of Malden 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 Engineering Department 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. A sample field inspection form is provided in **Appendix I**.
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.

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### 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 Engineering Department 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.

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## 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

These methods are described in the sections below. Instructions and Standard Operating Procedures (SOPs) made available through the IDDE plan template prepared by the Central Massachusetts Stormwater Regional Stormwater Coalition and Fuss & O’Neil for smoke testing and dye testing are provided in **Appendix J**. Additional SOPs will be added as those methods are deemed necessary.

Public notification is an important aspect of a detailed source investigation program. Prior to smoke testing, dye testing, or TV inspections, the Engineering Department will notify property owners in the affected area. Smoke testing notification will include hanging notifications 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 placed 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.

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### 7.5 Illicit Discharge Removal

When the specific source of an illicit discharge is identified, the Engineering Department 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.

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## 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 K**. 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.

# Malden Stormwater Illicit Discharge Detection and Elimination Plan

## ATTACHMENT A

*Malden City Ordinance 11.73*

# **Malden City Ordinance**

## **SECTION 11.73 MUNICIPAL STORM DRAINAGE SYSTEM**

### **.1 IN GENERAL**

The City shall maintain and, under the direction of the City Engineer, regulate use of a stormwater drainage system for the collection and dispersion of storm water runoff, snow melt runoff and surface water runoff and drainage. The City Engineer may promulgate rules and regulations to effectuate the provisions of this ordinance and may issue permits for use of the storm drainage system upon such terms and conditions as he may deem appropriate.

The City Engineer may suspend access to the municipal storm drainage system without notice whenever necessary to prevent the actual or threatened discharge of prohibited substances into the storm drainage system and, upon failure of any party to comply with such suspension order, may take all reasonable steps to prevent or minimize harm to the public health, safety, welfare or the environment.

### **.2 PROHIBITED ACTIVITIES**

No person shall dump, discharge, cause or allow to be discharged any non-stormwater discharge or pollutant into the municipal storm water drainage system. Pollutants shall include, without limitation, paints, varnishes, solvents, automotive fluids, pesticides, herbicides, fertilizers, sewage, fecal coliform and pathogens, dissolved and particulate metals, animal waste, rock, sand, salt, soils, construction wastes and residues, refuse, rubbish, garbage, litter, and other noxious or offensive matter of any kind.

No person shall construct, use, allow, maintain or continue any connection to the municipal storm water drainage system from indoor drains, sinks or toilets or which allows discharge of wastewater or wash water, whether or not said connection was approved before the effective date of this ordinance.

No person shall obstruct or interfere with the normal flow of stormwater into or out of the municipal storm drain system without prior written approval from the City Engineer.

### **.3 EXEMPTIONS**

Discharge into the municipal storm water system resulting from the following sources shall be exempt from the prohibited activities set forth in Section 11.73.2:

- .1 municipal activities, including but not limited to fire fighting, waterline flushing;
- .2 flow from potable water sources, springs, riparian habitats and wetlands, diverted stream flow and rising groundwater;
- .3 uncontaminated groundwater infiltration as defined in 40 CFR 35.2005(20), uncontaminated pumped groundwater, water from approved exterior foundation drains, crawl space pumps, air conditioning condensations and footing drains, but not including active groundwater dewatering systems;;
- .4 discharge from landscape irrigation, lawn watering or individual residential car washing
- .5 Discharge from swimming pools which contains one part per million or less of chlorine;
- .6 dye-testing, provided that prior verbal notification has been given to the City Engineer;
- .7 discharge for which prior written approval has been obtained from the City Engineer as necessary to protect public health, safety and welfare or the environment;
- .8 discharge permitted under a permit, waiver or order issued by any state or federal environmental agency, provided that said discharge is in full compliance with the requirements of permit, waiver or order and applicable laws and regulations.

#### .4 NOTIFICATION OF SPILLS

Any person in control, or in charge of emergency response, at any facility or operation in the city shall immediately, upon becoming aware of a release or threatened release of materials at the facility or operation which could result in discharge of pollutants to the municipal drainage system, take all necessary steps to insure containment and cleanup of the release.

Said person shall immediately notify the police and fire departments of the release of oil or hazardous materials.

The release of non-hazardous materials shall be reported to the City Engineer no later than the following business day.

The person charged with reporting discharge shall provide the City Engineer with written confirmation of all notifications within three business days of the discharge and shall retain, on site, a written record of the discharge and actions taken to prevent its recurrence. Said records shall be retained for no fewer than three years.

#### .5 ENFORCEMENT

The City Engineer may pursue civil and criminal remedies for violation of this ordinance or any permit or order issued pursuant thereto and may seek injunctive relief to restrain further violations or compel remediation of violations.

The City Engineer may issue written orders to compel compliance with the provisions of this ordinance and may require:

- .1 performance of monitoring, analyses and reporting to assure compliance; and
- .2 remediation of contamination resulting from violations.

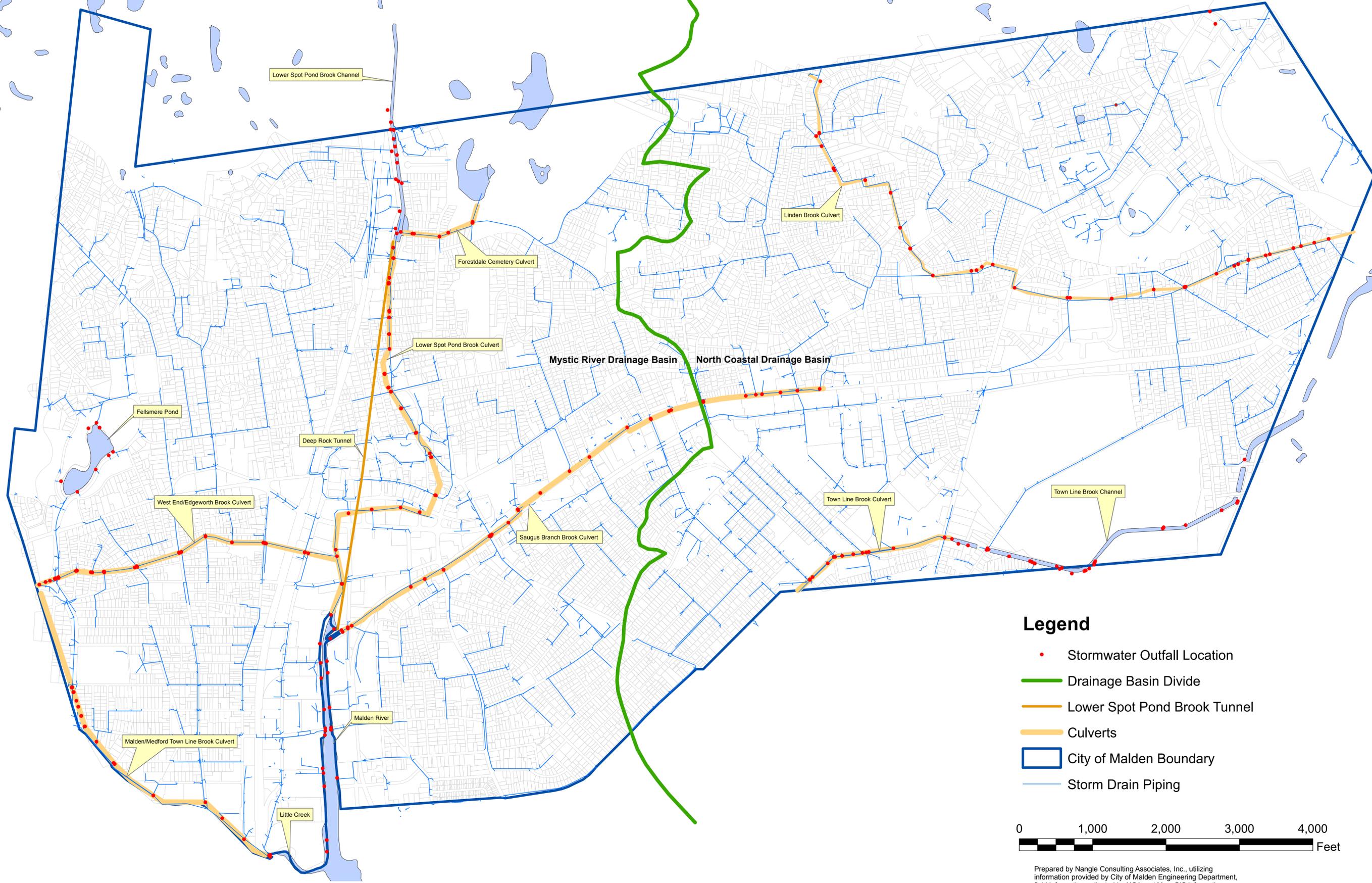
Where remediation is ordered, the City Engineer shall specify the time within which such remediation shall be complete. Said order shall state that, failure to abate the violation or perform the required remediation within the specified time, may result in the city undertaking such work at the expense of the owner.

The city shall, within 30 days of completing abatement or remediation of a violation, notify the property owner of cost incurred in remediation, including administrative costs. If the amount due is not received within 30 days of notification or within thirty days following a final decision of a court of competent jurisdiction affirming or reducing the costs, the costs shall become a special assessment and shall constitute a lien on the owners property for the amount of said costs. Costs remaining unpaid more than 31 days after becoming due shall accrue interest at the rate provided by law.

# Malden Stormwater Illicit Discharge Detection and Elimination Plan

## ATTACHMENT B

### Stormwater System Maps



**Legend**

- Stormwater Outfall Location
- Drainage Basin Divide
- Lower Spot Pond Brook Tunnel
- Culverts
- City of Malden Boundary
- Storm Drain Piping

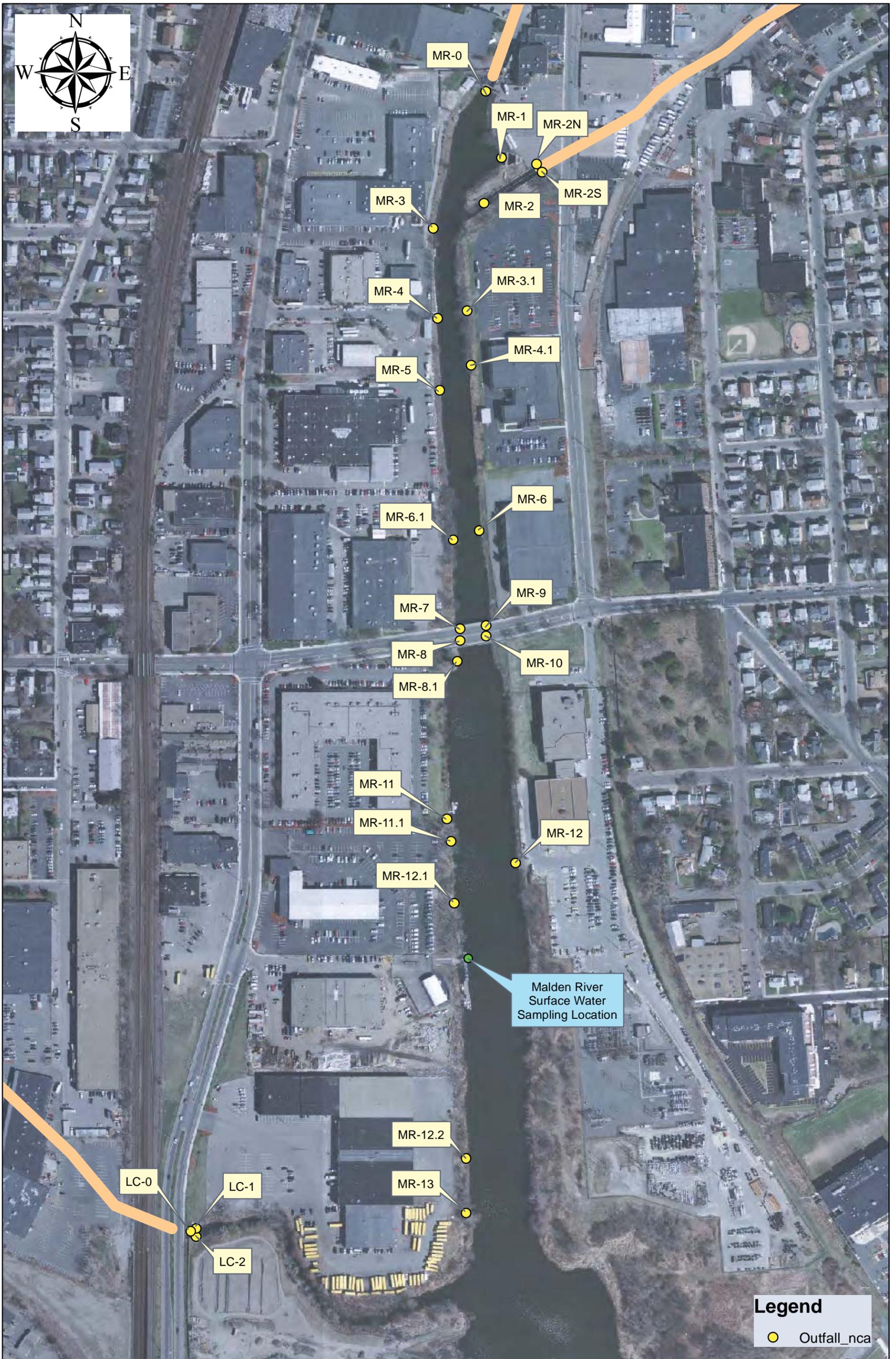
0 1,000 2,000 3,000 4,000 Feet

Prepared by Nangle Consulting Associates, Inc., utilizing information provided by City of Malden Engineering Department, field information collected by NCA and MassGIS information. Locations shown are approximate.

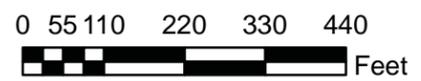
# City of Malden Stormwater Outfall Location Map - September 2018

MALDEN, MASSACHUSETTS





**Malden River Outfalls**





**Town Line Brook Outfalls**



**Lower Spot Pond Brook Outfalls**

# Malden Stormwater Illicit Discharge Detection and Elimination Plan

## ATTACHMENT C

### *SSO Notification Form*



**Massachusetts Department of Environmental Protection**  
 Bureau of Water Protection – Wastewater Management Program  
**Sanitary Sewer Overflow (SSO)/Bypass**  
**Notification Form**

FOR DEP USE ONLY

\_\_\_\_\_  
 Tax Identification Number

**A. Reporting Facility**

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. Facility Information

\_\_\_\_\_  
 Reporting Sewer Authority Permit # \_\_\_\_\_

2. Authorized Representative Transmitting Form:

\_\_\_\_\_  
 First Name Last Name Telephone No. \_\_\_\_\_

\_\_\_\_\_  
 Title E-mail Address \_\_\_\_\_

**B. Phone Notifications:**

See DEP Regional Office telephone and fax numbers at the end of this form.

1. **MassDEP staff** contacted: \_\_\_\_\_ first name \_\_\_\_\_ last name

Date/Time contacted: \_\_\_\_\_ Date \_\_\_\_\_ Time  am  pm

2. **EPA staff** contacted: \_\_\_\_\_ first name \_\_\_\_\_ last name

Date/Time EPA contacted: \_\_\_\_\_ Date \_\_\_\_\_ Time  am  pm

3. **Board of Health** contacted: \_\_\_\_\_ First Name \_\_\_\_\_ Last Name

Date/Time contacted: \_\_\_\_\_ Date \_\_\_\_\_ Time  am  pm

4. Others notified (select all that apply);  Conservation Commission  
 Harbormaster  Shellfish Warden  Division of Marine Fisheries  
 Downstream Drinking Water Supplier  Watershed Association  
 Beach Resource Manager  Other: \_\_\_\_\_  
(specify)

**C. SSO Information**

1. SSO Discovered: \_\_\_\_\_ Date \_\_\_\_\_ Time  am  pm

By: \_\_\_\_\_

2. SSO Stopped: \_\_\_\_\_ Date \_\_\_\_\_ Time  am  pm

3. SSO Discharge from:  Sanitary Sewer Manhole  Pump Station  
 Backup into Property  Other: \_\_\_\_\_  
(specify)

4. SSO Discharge to:  Ground Surface (no release to surface water)  
 Direct to Receiving Water \_\_\_\_\_ (surface water)  
 Catch basin to Receiving Water \_\_\_\_\_ (surface water)  
 Backup into Property Basement



**Massachusetts Department of Environmental Protection**  
 Bureau of Water Protection – Wastewater Management Program  
**Sanitary Sewer Overflow (SSO)/Bypass**  
**Notification Form**

FOR DEP USE ONLY

\_\_\_\_\_  
 Tax Identification Number

**C. SSO Information (cont.)**

Location: \_\_\_\_\_  
 (Description of discharge site or closest address)

5. Estimated SSO Volume at time of this Report: \_\_\_\_\_

Method of Estimating Volume: \_\_\_\_\_

6. Cause of SSO Event:

Rain Event     Pump Station Failure     Insufficient Capacity in System

Treatment Unit failure

Sewer System Blockage:     Pipe Collapse     Root Intrusion     Grease Blockage

Other: \_\_\_\_\_  
 (Specify)

7. Corrective Actions Taken:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Impact Area cleaned and/or disinfected:     Yes     No

\_\_\_\_\_  
 \_\_\_\_\_

Corrective Actions Completed:     Yes     No

\_\_\_\_\_

**D. Comments/Attachments/Follow-up**

I wish to provide (select all that apply):

Attachment     Additional comments below:     No additional comments or attachments

Additional comments and planned actions:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



**Sanitary Sewer Overflow (SSO)/Bypass  
Notification Form**

\_\_\_\_\_  
Tax Identification Number

---

**E. Certification Statement**

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, 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.

\_\_\_\_\_  
Signature of Authorized Representative

\_\_\_\_\_  
Date Signed

Please keep a copy of this report for your records. When submitting additional information, include the MassDEP Incident Number from this report.

---

**MassDEP Regional Office and EPA Telephone and Fax Numbers:**

Northeast Region	Phone: 978-694-3215	Fax: 978-694-3499
Southeast Region	Phone: 508-946-2750	Fax: 508-947-6557
Central Region	Phone: 508-792-7650	Fax: 508-792-7621
Western Region	Phone: 413-784-1100	Fax: 413-784-1149
EPA	Phone: 617-918-1510	
EPA for Southeast Region, David Turin	Phone: 617-918-1598	Fax: 617-918-0598
EPA for Northeast, Central and Western Regions, Douglas Koopman	Phone: 617-918-1747	Fax: 617-918-0747
DEP 24-hour emergency	Phone: 888-304-1133	

# Malden Stormwater Illicit Discharge Detection and Elimination Plan

## ATTACHMENT E

### *Outfall Inspection Form*

**Outfall ID:** \_\_\_\_\_ **Town:** \_\_\_\_\_  
**Inspector:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Street Name** \_\_\_\_\_  
**Last rainfall event** \_\_\_\_\_



**DRY WEATHER OUTFALL INSPECTION SURVEY**

<b>Type of Outfall (check one):</b>		<b>Pipe Outfall</b> <input type="checkbox"/>	<b>Open Swale Outfall</b> <input type="checkbox"/>
<b>Outfall Label:</b>		<b>Stencil</b> <input type="checkbox"/>	<b>Ground Inset</b> <input type="checkbox"/> <b>Sign</b> <input type="checkbox"/> <b>None</b> <input type="checkbox"/> <b>Other</b> _____
<b>Pipe Material:</b>	Concrete <input type="checkbox"/>	<b>Pipe Condition:</b>	Good <input type="checkbox"/> Poor <input type="checkbox"/>
	Corrugated metal <input type="checkbox"/>		Fair <input type="checkbox"/> Crumbling <input type="checkbox"/>
	Clay Tile <input type="checkbox"/>		
	Plastic <input type="checkbox"/>		
Other: _____ <input type="checkbox"/>			
<b>Swale Material:</b>	Paved (asphalt) <input type="checkbox"/>	<b>Swale Condition:</b>	Good <input type="checkbox"/> Poor <input type="checkbox"/>
	Concrete <input type="checkbox"/>		Fair <input type="checkbox"/> Crumbling <input type="checkbox"/>
	Earthen <input type="checkbox"/>		
	Stone <input type="checkbox"/>		
	Other: _____ <input type="checkbox"/>		
<b>Shape of Pipe/Swale (check one)</b>			
 <input type="checkbox"/>		 <input type="checkbox"/>	
 <input type="checkbox"/>		 <input type="checkbox"/>	
<b>Rounded Pipe/Swale</b>		<b>Rectangular Pipe/Swale</b>	<b>Triangular Swale</b>
<b>Trapezoidal Swale</b>			
<b>Pipe Measurements:</b>		<b>Swale Measurements:</b>	
Inner Dia. (in): d= _____		Swale Width (in): T= _____	
Outer Dia. (in): D= _____		Flow Width (in): t = _____	
Pipe Width (in): T= _____		Swale Height (in): H= _____	
Pipe Height (in): H= _____		Flow Height (in): h= _____*	
Flow Width (in): h= _____*		Bottom Width (in): b= _____	
		<b>Is there a headwall?</b>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	
		<b>Condition:</b>	
		Good <input type="checkbox"/> Poor <input type="checkbox"/>	
		Fair <input type="checkbox"/> Crumbling <input type="checkbox"/>	
		<b>Location Sketch</b>	
<b>Description of Flow:</b> Heavy <input type="checkbox"/> Moderate <input type="checkbox"/> Trickleing <input type="checkbox"/> Dry <input type="checkbox"/>			
<b>If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):</b>			<b>Circle All Materials Present:</b>
Odor: Yes <input type="checkbox"/> No <input type="checkbox"/>			Rip rap
Optical enhancers suspected? Yes <input type="checkbox"/> No <input type="checkbox"/>			Excessive sediment
Has channelization occurred? Yes <input type="checkbox"/> No <input type="checkbox"/>			Foam
Has scouring occurred below the outlet? Yes <input type="checkbox"/> No <input type="checkbox"/>			Sanitary Waste
<b>Required Maintenance:</b>		Remove Trash/Debris	Orange Staining
Tree Work		Blocked Pipe	
Ditch Work		Erosion at Structure	
Structural Corrosion		Other	
N/A			
<b>Comments:</b>			Sheen: Bacterial
			Sheen: Petroleum
			Floatables
			Algae
			Excessive Vegetation

# Malden Stormwater Illicit Discharge Detection and Elimination Plan

## ATTACHMENT F

*Sample Labels and Field Data Sheets*

**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	<input type="checkbox"/>	<input type="checkbox"/>	
Odor	<input type="checkbox"/>	<input type="checkbox"/>	
Turbidity	<input type="checkbox"/>	<input type="checkbox"/>	
Excessive Sediment	<input type="checkbox"/>	<input type="checkbox"/>	
Sanitary Waste	<input type="checkbox"/>	<input type="checkbox"/>	
Pet Waste	<input type="checkbox"/>	<input type="checkbox"/>	
Floatable Solids	<input type="checkbox"/>	<input type="checkbox"/>	
Oil Sheen	<input type="checkbox"/>	<input type="checkbox"/>	
Bacterial Sheen	<input type="checkbox"/>	<input type="checkbox"/>	
Foam	<input type="checkbox"/>	<input type="checkbox"/>	
Algae	<input type="checkbox"/>	<input type="checkbox"/>	
Orange Staining	<input type="checkbox"/>	<input type="checkbox"/>	
Excessive Vegetation	<input type="checkbox"/>	<input type="checkbox"/>	
Optical Enhancers	<input type="checkbox"/>	<input type="checkbox"/>	
Other _____			

# WET WEATHER OUTFALL INSPECTION SURVEY



Sample Parameters	Analytical Test Method	Benchmark	Field Screening Result	Full Analytical?
Ammonia <sup>1</sup>	EPA 350.2/SM4500-NH3C	>0.5 mg/L		<input type="checkbox"/> Yes <input type="checkbox"/> No
Boron <sup>1</sup>	EPA 212.3	>35.0 mg/L		<input type="checkbox"/> Yes <input type="checkbox"/> No
Chloride <sup>2</sup>	EPA 300.0	230 mg/L		<input type="checkbox"/> Yes <input type="checkbox"/> No
Color <sup>1</sup>	EPA 110.1/110.2	>500 units		<input type="checkbox"/> Yes <input type="checkbox"/> No
Detergents & Surfactants <sup>3</sup>	EPA 425.1/SM5540C	>0.25 mg/L		<input type="checkbox"/> Yes <input type="checkbox"/> No
Fluoride <sup>3</sup>	EPA 300.0	>0.25 mg/L		<input type="checkbox"/> Yes <input type="checkbox"/> No
Hardness <sup>1</sup>	EPA 130.2	<10 mg/L or >2,000 mg/L		<input type="checkbox"/> Yes <input type="checkbox"/> No
pH <sup>1</sup>	EPA 150.1/SM 4500H	<5		<input type="checkbox"/> Yes <input type="checkbox"/> No
Potassium <sup>1</sup>	EPA 200.7	>20 mg/L		<input type="checkbox"/> Yes <input type="checkbox"/> No
Specific Conductance <sup>1</sup>	SM 2510B	>2,000 µS/cm		<input type="checkbox"/> Yes <input type="checkbox"/> No
Turbidity <sup>1</sup>	EPA 180.1	>1,000 NTU		<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>Comments:</b>				

<sup>1</sup> – *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.

<sup>2</sup> – *Env –Ws 1703.21 Water Quality Criteria for Toxic Substances*, State of New Hampshire Department of Surface Water Quality Regulations.

<sup>3</sup> – *Appendix I – Field Measurements, Benchmarks and Instrumentation*, Draft Massachusetts North Coastal Small MS4 General Permit, 2009.

**CLIENT: Malden Engineering Dept.**

<b>S I T E :</b>	<b>DATE:</b>
<b>ANALYSIS:</b>	<b>PRESERVATIVE:</b>
<b>SAMPLE ID:</b>	<b>TIME: BY:</b>

# Malden Stormwater Illicit Discharge Detection and Elimination Plan

## ATTACHMENT G

### Chain of Custody Form



# Malden Stormwater Illicit Discharge Detection and Elimination Plan

## ATTACHMENT H

*Field Equipment Procedures and Users Manuals*

# Detergents SAM

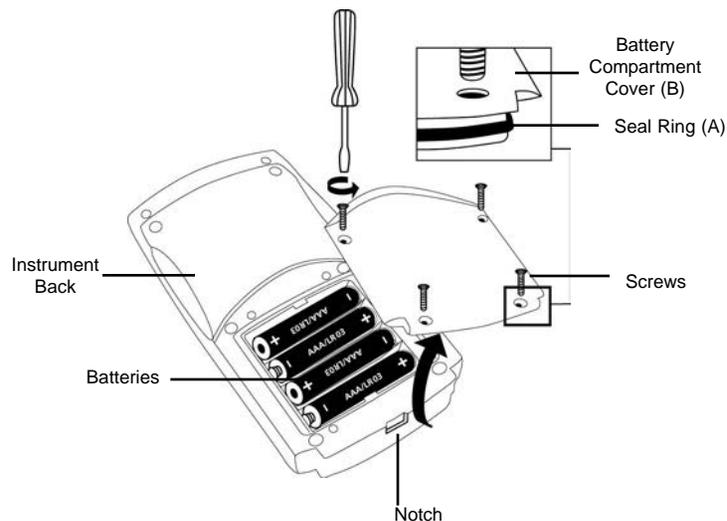
I-2017

0 to 2.50  
PPM (mg/Liter)



Simplicity in Water Analysis

## Battery Replacement



To ensure that the instrument is waterproof:

- seal ring (A) must be in position
- battery compartment cover (B) must be fixed with the four screws

### To Set Zero

1. Press the Power key.
2. The display will show “**det**”.
3. Insert the ZERO test tube (supplied in detergents test kit) filled with distilled or deionized water into the sample cell compartment (with mild downward pressure), making sure that it is fully seated.
4. Place the light shield over the ZERO test tube.
5. Press the Zero/Test key. The “**det**” symbol will flash for approximately 8 seconds, then the display will show “0.0.0”.

### To Make a Measurement

1. Follow the Test Procedure in the Instrumental Detergents Test (Cat. # R-9423).
2. Insert the resulting Detergents test tube into the sample cell compartment (with mild downward pressure), making sure that it is fully seated.
3. Place the light shield over the test tube.
4. Press the Zero/Test key. The “**det**” symbol will flash for approximately 3 seconds, then the sample test result will appear in the display as ppm (mg/Liter).

## Operating Tips

- Upon startup, the photometer automatically proceeds to the zeroing process. Every time the photometer powers on, it must be re-zeroed.
- To re-zero the photometer, it must be turned off and back on again.
- A series of readings can be taken without re-zeroing, as long as the photometer stays on during the series.
- Protect photometer from extreme humidity, corrosive fumes and dusty areas. Store in a cool, dry place.
- Remove the batteries when photometer is not in use.
- Press the ! key to turn the display back light on or off.
- When moving the photometer from one temperature extreme to another, wait at least 10 minutes before use to allow photometer to come to temperature equilibrium.
- Contamination of the optics in the sample chamber will result in incorrect measurements. The windows in the sample chamber should be checked at regular intervals and cleaned as necessary. Use a soft moist cloth or cotton swab for cleaning purposes.
- If the sample cell adapter has been removed, it must be replaced with proper orientation, aligning the triangle on the adapter with the triangle on the photometer.

## Displays and Troubleshooting

**E01:** Light absorption too great (dirty optics)

**E20/E21:** Too much light reaching detector

**E22 or Battery Icon:** Battery should be replaced

**E27/E28/E29:** Instrument zeroed incorrectly, misaligned adapter, test tube not properly seated, dirty optics or failing light source.

**Hi/E03:** Measuring range exceeded or excessive turbidity

**Lo:** Test result has a negative value (less than 0 ppm)

## Specifications

**Auto Shutoff:** After 15 minutes of non-use

**Optics:** 660 nm LED/interference filter and photosensor in transparent sample chamber

**Operating Temp.:** 5 to 40°C (41 to 104°F)

**Battery:** 4 AAA batteries (approx. 5,000 tests or 17 hours)

**Waterproof:** Floating, IP68 (1 hour at 0.1 meter)

**Wavelength Accuracy:** ± 1 nm

**Photometric Accuracy:** 3% full scale (T = 20 - 25° C / 68 - 77° F)

**Photometric Resolution:** 0.01 A

**Ambient Conditions:** Temperature 5 - 40° C / 41 - 104° F

Rel. humidity 30 - 90 % (non-condensing)

**CE:** Certificate of Declaration of CE-Conformity available upon request.

## Menu Selection

### Setting Date and Time

Upon initial start-up, the SAM will display "Set", "dAtE", and "YYYY", then a 4 digit number. Proceed to Step 4 in the procedure below to set the date and time, or power the instrument off and on again to bypass this process. At any time that the time and/or data need to be reset, follow steps 1-6 of the procedure below.

1. Press the Mode key and hold. Turn the instrument on by pressing and releasing the Power key. Once three decimal points appear in the display, release the Mode key. The display will show "di 5".
2. Press and release the ! key until the display shows arrows in the upper right and lower left corners of the display, pointing to "Time" and "Date".
3. Press the Mode key. "Set", "dAtE" will briefly appear in the display.
4. Date and time settings are displayed in the following order: Year ("YYYY"), Month ("MM"), Day ("dd"), Hour ("hh"), Minutes ("mm"). Increase the displayed value for each setting by pressing the Mode key or decrease the value by pressing the Zero/Test key until the desired value is displayed.
5. Press the ! key to save the displayed value and to proceed to the next setting.
6. After setting the minutes, press the ! key. The display will flash "iS" "SEt" and then will return to the measurement mode.

### Recall of Stored Data

The SAM photometer automatically stores the last 15 data sets. To recall stored data:

1. Press the Mode key and hold. Turn the instrument on by pressing and releasing the Power key. Once three decimal points appear in the display, release the Mode key. The display will show "di 5".  
**Note:** If the instrument is already on, press and hold the ! key for at least 4 seconds and release to access the stored data.
2. Press the Mode key. The photometer will display the stored data sets in the following format:
  - a. Sample Number: nXX (e.g. n15, n14, ... n1)
  - b. Year: XXXX (e.g. 2017)
  - c. Date: mm.dd (e.g. 03.15)
  - d. Time: hh.mm (e.g. 12:05)
  - e. Analyte
  - f. Result
3. Press the Zero/Test key to repeat the current data set.
4. Press the Mode key to proceed to the next data set.
5. Press the ! key to return to the measurement mode.

*www.chemetrics.com*

*4295 Catlett Road, Midland, VA 22728 U.S.A.*

*Phone: (800) 356-3072; Fax: (540) 788-4856*

*E-Mail: orders@chemetrics.com*

*Feb. 18, Rev. 11*



DOC022.53.80451

# **Pocket Colorimeter II**

User Manual

04/2014, Edition 1

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# Section 1 Specifications

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Specifications are subject to change without notice.

Specification	Details
Dimensions (W x D x H)	6.1 x 3.2 x 15.2 cm (2.4 x 1.25 x 6 in.)
Enclosure	IP67, waterproof at 1 m (3.3 ft) for 30 minutes (battery compartment not included). Keep out of direct sunlight.
Light source	Light emitting diode (LED)
Detector	Silicon photodiode
Display	LCD with backlight
Weight	0.2 kg (0.43 lb)
Pollution degree	2
Installation category	I
Protection class	3
Power requirements	4 AAA batteries; approximate life of 2000 tests (use of backlight decreases this number) Rechargeable batteries are not recommended.
Operating environment	0 to 50 °C (32 to 122 °F), 0 to 90% relative humidity non-condensing
Storage temperature	-20 to 55 °C (-7.6 to 131 °F)
Photometric precision	± 0.0015 Abs
Wavelength	Fixed wavelength ±2 nm, different for each model
Filter bandwidth	15 nm
Absorbance range	0 to 2.5 Abs
Sample cell path length	1 cm (5–10 mL), 25 mm (10 mL)
Data storage	Last 10 measurements
Certifications	CE mark
Warranty	2 years



## Section 2 General information

---

In no event will the manufacturer be liable for direct, indirect, special, incidental or consequential damages resulting from any defect or omission in this manual. The manufacturer reserves the right to make changes in this manual and the products it describes at any time, without notice or obligation. Revised editions are found on the manufacturer's website.

### 2.1 Safety information

#### **NOTICE**

The manufacturer is not responsible for any damages due to misapplication or misuse of this product including, without limitation, direct, incidental and consequential damages, and disclaims such damages to the full extent permitted under applicable law. The user is solely responsible to identify critical application risks and install appropriate mechanisms to protect processes during a possible equipment malfunction.

Please read this entire manual before unpacking, setting up or operating this equipment. Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment.

Make sure that the protection provided by this equipment is not impaired. Do not use or install this equipment in any manner other than that specified in this manual.

#### 2.1.1 Use of hazard information

##### **▲ DANGER**

Indicates a potentially or imminently hazardous situation which, if not avoided, will result in death or serious injury.

##### **▲ WARNING**

Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.

##### **▲ CAUTION**

Indicates a potentially hazardous situation that may result in minor or moderate injury.

### NOTICE

Indicates a situation which, if not avoided, may cause damage to the instrument. Information that requires special emphasis.

#### 2.1.2 Precautionary labels

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed. A symbol on the instrument is referenced in the manual with a precautionary statement.

	This symbol, if noted on the instrument, references the instruction manual for operation and/or safety information.
	Electrical equipment marked with this symbol may not be disposed of in European domestic or public disposal systems. Return old or end-of-life equipment to the manufacturer for disposal at no charge to the user.

#### 2.1.3 Certification

##### Canadian Radio Interference-Causing Equipment Regulation, IECS-003, Class A:

Supporting test records reside with the manufacturer.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de classe A répond à toutes les exigences de la réglementation canadienne sur les équipements provoquant des interférences.

##### FCC Part 15, Class "A" Limits

Supporting test records reside with the manufacturer. The device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

1. The equipment may not cause harmful interference.
2. The equipment must accept any interference received, including interference that may cause undesired operation.

Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their expense. The following techniques can be used to reduce interference problems:

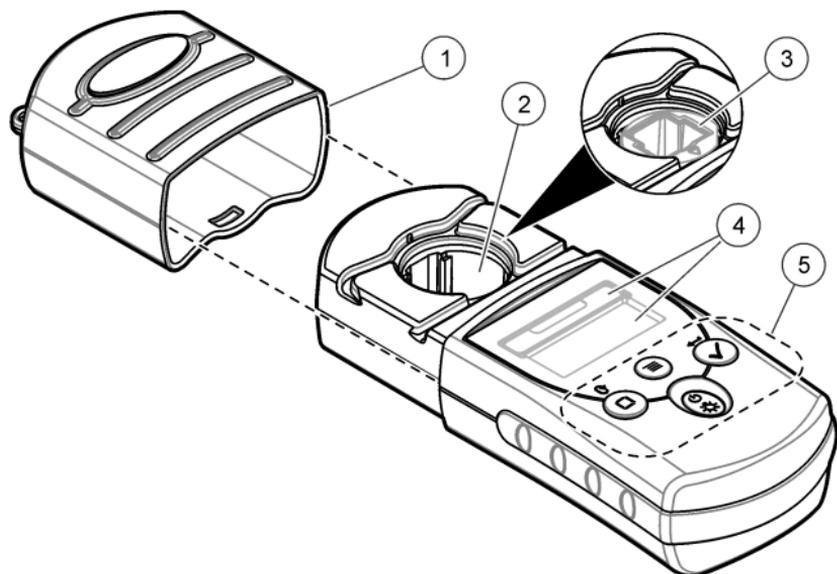
1. Move the equipment away from the device receiving the interference.
2. Reposition the receiving antenna for the device receiving the interference.
3. Try combinations of the above.

## 2.2 Product overview

This instrument is a portable filter photometer used for testing water. Refer to [Figure 1](#). This instrument is configured at the factory to measure one or two specific parameters. This instrument is calibrated at the factory. No user calibration is necessary.

**Note:** *This instrument has not been evaluated to measure chlorine and chloramines in medical applications in the United States.*

**Figure 1 Instrument overview**



1 Instrument cap	3 Cell holder with 1-cm cell adapter <sup>1</sup>	5 Keypad
2 Cell holder	4 Display	

<sup>1</sup> Factory installed in some models

## Section 3 Startup

### 3.1 Install the batteries

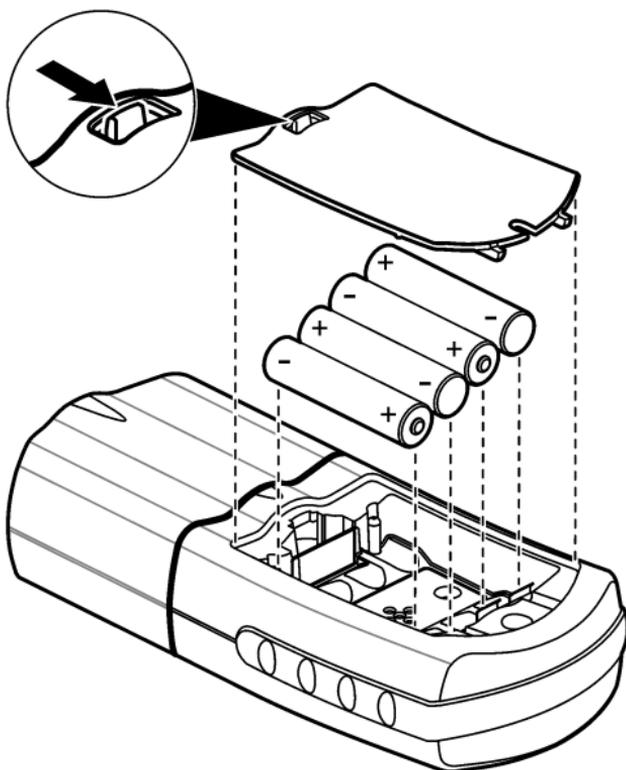
#### ⚠ WARNING



Explosion hazard. Incorrect battery installation can cause the release of explosive gases. Be sure that the batteries are of the same approved chemical type and are inserted in the correct orientation. Do not mix new and used batteries.

Install the batteries as shown in [Figure 2](#).

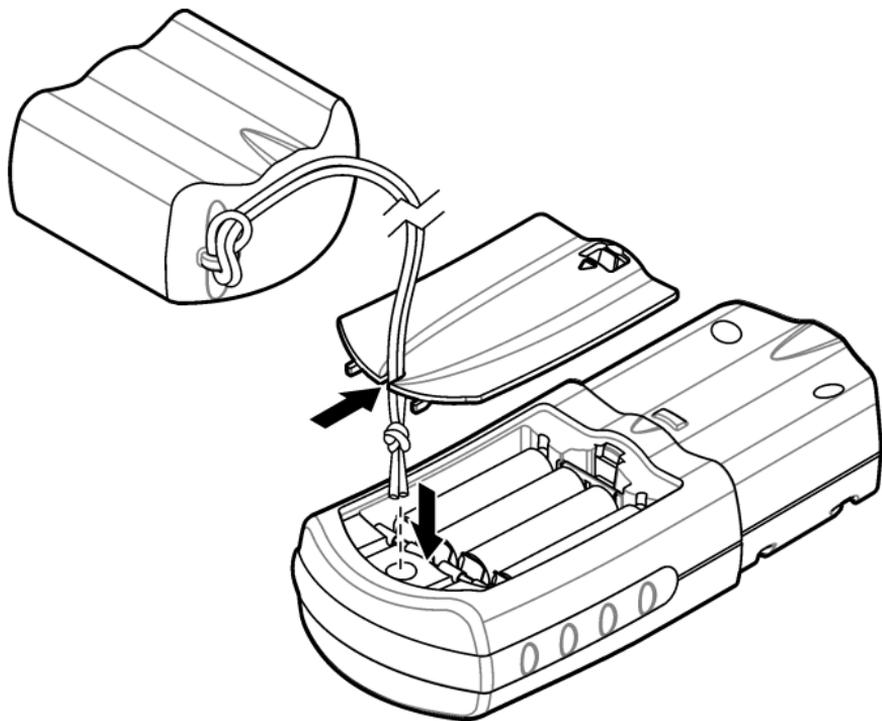
**Figure 2** Install the batteries



### 3.2 Install the cap cord

Attach the cap cord to prevent loss of the instrument cap. Refer to [Figure 3](#).

**Figure 3** Install the cap cord

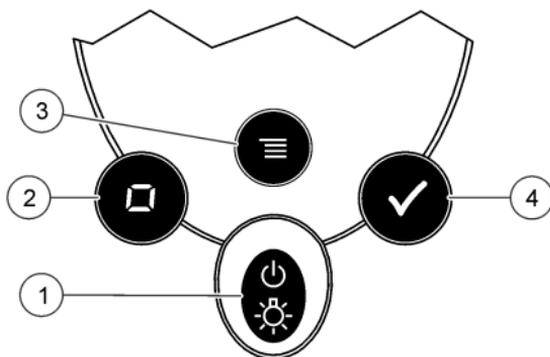


## Section 4 User interface and navigation

### 4.1 Keypad description

Figure 4 shows the keypad and gives the key functions.

Figure 4 Keypad



<b>1 Power/Backlight key:</b> Sets the power to on and off. Push and hold for 1 second to set the backlight to on or off.	<b>3 Menu key:</b> Enters and goes out of menu mode.
<b>2 Zero/Scroll key:</b> Sets the instrument to zero, scrolls through menu options and numbers	<b>4 Read/Enter key:</b> Starts a sample measurement, selects a menu option, moves the cursor to the next digit

### 4.2 Display description

Figure 5 shows the values and icons shown on the display.

Figure 5 Display



<b>1 Numeric display:</b> Measured value or menu options	<b>4 Menu icon:</b> The instrument is in menu mode.
<b>2 Range icon:</b> Selected range or parameter	<b>5 Calibration adjusted icon:</b> The factory default calibration was adjusted or a user-entered calibration curve was entered. Refer to the expanded user manual on the manufacturer's website.
<b>3 Range value:</b> Range(s) or parameters	<b>6 Low battery icon:</b> Battery level is 10%. Flashes when the battery level is too low to complete measurements.

## Section 5 Operation

### 5.1 Configure the instrument

1. Push .
2. Push  to scroll through the menu options. Push  to select an option.

Option	Description
SEL	Sets the measurement range or parameter. Push  to toggle between the measurement ranges or parameters.
00:00	Sets the time in 24-hour format (hh:mm). Push  to change the time. Push  to change the first digit, then  to go to the next digit.
rCL	Shows the last 10 measurements recorded. Push  to show the recorded measurements (01—most recent measurement, 10—oldest measurement). Push  to scroll through the measurements. To select a measurement by number, push  to select the number and then  . Push  to go out of this option.
SCA	Refer to <a href="#">Standard calibration adjust</a> on page 17.

3. Push  to go back to measurement mode.

### 5.2 Run a test

#### WARNING



Chemical exposure hazard. Obey laboratory safety procedures and wear all of the personal protective equipment appropriate to the chemicals that are handled. Refer to the current safety data sheets (MSDS/SDS) for safety protocols.

The basic measurement steps necessary to run a test follow. Refer to the applicable method to run a specific test.

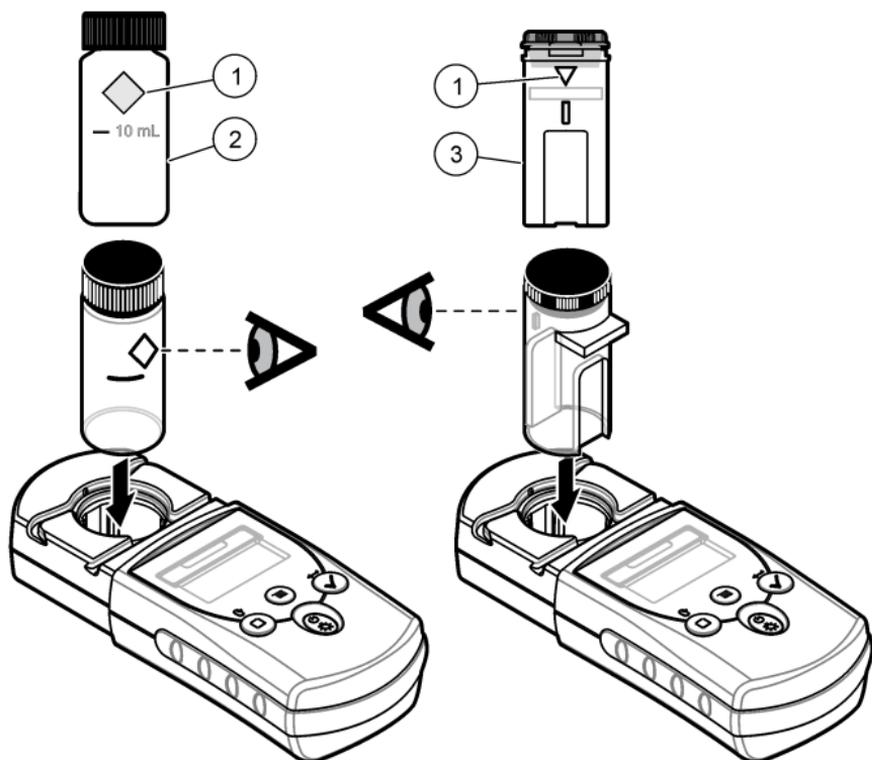
1. Select the applicable measurement range or parameter. Refer to [Configure the instrument](#) on page 13.
2. Prepare the blank according to the method document. Make sure to use the correct sample cell size. Rinse the sample cell and cap with the blank before the sample cell is filled.

## Operation

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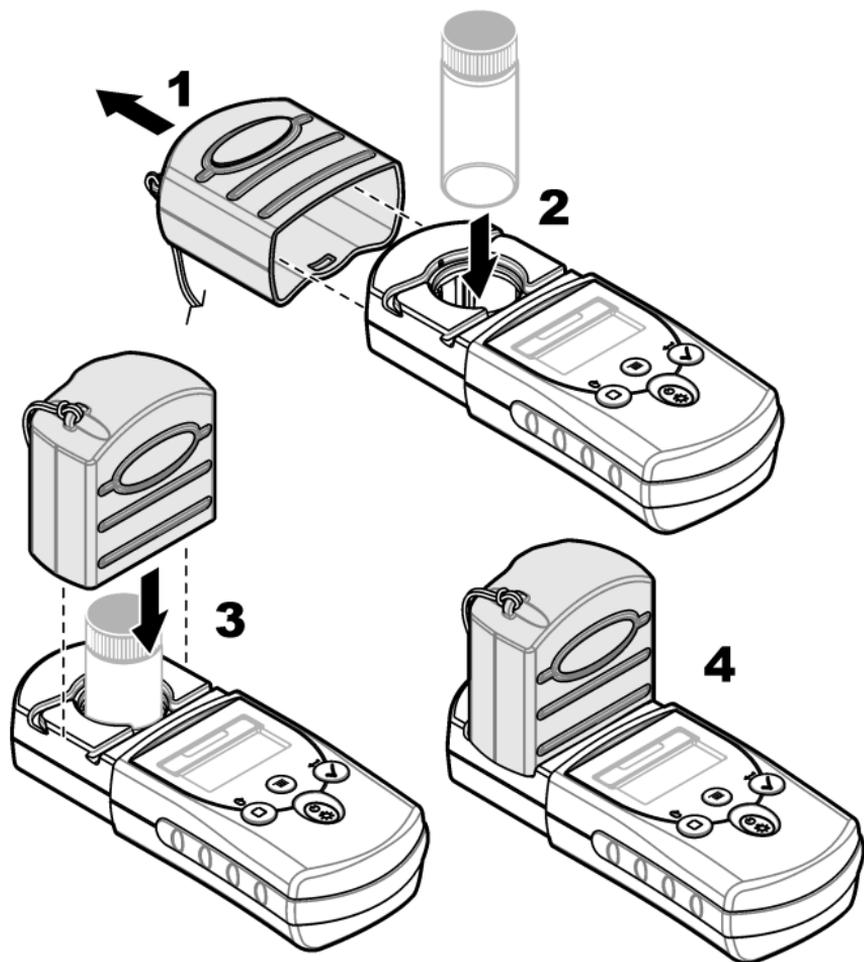
3. Close the sample cell and clean the optical faces of the sample cell with a lint-free cloth.
4. Insert the blank sample cell into the cell holder. Make sure to install the blank sample cell in the correct and consistent orientation so that the results are more repeatable and precise. Refer to [Figure 6](#).
5. Install the instrument cap over the cell holder. Refer to [Figure 7](#).
6. Push  to set the instrument zero. The display shows "0.000", or the degree of resolution that was previously selected.
7. Prepare the sample. Rinse the sample cell and cap with the sample three times before the sample cell is filled. Add reagents as specified by the method document.
8. Close the sample cell and clean the optical surfaces of the cell with a lint-free cloth.
9. Insert the sample into the cell holder. Make sure to install the sample cell in the correct and consistent orientation so that the results are more repeatable and precise. Refer to [Figure 6](#).
10. Install the instrument cap over the cell holder. Refer to [Figure 7](#).
11. Push . The display shows the results in concentration units or absorbance.  
*Note: The result flashes if the result is less or more than the instrument range.*
12. Remove the prepared sample from the cell holder.
13. Immediately empty and rinse the sample cell. Rinse the sample cell and cap three times with deionized water.

Figure 6 Sample cell orientation



<p>1 Orientation mark</p>	<p>2 Sample cell, 25-mm (10 mL)</p>	<p>3 Sample cell, 1-cm (10 mL)</p>
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Figure 7 Install the instrument cap over the cell holder



### 5.3 Show the recorded measurements

Refer to the "rCL" option in [Configure the instrument](#) on page 13.

## 5.4 Standard calibration adjust

Use the standard calibration adjust (SCA) option when a calibration must be adjusted to meet regulatory requirements. The factory calibration is adjusted slightly with the standard calibration adjust (SCA) option so that the instrument shows the expected value of the standard solution. The adjusted calibration is then used for all test results. This adjustment can increase the test accuracy when there are slight variations in the reagents or instruments.

**Note:** For instruments with factory-calibrated ranges or methods, the standard calibration adjust (SCA) feature is disabled when a user-entered method is entered into the instrument. To set SCA back to on, set the instrument to the factory default calibration. Refer to [Set to the factory default calibration](#) on page 22.

### 5.4.1 Adjust the factory calibration with a standard

1. Complete the test procedure for the range to calibrate. For the sample, use the standard solution concentration given in the test procedure documentation.

**Note:** If a standard solution concentration is not given in the test procedure documentation, a different known standard can be used.

2. When the test procedure is completed, push .
3. Push  until "SCA" shows, then push .  
The display shows the standard calibration adjust value.
4. If a different known standard is used, enter the value of the standard:
  - a. Push  until "Edit" shows, then push .
  - b. Push  to enter the value of the standard. Push  to go to the next digit.
5. Push  to add the standard calibration adjust value to the factory calibration curve.

The calibration adjusted icon shows on the display. Refer to [Figure 5](#) on page 12.

### 5.4.2 Set the standard calibration adjust to off

To use the factory default calibration again, set standard calibration adjust (SCA) to off.

1. Push .
2. Push  until "SCA" shows, then push .
3. Push  until "OFF" shows, then push .

**Note:** To set the SCA function to on again, calibrate with a standard.

## 5.5 User-entered calibration

This instrument accepts a user-prepared calibration curve. The calibration curve can be from 0 to 2.5 absorbance. Make sure that the calibration curve includes standard values that are less and more than the range of interest.

The instrument range will be the same as the calibration range. For example, when the standards that are used are 1.00, 2.00 and 4.00. The instrument range is 1.00 to 4.00.

There are two options to enter a user calibration curve:

- **Enter a calibration curve with standards**—The standard solution values are entered with the keypad and the absorbance values are measured.
- **Enter a calibration curve with the keypad**—The standard solution values and absorbance values are entered with the keypad.

**Note:** If the instrument is set to off or the instrument power is removed before a user-entered calibration curve is completed, the calibration curve is not saved. The instrument automatically switches off in user-entered calibration entry mode after 60 minutes of no activity. User-entered calibrations are completed when the user goes out of calibration (cal) mode or edit mode.

### 5.5.1 Channel restrictions

A user-entered calibration curve can be entered into any channel that does not contain a factory-programmed curve. These channels have the label:

- "abs" on the instruments that have a single factory calibration

- “1” and “2” on the single wavelength instruments that are not calibrated

Any chemistry that can be done at the instrument wavelength can contain a user-entered calibration in these channels.

### 5.5.2 Enter a calibration curve with standards

**Note:** Deionized water can be used for the blank unless the sample is significantly more turbid or has more color than deionized water.

1. Set the instrument to the range to calibrate. Refer to [Configure the instrument](#) on page 13.
2. Prepare the blank and the reacted standard solution. Refer to the test procedure. Let the color fully develop.
3. Set the instrument to zero.
  - a. Insert the blank sample cell in the cell holder.
  - b. Install the instrument cap over the cell holder.
  - c. Push . The display shows “- - -”, then “0.000”.
  - d. Remove the instrument cap.
  - e. Remove the sample cell from the cell holder.
4. Push and hold  until “USER” and then “CAL” shows, then push .

**Note:** If “USER” and “CAL” do not show, the factory calibration cannot be changed on the selected range.

5. If “RES” shows on the display, set the resolution.
  - a. Push . The resolution setting (decimal placement) shows.
  - b. To change the resolution, push , then . Push  to save the change.
  - c. To not change the resolution, push .

**Note:** “RES” does not show on the display of factory-calibrated instruments because the resolution cannot be changed. Only instruments that are not factory calibrated or have “abs” as one of the two ranges show “RES” on the display.

## Operation

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6. When "S0" shows on the display, push ✓. Push  to enter the blank value, then push ✓.  
*Note: Push ✓ to go to the next digit.*
7. When "A0" shows on the display, measure the absorbance of the blank.
  - a. Insert the blank sample cell in the cell holder.
  - b. Install the instrument cap over the cell holder.
  - c. Push ✓. The display shows the absorbance value for "S0".
  - d. Remove the sample cell from the cell holder.
8. Push  to show "S1".
9. When "S1" shows on the display, push ✓. Push  to enter the first standard value, then push ✓.  
*Note: Push ✓ to enter the next digit.*
10. When "A1" shows on the display, measure the absorbance of the reacted standard solution.
  - a. Insert the reacted standard sample cell in the cell holder.
  - b. Install the instrument cap over the cell holder.
  - c. Push ✓. The display shows the absorbance value for "S1".
  - d. Remove the sample cell from the cell holder.
11. The calibration is completed with two calibration points. If additional standards are necessary for calibration:
  - a. Push  until "Add" shows, then push ✓.
  - b. Do steps 9–10 again to enter more standards.
12. Push  two times to go back to measurement mode.

### 5.5.3 Enter a calibration curve with the keypad

At least two data pairs are necessary to enter a user-prepared calibration curve. A concentration value and the absorbance value for the given concentration is necessary for each data pair. A maximum of 10 data pairs can be entered.

*Note: This procedure can also be used to change the data pairs in a user-entered calibration curve or factory calibration curve.*

1. Set the instrument to the range to calibrate. Refer to [Configure the instrument](#) on page 13.

2. Push and hold  until "USER" and then "CAL" shows, then push .

**Note:** If "USER" and "CAL" do not show, the factory calibration cannot be changed on the selected range.

3. Push  until "EDIT" shows, then push .

4. If "RES" shows on the display, set the resolution.

a. Push . The resolution setting (decimal placement) shows.

b. To change the resolution, push , then . Push  to save the change.

c. To not change the resolution, push .

**Note:** "RES" does not show on the display of factory-calibrated instruments because the resolution cannot be changed. Only instruments that are not factory calibrated or have "abs" as one of the two ranges show "RES" on the display.

5. When "S0" shows on the display, push . Push  to enter the concentration value of the first data pair, then push .

**Note:** Push  to go to the next digit.

6. When "A0" shows on the display, push . Push  to enter the absorbance value of the first data pair, then push . "S1" shows on the display.

7. Do steps 5–6 again to enter the second data pair (S1 and A1).

8. The calibration is completed with two data pairs. If additional data pairs are necessary for calibration:

a. When "Add" shows, push .

b. Do steps 5–6 again to enter more data pairs.

9. Push  two times to go back to measurement mode.

### 5.5.4 Remove a calibration point

To remove a calibration point from a user-entered calibration curve:

1. Set the instrument to the range to calibrate. Refer to [Configure the instrument](#) on page 13.
2. Push and hold  until "USER" and then "CAL" shows.  
**Note:** If "USER" and "CAL" do not show, the factory calibration cannot be changed on the selected range.
3. Push  until "EDIT" shows, then push .
- Note:** Calibration points can also be removed in calibration (CAL) mode.
4. Push  until the calibration point to remove shows (i.e., S0 or S1), then push .
5. Push  until "dEL" shows, then push .
- Note:** The minimum number of data pairs is two. When only two data pairs remain, no more data pairs can be removed.
6. Push  two times to go back to measurement mode.

### 5.5.5 Set to the factory default calibration

1. Set the instrument to the applicable range. Refer to [Configure the instrument](#) on page 13.
2. Push and hold  until "USER" and then "CAL" shows.  
**Note:** If "USER" and "CAL" do not show, the factory calibration cannot be changed on the selected range.
3. Push  until "dFL" shows, then push .

## Section 6 Maintenance

### ⚠ CAUTION



Multiple hazards. Only qualified personnel must conduct the tasks described in this section of the document.

### NOTICE

Do not disassemble the instrument for maintenance. If the internal components must be cleaned or repaired, contact the manufacturer.

## 6.1 Clean the instrument

Clean the exterior of the instrument with a moist cloth and a mild soap solution and then wipe the instrument dry.

## 6.2 Clean the sample cells

### ⚠ CAUTION



Chemical exposure hazard. Obey laboratory safety procedures and wear all of the personal protective equipment appropriate to the chemicals that are handled. Refer to the current safety data sheets (MSDS/SDS) for safety protocols.

### ⚠ CAUTION



Chemical exposure hazard. Dispose of chemicals and wastes in accordance with local, regional and national regulations.

Most laboratory detergents are used at recommended concentrations. Neutral detergents, such as Liquinox, are safer to use when regular cleaning is necessary. To decrease the cleaning times, increase the temperature or use an ultrasonic bath. To complete the cleaning, rinse a few times with deionized water and then let the sample cell air dry. Sample cells may also be cleaned with acid, followed by a thorough rinse with deionized water.

**Note:** Always use acid to clean sample cells that were used for low-level metal tests.

Special cleaning methods are necessary for individual procedures. When a brush is used to clean sample cells, take extra care to avoid scratches on the interior surfaces of the sample cells.

### 6.3 Replace the batteries

Replace the batteries when the battery power level is low. Refer to [Install the batteries](#) on page 9.

## Section 7 Troubleshooting

Error	Description	Solution
E-0	No zero	In user calibration mode, a standard solution was measured before the instrument zero was set. Measure a blank solution to set the instrument to zero.
E-1	Ambient light error <sup>1</sup>	There is ambient light in the cell holder. Make sure that the instrument cap is fully installed over the cell holder.
E-2	LED error <sup>1</sup>	The LED (light source) is out of regulation. Replace the batteries. Make sure that the LED in the cell holder comes on when ✓ or  is pushed.
E-3	Standard adjust error	<ul style="list-style-type: none"><li>• The measured value of the standard solution is more than the adjustment limits. Prepare a fresh standard.</li><li>• The standard solution is not within the concentration range that can be used for standard calibration adjust. Prepare a standard with a value at or near the recommended concentrations given in the procedure.</li><li>• Make sure that the concentration of the standard solution is entered correctly.</li></ul>
E-6	Abs error	The absorbance value is not correct or the user-entered calibration curve has fewer than two points. Enter or measure the absorbance value again.
E-7	Standard value error	The standard solution concentration is equal to another standard solution concentration that is already entered in the user-entered calibration curve. Enter the correct standard concentration.
E-9	Flash error	The instrument is not able to save data.

## Troubleshooting

---

Error	Description	Solution
Reading flashes	The reading is more or less than the instrument range. <sup>2</sup>	If the reading is less than the instrument range, make sure that the instrument cap is fully installed over the cell holder. Measure a blank. If the blank reading is not zero, set the instrument to zero again.
		If the reading is more than the instrument range, identify if there is a light blockage in the cell holder. Dilute the sample. Do the test again.
		For factory-calibrated programs, the maximum and minimum values always equal the factory-calibrated values and cannot be changed.

- <sup>1</sup> When an E-1 or E-2 error occurs on a measurement, the display shows “\_.\_”. The decimal place depends on the chemistry. If the E-1 or E-2 error occurs while the instrument is set to zero, set the instrument to zero again.
- <sup>2</sup> The flashing value will be 10% over the upper test range limit.

## Section 8 Replacement parts

### ⚠ WARNING



Personal injury hazard. Use of non-approved parts may cause personal injury, damage to the instrument or equipment malfunction. The replacement parts in this section are approved by the manufacturer.

**Note:** *Product and Article numbers may vary for some selling regions. Contact the appropriate distributor or refer to the company website for contact information.*

### Replacement parts

Description	Quantity	Item no.
AAA batteries, alkaline	4/pkg	4674300
Cap cord	1	5955900
Instrument cap	1	5954800
Sample cell, 25 mm (10 mL), with caps	6/pkg	2427606
Sample cell, 1 cm (10 mL), with caps	2/pkg	4864302



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# Malden Stormwater Illicit Discharge Detection and Elimination Plan

## ATTACHMENT I

### *Dry Weather Manhole Inspection Form*

Job No.: \_\_\_\_\_ City: \_\_\_\_\_  
 Inspector: \_\_\_\_\_ Date: \_\_\_\_\_

**MANHOLE INSPECTION FORM**

<b>MANHOLE I.D.</b>		<b>Final Discharge from Structure?</b> Yes <input type="checkbox"/> No <input type="checkbox"/> <b>If Yes, Discharge to Outfall No:</b> _____	
<b>MANHOLE Label:</b>	Stencil <input type="checkbox"/> Ground Inset <input type="checkbox"/> Sign <input type="checkbox"/> None <input type="checkbox"/> Other _____		
<b>Manhole Material:</b>	Concrete <input type="checkbox"/> Corrugated metal <input type="checkbox"/> Stone <input type="checkbox"/> Brick <input type="checkbox"/> Other: _____ <input type="checkbox"/>	<b>Manhole Condition:</b>	Good <input type="checkbox"/> Poor <input type="checkbox"/> Fair <input type="checkbox"/> Crumbling <input type="checkbox"/>
<b>Pipe Material:</b>	Concrete <input type="checkbox"/> HDPE <input type="checkbox"/> PVC <input type="checkbox"/> Clay Tile <input type="checkbox"/> Other: _____ <input type="checkbox"/>	<b>Pipe Measurements:</b>	Inlet Dia. (in): d= _____ Outlet Dia. (in): D= _____
<b>Required Maintenance/ Problems (check all that apply):</b>			
<input type="checkbox"/> Tree Work Required <input type="checkbox"/> New Cover is Required <input type="checkbox"/> Pipe is Blocked <input type="checkbox"/> Frame Maintenance is Required <input type="checkbox"/> Remove Accumulated Sediment <input type="checkbox"/> Pipe Maintenance is Required <input type="checkbox"/> Structure Undermined or Bypassed		<input type="checkbox"/> Cannot Remove Cover <input type="checkbox"/> Ditch Work <input type="checkbox"/> Corrosion at Structure <input type="checkbox"/> Erosion Around Structure <input type="checkbox"/> Remove Trash & Debris <input type="checkbox"/> Need Cement Around Cover Base <b>Other:</b> _____	
<b>Sketch with Inlet(s) and Outlet(s) :</b>	<b>Sediment Buildup Depth :</b> 0-6 (in): _____ 6-12(in): _____ 12-18 (in): _____ 18-24 (in): _____ 24 + (in): _____	<b>Description of Flow:</b> Heavy <input type="checkbox"/> Moderate <input type="checkbox"/> Slight <input type="checkbox"/> Trickling <input type="checkbox"/>	<b>Street Name/ Structure Location:</b>
<b>*If the outlet is submerged check yes and indicate approximate height of water above the outlet invert.</b> height above invert (in): _____		Yes <input type="checkbox"/>	No <input type="checkbox"/>
<input type="checkbox"/> Flow <input type="checkbox"/> Standing Water (check one or both)	<b>Observations:</b> Color: _____ Odor: _____	<b>Circle those present:</b>	
<b>Weather Conditions :</b> Dry > 24 hours <input type="checkbox"/> Wet <input type="checkbox"/>		Sanitary Waste	Bacterial Sheen
<b>Sample of Screenings Collected for Analysis?</b> Yes <input type="checkbox"/> No <input type="checkbox"/>		Orange Staining	Floatables
<b>Comments:</b>		Excessive sediment	Pet Waste
		Other: _____	Optical Enhancers



Job No.: \_\_\_\_\_ City: \_\_\_\_\_  
 Inspector: \_\_\_\_\_ Date: \_\_\_\_\_

**CATCH BASIN INSPECTION FORM**

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

<b>Required Maintenance/ Problems (check all that apply):</b>	
<input type="checkbox"/> Tree Work Required <input type="checkbox"/> New Grate is Required <input type="checkbox"/> Pipe is Blocked <input type="checkbox"/> Frame Maintenance is Required <input type="checkbox"/> Remove Accumulated Sediment <input type="checkbox"/> Pipe Maintenance is Required <input type="checkbox"/> Basin Undermined or Bypassed	<input type="checkbox"/> Cannot Remove Cover <input type="checkbox"/> Ditch Work <input type="checkbox"/> Corrosion at Structure <input type="checkbox"/> Erosion Around Structure <input type="checkbox"/> Remove Trash & Debris <input type="checkbox"/> Need Cement Around Grate <b>Other:</b> _____

<b>Catch Basin Grate Type :</b>	<b>Sediment Buildup Depth :</b>	<b>Description of Flow:</b>	<b>Street Name/ Structure Location:</b>
Bar: <input type="checkbox"/> Cascade: <input type="checkbox"/> Other: _____ Properly Aligned: Yes <input type="checkbox"/> No <input type="checkbox"/>	0-6 (in): _____ 6-12(in): _____ 12-18 (in): _____ 18-24 (in): _____ 24 + (in): _____	Heavy <input type="checkbox"/> Moderate <input type="checkbox"/> Slight <input type="checkbox"/> Trickling <input type="checkbox"/>	

<b>*If the outlet is submerged check yes and indicate approximate height of water above the outlet invert.</b> h above invert (in): _____	Yes <input type="checkbox"/>	No <input type="checkbox"/>
-------------------------------------------------------------------------------------------------------------------------------------------	------------------------------	-----------------------------

<input type="checkbox"/> Flow <input type="checkbox"/> Standing Water (check one or both)	<b>Observations:</b>	<b>Circle those present:</b>	
	Color: _____	Foam	Oil Sheen
	Odor: _____	Sanitary Waste	Bacterial Sheen
<b>Weather Conditions :</b>	Dry > 24 hours <input type="checkbox"/> Wet <input type="checkbox"/>	Orange Staining	Floatables
<b>Sample of Screenings Collected for Analysis?</b> Yes <input type="checkbox"/> No <input type="checkbox"/>		Excessive sediment	Pet Waste
<b>Comments:</b>		Other: _____	Optical Enhancers

# Malden Stormwater Illicit Discharge Detection and Elimination Plan

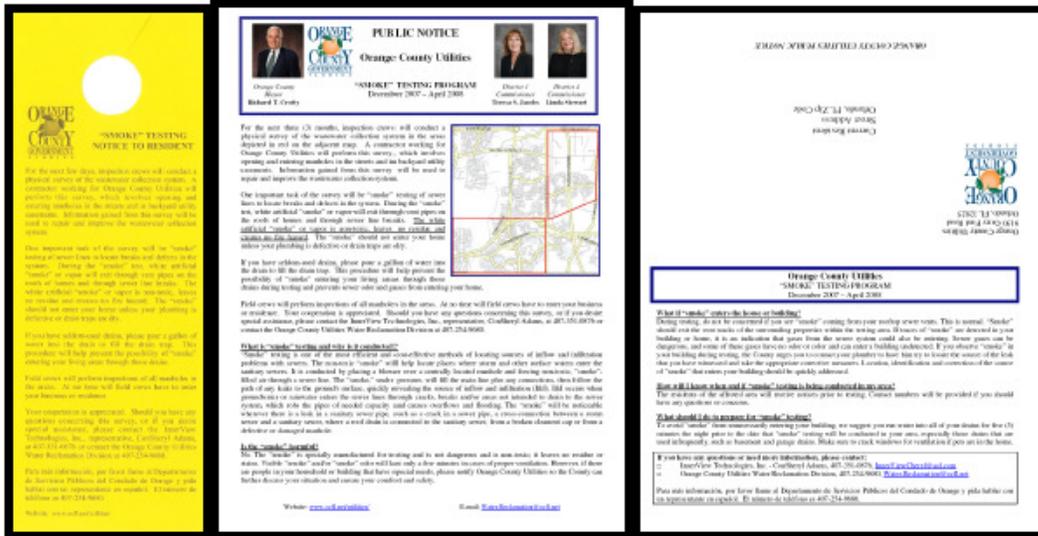
## ATTACHMENT J

*IDDE Source Isolation SOPs*



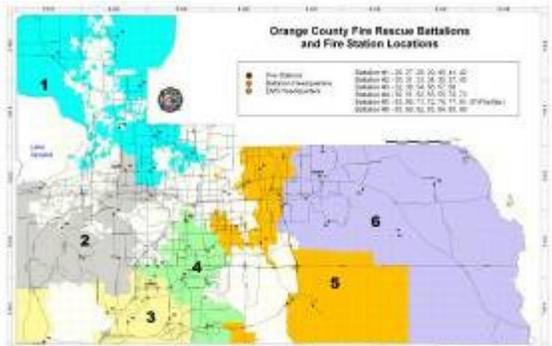
- Provide Variable Message boards strategically placed throughout testing including major streets into the area and entrances into subdivisions
- Weekly updates were sent to the Fire Department, 911, Utilities and Testing Company
- Notification of all parties of project completion

1. The OCUD Project Manager must have the Public Notification flyer / mailer and door hanger approved through the Director's office using the PIO request form and PIO checklist unless an approved template is being utilized.



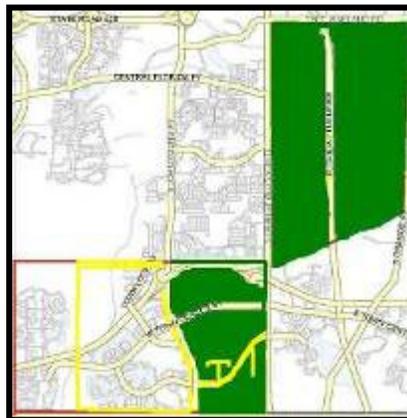
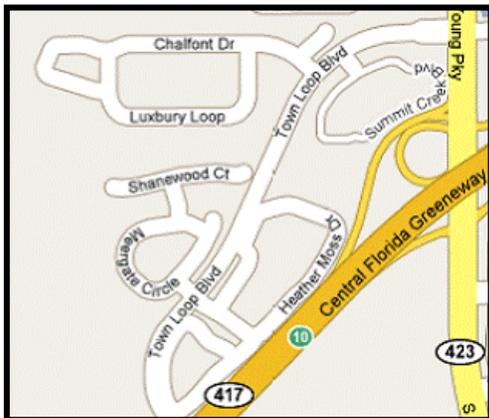
2. The OCUD Project Manger will contact the Commissioners office and notify the Commissioners that there will be smoke testing in their District. Commissioners need to be notified or briefed prior to the public notification flyers / mailers being sent to the public.

3. The OCUD Project Manger shall provide initial notification to [Orange County Fire Rescue](http://www.orangefire.com) and locate the Assistant Chiefs commanding the Fire Stations of the affected area. This may cover several areas depending on the total area to be smoke tested. However, the City of Orlando may also be providing fire service for the area, and coordination is required.



4. The Contractor or OCU shall provide a mass mailing to all residents in the smoke testing area approximately two (2) weeks prior to project start. The Project Manager shall determine if the mailers shall be handled in-house or by the Contractor. The Project Manager will provide residents names and addresses by coordinating with GIS. GIS can export all the information in an excel table for an easy mail merge. Please request customers billing address be provided in addition to the home owner data so that renters are included in the notification process. Note that Customer service's reverse dialing system may also be utilized and a printed note can be placed on Customers Bills, to supplement the public notification flyer / mailer.

5. The Contractor will hang door hangers approximately 2-4 days prior to Testing specific streets.
6. The Contractor shall provide Variable Message Boards (VMB) strategically placed throughout testing including major streets into the area and entrances into subdivisions. Project 58166 covered 75 miles of sanitary sewer (400,000 LF) and 7,300 residents over a 2 month period. The Contractor constantly relocated the three (3) VMB to cover the areas being smoked.
7. The Project Manager shall provide weekly updates to the Fire Department, 911, Water Reclamation contacts, Utilities Dispatch and Testing Company. Work for the upcoming week as well as total progress shall be provided by the Contractor and this information shall be conveyed to all parties on a weekly basis and sent the Friday before the upcoming week by the Project Manager. This included an overall progress map of the entire project progress, narrative describing the week look ahead and a map showing all street names to be tested the following week. The Project Manager is the sole point of contact for all Public Safety and Utilities Departments.



Green = complete  
 Yellow = In Progress  
 Red = not started

8. Provide Notification to all parties that the smoke testing is complete. The Fire Department will call immediately if they haven't received the weekly update.

## **OCUD DOCUMENTATION COLLECTION**

The OCUD Project Manager will provide the Consultant or Contractor with the following information to provide a quote.

- Proposed smoke testing area map,
- One set of quarter section maps for the purpose of bidding
- Total Linear Footage of Sanitary Sewer,
- Total number of Manholes,
- Total number of Resident Addresses & spreadsheet for Mailers and door hanger count,
- Requirements for Variable Message Boards,
- Requirements for the door hanger and 2 page mailer including sizes, color, etc.
- Three (3) color sets of quarter section maps to the Contractor plotted at the time of smoke testing.
- Coordination with Water Reclamation for Manhole locates just prior to smoke testing (several manholes were found to be paved over or located in the R-O-W)
- Coordination with Construction and Water Reclamation during smoke testing for an emergency contact / standby personal to make emergency repairs if required and provide sewer cleaning if line is blocked.

## **SMOKE TESTING SCOPE OF SERVICES.**

### Procedures

- Approved Public Notification Mass Mailers. The Contractor shall mail out to all the residences and businesses in the proposed project area, the approved Smoke Testing public notification flyer / mailers, as a mass mailing approximately 2 weeks before the overall project starts. The mailer shall only be the approved Orange County Utilities smoke testing public notification flyer / mailer and shall be provided by the Project Manager for each project.
- Door Hangers. The Contractor shall place door hangers on all residences and business 2-4 days prior to smoke testing at those specific addresses. Door hangers shall be an ongoing process throughout the project and shall be limited to the area provided in the look ahead schedule. Door Hangers shall not be placed for areas which will not be tested within 4 days.
- Smoke Test Setup. The contractor will setup on every other manhole and smoke test no more than 400 ft both directions from setup (Total of 800 LF). This distance shall not be exceeded unless written authorization and field verification is given by the verifying that distances greater than a 400 ft radius are providing acceptable results. The Contractor shall be responsible for Maintenance of Traffic and relocation of variable message boards throughout the duration of the project.
- Smoke Testing Crew. The smoke testing Contractor shall provide at minimum a crew of four (4) people. One member to man the machine, two (2) to walk and one supervisor. The supervisor will assist in all functions but with primary effort on data collection, logging, determination of smoke testing schedule and tracking.

- Smoke Testing. Smoke will be turned on and remain on throughout the entire time of testing including the walkthrough for identification of defect locations with flags as well as during the taking digital pictures for each flagged and numbered defect.
- Identification of Defects. The walk through for locating of defects will not begin until smoke is highly visible with a smoke plume emanating from the plumbing vents of houses at the end of the setup location (maximum 400 ft radius) from the smoke testing machine. A colored locate flag will dropped at the location of the defect and will be left for the homeowner to remove. Walkers shall traverse not only the sidewalk but between all homes and in back yards looking for illegal connections including patio, pool drains and roof drain connections.
- Defect Pictures. Once the area has been flagged the Smoke Testing Contractor will snap a digital picture (not less than 2 Megapixel with time and date stamp on the digital photograph) showing the smoke billowing from the defect, flag, unique number, and physical features at or near the defect. Pictures without smoke plume from the located defect or missing visible unique number are unacceptable. The contractor will provide a self standing sign (sandwich board) at each defect with minimum 4” tall numbers physically located at each defect part of the picture. Numbering shall be consecutive, unique number per defect, clearly visible in the picture and noted on the report, record drawings and summary spreadsheet.
 
- Defect Reporting. The report for each defect shall be a MS Word document containing the following information: Contractor letterhead, name of smoke tester, date, time, address of defect, description of defect, manhole to manhole OCU identification, digital photograph, priority rating of defect, Total Drainage Area estimation, quarter section number, footage smoked and map for exact location of defect. Note the map may be of an entire street with multiple defects shown. Weekly reports shall be provided to the Project Manager in digital form as well as 2 hard copies. The Project Manager shall provide one copy to Water Reclamation.
  - Common description of defects include: broken cleanout, broken cleanout cap, missing cleanout cap, manhole lid, roof leader, drain connection, AC connection, smoke under sidewalk or driveway, etc
  - Common priority ratings and Total Drainage Area estimations include: Priority 1 (illegal connections, direct impact, large drainage area), Priority 2 – High Impact (low lying area, down spouts near cleanout, etc), Priority 3 – Moderate Impact (small impact but potential inflow), Priority 4 - Insignificant (None, no impact).



- Cost for variable message boards Per Month
- Final Report, Excel Summary and Record DWGS LS
- Acknowledgements of Contractor Responsibilities and Scope of Services
  - Responsible for all MOT including traffic control, barricades, flagmen, traffic cones, police, etc
  - Providing all flags, equipment, chemicals, water, fuel and all appurtenances to be included in the per foot cost
  - Responsible for protecting the public from open manholes
  - Responsible for any special permits or licenses
  - Coordination with Schools and high traffic roads for testing on weekends only
  - Providing a phone number for information and point of contact onsite during testing for the public

### **UTILITY INSPECTOR**

As with any project, there are several procedural errors or shortcuts that can be made which will detrimentally affect the outcome. The inspector will verify the procedures are being followed by the Contractor including, running the smoke the entire time, effectiveness of the walkers, verify backyards and side yards are being investigated, speaking with the public and documentation. The project schedule shall be coordinated by the Project Manager with Construction to verify the specifications are being adhered.

In 58166, we provided a full time inspector as well as a part time representative from Water Reclamation. Both Utilities representatives were looking for defects, calling in critical defects to be repaired immediately, speaking with the public about the project and directly responding to customer calls to the Smoke Tester PIO as well as the Water Reclamation hotline. In addition, we corrected several issues with the smoke tester procedures. The first was the duration of the smoke. The walkers were leaving before the smoke had reached the end of the area to be tested and were missing vital defects. There is a time lag from when the machine is started until the smoke fills the volume of the gravity collection system, laterals, house plumbing and reaches the final point of the testing area. The coordination between the Contractor in charge of running the smoke test machine and the walkers was not efficient. In one instance, they ran out of smoke and the walkers continued looking for defects even though no smoke was in the system. Finally, the machine was being turned off immediately after the flagging was finished. In some instances, the defect (broken later under a sidewalk, manhole shifted cone section or deep cleanout) were not readily apparent without the presence of smoke. The defect pictures must show smoke to identify the specific defect and show proof that there is an issue.

### **GPS COORDINATES**

In 58166, the Prime Contractor shot GPS coordinates of each defect as well as took coordinates for every manhole and lift station in the testing area. This task was a full time position and required the Contractor to provide the GPS Trimble equipment. The need to locate both the existing facilities as well as the defects is a coordination effort by the Project Manager with both GIS and Water Reclamation. In addition, the GPS Technology is not normally a service provided by Smoke Testers, so the additional cost for a sub will have to be evaluated by the Project Manager and the need for the Utility.

## **DATA ANALYSIS**

The Project Engineer is responsible for analyzing the defects found during smoke testing, verifying priority, and creating a column on the summary spreadsheet for responsibility. Illegal connects or cleanout issues at the home are the responsibility of the homeowner to repair. The cleanouts at the R-O-W line, defects found under sidewalks or driveway aprons, manholes, etc are the responsibility of Utilities to repair. The Project Manager will sort the summary spreadsheet by responsibility and priority. This information shall be coordinated through both Water Reclamation for scheduling of repairs as well as with the Water Reclamation Environmental Compliance section for residential compliance and verification of repairs. The project manager shall ensure that the digital data is filed on the digital network under the appropriate sequence number.

## **PROJECT CLOSEOUT**

The Project Manager shall have a closeout meeting and pass all the information including spreadsheet, record drawings and Final Report with pictures to Water Reclamation. Water Reclamation will schedule repairs that are the responsibility of the Utility and coordinate the compliance action with homeowners responsible for private property repairs.

The results for #58166

<b>Priority of Defect</b>	<b>Description</b>	<b>ROW / Easement</b>	<b>Private Property</b>	<b>Total</b>	<b>Percent</b>
<b>Priority 1 - Illegal Connections</b>	Direct Connection (Roof Gutters, porch / pool drains, plumbing, etc)	0	20	20	1.6%
<b>Priority 1 - Direct Impact</b>	(Ponds nearby, large depressions, parking lots, MH in drainage)	45	10	55	4.5%
<b>Priority 2 - High Impact</b>	(Low areas, down spouts near cleanout, etc)	527	186	713	58.4%
<b>Priority 3 - Moderate Impact</b>	Small impact but potential inflow	134	221	355	29.1%
<b>Priority 4 - Insignificant</b>	Above grade or high ground, No observable impact	8	70	78	6.4%
<b>Total</b>		<b>714</b>	<b>507</b>	<b>1221</b>	<b>100%</b>

Priority 2 –Impact – Low Areas.  
Note swale between houses



Priority 2 – Impact (Low Area) Note screen on cleanout  
and swale between houses



Priority 3 – Small Impact  
Good drainage to lake. Small impact.



Priority 4 – No Impact – No drainage Area.  
Homeowner to repair c/o on house



Priority 1 - Illegal connections





## Dye Testing for Storm Water and Sanitary Systems

### Guideline

Issue Date: 05/05/2000

Revision Date: 06/28/2018

**Applies To:** University of Michigan employees and contractors performing dye testing.

This guideline is for dye testing of the storm water and sanitary sewer systems on the University of Michigan (U-M) Ann Arbor Campus. Dye testing is conducted as part of the U-M National Pollutant Discharge Elimination System ([NPDES](#)) storm water discharge permit in order to check for illicit connections. Dye testing is regulated under Rule 97 of Michigan Water Quality Standards. This regulation requires that the Michigan Department of Environmental Quality (MDEQ) approve all dye testing.

Prior to dye testing approvals, the contractor or person(s) performing the dye test must fully read and understand these guidelines and must submit all information requested to Environment, Health & Safety (EHS). Additionally, **this form must be signed and submitted to EHS, Environmental Protection and Permitting Program (EP3)**, signifying acceptance to the terms and conditions herein.

1. Call EHS, EP3 at 734-936-1920, a **minimum of seventy-two (72) hours** prior to any dye testing to accommodate the required MDEQ advance notice.
2. Provide the location of the proposed dye test. Be specific, so that the potential receiving water can be determined by EHS, EP3 through a review of the campus storm water system maps.
3. EHS, EP3 will forward dye testing requests to the MDEQ Jackson District Office. EHS, EP3 will also notify other units on campus that should be aware of the activities, such as the Plumbing Shop, the Department of Public Safety and the EHS on-call emergency responder. EHS, EP3 will also contact the City of Ann Arbor Waste Water Treatment Plant, the Washtenaw County Water Resources Commissioner, and Washtenaw County Department of Environmental Health.
4. After the dye testing notification has been made, dye can be obtained from EHS, EP3 (734-936-1920). Before obtaining the dye, all requested information requested herein, including a signed copy of this form must be submitted to EHS, EP3. Follow the manufacturer's recommendation on the amount of dye used. Norlab, Inc. liquid powder tracing dye yellow green is the approved color for use on campus. Norlab, Inc. recommends using 1 oz. dye per 250 gallons of water or 1 oz. of dye per 100 gallons of water with high turbidity. If additional dye colors are needed or proposed for use – they must be approved by EHS, prior to use. **Absolutely no other materials or substances such as soaps may be used for testing of the sanitary or storm lines without written approval from U-M EHS.**
5. Check for dye downstream of the testing location in manholes on the storm and sanitary systems to determine the sewer line connections. The time required for monitoring will vary, depending on flow in the lines that are tested. In order to make sure the test is properly conducted, the individual checking the downstream manholes should be in place prior to the introduction of the dye. Based on the circumstances at each location, additional people may be needed to monitor multiple locations. It is recommended that radios or cell phones be utilized to maintain contact during the dye test.

6. For projects primarily testing sanitary connections, a vacuum truck is not required. However, for projects primarily testing storm connections, a vacuum truck may be required to be on-site for the removal of dye colored water from the storm water drainage system. Please consult EHS, EP3 on whether or not a vacuum truck or other method is required. If a vacuum truck is required, please contact the Utilities Department at 734-647-1348 to arrange for the U-M vacuum truck (or contractor’s truck) to be on-site during the proposed dye test. If a vacuum truck is required, have the vacuum truck available and positioned by what is thought to be a downstream storm water manhole. If necessary, use the vacuum truck to remove any of the water and dye from the storm water system prior to it reaching a water body. Discharge the dye and water mixture to an approved sanitary sewer location.

**NOTE: EHS requires written follow-up of all findings, even if no cross-connections are found. All illicit connections must be reported to EHS, EP3 immediately.** Provide information about the actions that will be taken to prevent an illicit discharge (if possible) and to correct the cross connection.

EHS, EP3 will verbally notify the MDEQ Jackson District Supervisor within 24 hours of any confirmed illicit connection that is suspected of being a danger to health or the environment as specified under U-M’s NPDES permit. For discharges that do not pose imminent danger to health or the environment, EHS, EP3 will provide notification to the MDEQ Jackson District Supervisor, verbally or in writing, within 5 days of discovery. Written documentation will be submitted to the MDEQ within 14 days in either case. This information is also included in the storm water permit reports which are submitted to the MDEQ on a regular basis.

These dye testing guidelines will be reviewed on a periodic basis to determine if any modifications are required. Contact EHS, EP3 at 734-936-1920 or [stormwater@umich.edu](mailto:stormwater@umich.edu) with any questions regarding this guideline.

**Verification of Guideline Review**

Each person involved in the dye testing event should complete the information in the table below. Please either fax the completed form below to EHS, EP3 at 734-763-1185 or scan and email to [stormwater@umich.edu](mailto:stormwater@umich.edu). Your signature on this document indicates that you have reviewed the storm water system dye testing guidelines and agree to follow these guidelines.

<b>Name</b>			
<b>Company</b>			
<b>Email Address</b>			
<b>Phone Number</b>			
<b>Signature</b>			
<b>Date</b>			

<b>Name</b>			
<b>Company</b>			
<b>Email Address</b>			
<b>Phone Number</b>			
<b>Signature</b>			
<b>Date</b>			

# Malden Stormwater Illicit Discharge Detection and Elimination Plan

## ATTACHMENT K

*IDDE Training Records*

**Illicit Discharge Detection and Elimination (IDDE)  
Training Record**

**Malden, Massachusetts**

<b>Name</b>	<b>Title</b>	<b>Date</b>	<b>IDDE Training Topic</b>
John DeSantis	Malden Utility Superintendent	5/8/19	Review of ongoing IDDE activities and review of new requirements, SSO inventory
Robert Knox	Malden Director of Public Works	5/8/19	Review of IDDE requirements
Charles Altobello	NCA, Inc. (Contractor/Consultant)	5/20-6/4	Review of updated IDDE Plan and field testing and analytical requirements
John DeSantis	Malden Utility Superintendent	6/20/19	Review of updated IDDE Plan
Yem Lip, P.E.	Malden City Engineer	6/25/2019	Review of updated IDDE Plan and roles and responsibilities

# Malden Stormwater Management Program Plan

## ATTACHMENT 17

MCM 4 Construction Site Stormwater Runoff Control

**BMP 4.1- Sediment and Erosion Control Ordinance**

# **Malden City Ordinance**

## **SECTION 11.74 STORM WATER MANAGEMENT AND LAND DISTURBANCE REGULATION**

### **.1 APPLICABILITY AND ADMINISTRATION**

Except as authorized by the City Engineer in a Land Disturbance Permit or as otherwise permitted by ordinance, no person shall engage in any activity which disturbs

- .1 one acre or more of land that drains to the municipal storm drainage system;
- .2 less than one acre of land but is part of a larger common plan of development or sale that will ultimately disturb one acre or more of land that drains to the municipal storm drainage system;

The following activities shall be exempt from the provisions of this ordinance:

- .1 routine maintenance to maintain the original line, grade, hydraulic capacity or the original purpose of the site;
- .2 normal maintenance and improvement of land in agricultural use as defined by Wetlands Protection Regulation;
- .3 maintenance of existing landscaping, gardens, or lawn areas associated with a single family dwelling;
- .4 construction of fencing that will not substantially alter existing terrain or drainage patterns;
- .5 construction of utilities other than drainage which will not alter terrain and drainage patterns;
- .6 activities that are subject to the Wetlands Protection Act and demonstrate compliance with an Order of Conditions issued by the Conservation Commission.
- .7 normal maintenance or improvement to agricultural or aquacultural land as defined in 310 CMR 10.4.

The City Engineer shall enforce the provisions of this ordinance and may delegate any duties imposed by it to his employees and agents. The Director may adopt rules and regulations for storm water management not inconsistent with the provisions of this ordinance and may waive strict compliance with any requirement of this ordinance where such action is allowed under federal, state or local statutes and regulations, is in the public interest and is not inconsistent with the purpose and intent of this ordinance.

## **.2 STORMWATER MANAGEMENT PLAN**

The Stormwater Management Plan shall fully describe the proposed project in drawings and narrative and shall include:

- .1 a locus map
- .2 existing zoning and land use at the site;
- .3 the proposed land use;
- .4 the location of existing and proposed easements and utilities;
- .5 existing and proposed topography with contours at 2 foot intervals;
- .6 existing site hydrology;
- .7 description and delineation of existing stormwater conveyances, impoundments and wetlands on or adjacent to the site or into which stormwater flows;
- .8 a delineation of 100 year flood plains, if applicable;
- .9 estimated seasonal high groundwater elevation in areas to be used for stormwater retention, detention or infiltration;
- .10 existing and proposed vegetation and ground surfaces with runoff coefficients for each;
- .11 an area drainage map showing pre-construction and post-construction watershed boundaries, drainage area and stormwater flow paths;
- .12 description and drawings of all components of the proposed drainage system including
  - .1 locations, cross sections and profiles of all brooks, streams, drainage swales and their method of stabilization;
  - .2 measures for detention, retention or infiltration of water;
  - .3 measures for the protection of water quality;

- .4 structural details for all components of the proposed drainage system and stormwater management facilities;
- .5 specification of materials to be used, construction specifications and typicals, and
- .6 expected hydrology with supporting calculations;
- .13 proposed improvements, including buildings or other structures, impervious surfaces and drainage facilities, as applicable;
- .14 timing, schedules and sequence of development;
- .15 a maintenance schedule for the construction period.
- .16 such other information as is required by the Water Utilities Department.

### **.3 LAND DISTURBANCE PERMIT - APPLICATIONS AND PROCEDURES**

Application for a Land Disturbance Permit shall be signed by all owners of the property for which the permit is requested and shall be accompanied by all of the following:

- .1 a list of abutters, certified by the Assessor's Office;
- .2 a non-refundable filing fee of \$50.00;
- .3 three copies of an Construction Phase Erosion and Sediment Control Plan as described in 11.74.1.4.
- .4 three copies of a Post-Construction Storm Water Management Plan as described in Section 11.74.6.
- .5 three copies of a Operation and Maintenance Plan for Storm Water Management as described in Section 11.74.7
- .6 verification that an additional copy of required materials have been placed on file in the City Clerk's Office. Filing of a completed application shall constitute permission for the City Engineer and his agents to enter the site to verify information contained in the application, to inspect for compliance with permit conditions and to make such tests and take such samplings as may be required to determine compliance with the permit or permit conditions.

The City Engineer may request additional information as he deems necessary to issue a decision on the application.

Within 10 days of receipt of a completed application, the City Engineer shall notify abutters that the application is available for inspection at a time and place designated by the Director and that public comment will be accepted for 21 days from the date of notice. Within 14 days of the expiration of the time for public comment, the Director shall render a decision on the permit application in one of the following forms:

- .1 approve the application and issue the permit;
- .2 approve the application and issue a permit with such conditions, restrictions or modifications as he deems necessary to protect water resources;
- .3 disapprove the application and deny a permit as failing to meet the requirements of this ordinance.

A permit shall be deemed to be approved if the City Engineer fails to take action within the times specified herein and, upon certification by the City Clerk that allowed times have passed, a permit shall be issued by the Water Utilities Department.

Prior to any change or alteration of the permitted plan, the permit holder shall notify the Water Utilities Department in writing. When, in the opinion of the City Engineer, the change or alteration is significant, he may require the permittee to install interim erosion and sedimentation control measure and to submit an amended Land Disturbance Permit applications, which shall conform to the procedures outlined above.

#### **.4 CONSTRUCTION PHASE - EROSION AND SEDIMENT CONTROL PLAN - FORM, CONTENTS & DESIGN STANDARDS**

The Erosion and Sediment Control Plan shall be designed so as to:

- .1 minimize the total area of disturbance;
- .2 sequence activities to minimize simultaneous areas of disturbance;
- .3 minimize peak rate runoff in accordance with the Massachusetts Stormwater Policy;
- .4 minimize soil erosion and control sedimentation during construction, provided that prevention of erosion shall take precedence over sedimentation control;
- .5 divert uncontaminated water around disturbed areas;
- .6 maximize groundwater recharge;
- .7 install and maintain all Erosion and Sediment Control measures in accordance with product specifications and good engineering practice;
- .8 prevent off-site transport of sediment;
- .9 protect and manage on and off-site material storage areas, including all areas used solely by the permitted project;
- .10 comply with all applicable laws and regulations, including waste disposal, sanitary sewer or septic system regulations, air quality requirements and dust control;
- .11 prevent significant alteration of habitats mapped by the Massachusetts Natural Heritage and Endangered Species Program as endangered, threatened or of special

concern, estimated habitats of rare wildlife, certified vernal pools and priority habitats of rare species from the proposed activities;

.12 institute interim and permanent stabilization measures as soon as practicable but no more than 14 days after construction activity has temporarily or permanently ceased on a specified portion of the site;

.13 properly manage on-site construction and waste materials;

.14 prevent off-site vehicle tracking of sediments.

The Erosion and Sediment Control Plan shall be certified by a Professional Engineer or a Certified Professional in Erosion and Sediment Control and contain the following:

.1 Names, addresses and telephone numbers for the owner, applicant and the person or firm preparing the plan;

.2 Title, date, north arrow, names of abutters, scale, legend and locus map;

.3 Location and description of natural features including:

.1 watercourses and waterbodies, wetland resource areas and all floodplain information, including the 100 year flood elevation based on the most recent Flood Insurance Rate Map or as calculated by a professional engineer for areas not assessed on maps;

.2 existing vegetation including tree lines, canopy layer, shrub layer and ground cover, and trees with a caliper twelve (12) inches or larger, noting specimen trees and forest communities; and

.3 habitats mapped by the Massachusetts Natural Heritage and Endangered Species Program as endangered, threatened or of special concern, estimated habitats of rare wildlife, certified vernal pools and priority habitats of rare species within five hundred (500) feet of any construction activity

.4 Lines of existing abutting streets showing drainage, driveway and curbcut locations;

.5 existing soil volume and nature of imported soil materials;

.6 topographical features, including existing and proposed contours at intervals no greater than two (2) feet, with spot elevations provided when needed;

.7 surveyed property lines showing distances and monument locations, existing and proposed easements, rights-of-way and other encumbrances, the size of the entire parcel and the delineations and number of square feet of land area to be disturbed;

.8 Drainage patterns and approximate slopes anticipated after major grading activities;

.9 location, details, and a narrative of the steps taken to conform with the design standards set forth above;

.10 such other information as is required by the Water Utilities Department.

## **.5 INSPECTION AND SITE SUPERVISION**

The City Engineer may require the permittee to post a surety bond or other acceptable security prior to the start of work under a Land Disturbance Permit. The form of the bond shall be in an amount deemed sufficient to ensure that the work will be completed in accordance with the approved plan and shall be in a form approved by the City Solicitor. The Director may release portions of the bond on a phased project as each phase is completed in compliance with the permit; provided that the bond is not fully released until certification of final completion of the project.

Prior to the start of any permitted land disturbing activity, the City Engineer shall meet with responsible representatives of the permittee to review the permitted plans and their implementation. The permit and associated plans shall be maintained at the site until final certification of completion.

The permittee shall conduct and document weekly inspections to determine the overall effectiveness of the control plan and shall cause additional control or maintenance measures to be taken as needed. The permittee shall submit monthly reports to the Water Utilities Department in a format designated by the City Engineer.

The City Engineer or his agents shall inspect work under an approved permit in conformance with the following schedule:

- .1 erosion and sediment control measures are in place and stabilized;
- .2 site clearing has been substantially completed;
- .3 rough grading has been substantially completed;
- .4 final grading has been substantially completed;
- .5 close of the construction season and
- .6 final stabilization and project completion.

The permittee shall notify the Water Utilities Department no less than two working days before inspection is required.

Upon completion of the work, the permittee shall submit a report, including as-built construction plans, from a Professional Engineer, surveyor or Certified Professional in Erosion and Sediment Control certifying that all erosion and sediment control devices have been completed in accordance with the approved permit or approved changes or modifications to the permit.

## **.6 POST- CONSTRUCTION STORM WATER MANAGEMENT PLAN - FORM, CONTENTS & DESIGN STANDARDS**

The Plan shall be meet the following standards:

- .1 No new stormwater conveyances shall discharge untreated stormwater directly to or cause erosion in wetlands or water of the Commonwealth;
- .2 Post-development peak discharge rates shall not exceed pre-development peak discharge rates;
- .3 Post-development annual recharge to groundwater shall approximate the pre-development recharge rate, based on soil types;
- .4 for new development, stormwater management systems shall remove 80% of the average annual load to total suspended solids. This standard will be presumed to be met when:
  - .1 suitable nonstructural practices for source control and pollution prevention are implemented;
  - .2 stormwater management best practices are sized to capture the prescribed runoff volume; and
  - .3 stormwater management best practices are maintained as designed;
  - .5 stormwater discharges from areas with higher potential pollutant loads use specific stormwater management best practices, as established in the Stormwater Policy Handbook;
  - .6 stormwater discharges to shellfish beds, swimming beaches, cold water fisheries and recharge areas for public water supplies utilize stormwater management best practices approved for critical areas, as established in the Stormwater Policy Handbook;
  - .7 for redevelopment, Stormwater Management Standards must be met to the maximum extent practicable through retrofitted or expanded stormwater management systems;
  - .8 erosion and sediment controls must prevent impacts during construction activities.

In lieu of meeting one or more of the standards set forth here, an applicant may demonstrate that an equivalent level of environmental protection will be provided.

## **.7 OPERATION AND MAINTENANCE PLANS**

The Operation and Maintenance Plan shall be designed to insure compliance with the permit and shall be signed by the property owners, shall include the name of the owner of each component of the Stormwater Management system and shall contain a maintenance agreement specifying:

.1 Names and addresses of persons responsible for operation and maintenance of the stormwater management system;

.2 Names and addresses of the persons responsible for financing maintenance and emergency repairs of the stormwater management system;

.3 a maintenance schedule for all drainage structures, including swales and ponds;

.4 a listing of easements with the purpose and location of each and shall include easements providing:

.1 access for facility inspections and maintenance;

.2 preservation of stormwater runoff conveyance, infiltration and detention areas and facilities, including flood routes for the 100 year storm event;

.3 direct maintenance access by heavy equipment to structures requiring regular cleanout.

Unless waived by the City Engineer, easements shall be required for all areas used for off-site stormwater control and shall be recorded in the Middlesex County Registry of Deeds.

## **.8 ENFORCEMENT**

The City Engineer may issue a written order to enforce the provisions of this ordinance, including but not limited to:

.1 an order to cease and desist from activity pending compliance with this ordinance or a permit issued thereunder;

.2 maintenance, installation or performance of additional erosion and sediment control measures;

.3 monitoring, analyses and reporting;

.4 remediation of erosion and sedimentation resulting directly or indirectly from land disturbing activity.

Where abatement or remediation is required, the order shall set forth a deadline for completion of said abatement or remediation. Said order shall state that, failure to abate the violation or perform the required remediation within the specified time, may result in the city undertaking such work at the expense of the owner.

The city shall, within 30 days of completing abatement or remediation of a violation, notify the property owner of cost incurred in remediation, including administrative costs. If the amount due is not received within 30 days of notification or within thirty days following a final decision of a court of competent jurisdiction affirming or reducing the costs, the costs shall become a special assessment and shall constitute a lien on the

owners property for the amount of said costs. Costs remaining unpaid more than 31 days after becoming due shall accrue interest at the rate provided by law.

The City Engineer and his authorized agents may purpose any civil and criminal remedy available in law and in equity to enforce the provisions of this ordinance or permits issued thereunder and may also punish violations in the manner provided in Massachusetts General Laws Chapter 40, Section 21D by a fine of \$300.00. Every twenty-four hours during which a violation exists shall constitute a separate offense punishable by an additional fine.

# Malden Stormwater Management Program Plan

## ATTACHMENT 18

*MCM 4 Construction Site Stormwater Runoff Control*  
**BMP 4.2, 4.3- Site Plan Review Procedures, Site Inspections  
and Enforcement of Sediment and Erosion Control Measures  
Procedures**

# **CITY OF MALDEN CONSTRUCTION ACTIVITY** **LAND DISTURBANCE PERMIT** **REQUIREMENTS AND PROCEDURES**

## **1.0 Applicability**

In accordance with Malden City Ordinance 11.74, except as authorized by the City Engineer in a Land Disturbance Permit, or as otherwise permitted by ordinance, no person shall engage in any construction activity which disturbs (1) one acre or more; or less than one acre of land but is part of a larger common plan that will ultimately disturb one acre or more of land, that has the potential to generate stormwater discharge to the municipal storm drainage system either during or after disturbance.

The following activities shall be exempt from requiring a Land Disturbance Permit:

1. Routine maintenance to maintain the original line, grade, hydraulic capacity of the original purpose of the site;
2. Normal maintenance or improvement of land in agriculture or aquaculture use as defined by Wetlands Protection Regulation (310 CMR 10);
3. Maintenance of existing landscaping, gardens, or lawn areas associated with a single family dwelling;
4. Construction of fencing that will not substantially alter existing terrain or drainage patterns;
5. Construction of utilities other than drainage which will not alter terrain and drainage patterns; or
6. Activities that are subject to the Wetlands Protection Act and demonstrate compliance with an Order of Conditions issued by the Conservation Commission that meets the requirements for site plan review and inspection established herein.

## **2.0 Procedures and Submittal Requirements For Site Plan Review**

Pursuant to Malden City Ordinance 11.74.3, an application for a Land Disturbance Permit submitted to the Engineering Office for site plan review shall be signed by all owners of the property for which the permit is requested and shall be accompanied by all of the following:

1. A list of abutters certified by the Assessor's Office;
2. A non-refundable filing fee of \$50.00;
3. Three (3) copies of site plans depicting proposed and existing conditions, as well as Post-Construction Stormwater Management Plan which shall meet the following standards:
  - A. No new stormwater conveyances shall discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth;
  - B. Post-development peak discharge rates shall not exceed pre-development peak discharge rates;
  - C. Post-development annual recharge to groundwater shall approximate the pre-development recharge rate, based on soil types;
  - D. For new development, stormwater management systems shall remove 80% of the average annual load to total suspended solids. This standard will be presumed to be met when:
    - 1) Suitable nonstructural practices for source control and pollution prevention are implemented;
    - 2) Stormwater management best practices are sized to capture the prescribed runoff volume; and
    - 3) Stormwater management best practices are maintained as designed;
  - E. Stormwater discharges from areas with higher potential pollutant loads use specific stormwater management best practices, as established in the Stormwater Policy Handbook;
  - F. Incorporation of low impact design and green infrastructure where feasible;
  - G. Stormwater discharges to shellfish beds, swimming beaches, cold water fisheries and recharge areas for public water supplies utilize stormwater management best practices approved for critical areas, as established in the Stormwater Policy Handbook;
  - H. For redevelopment, Stormwater Management Standards must be met to the maximum extent practicable through retrofitted or expanded stormwater management systems;

- I. Erosion and sediment controls must prevent impacts during construction activities; and
  - J. In lieu of meeting one or more of the standards set forth here, an applicant may demonstrate that an equivalent level of environmental protection will be provided.
4. Three (3) copies of a Construction Phase Erosion and Sediment Control Plan which shall be designed so as to address the following requirements:
- A. Minimize the total area of disturbance;
  - B. Sequence activities to minimize simultaneous areas of disturbance;
  - C. Minimize peak rate runoff in accordance with the Massachusetts Stormwater Policy;
  - D. Minimize soil erosion and control sedimentation during construction, provided that prevention of erosion shall take precedence over sedimentation control;
  - E. Divert uncontaminated water around disturbed areas;
  - F. Maximize groundwater recharge;
  - G. Install and maintain all Erosion and Sediment Control measures in accordance with product specifications and good engineering practice;
  - H. Prevent off-site transport of sediment;
  - I. Protect and manage on and off-site material storage areas, including all areas used solely by the permitted project;
  - J. Comply with all applicable laws and regulations, including waste disposal, sanitary sewer or septic system regulations, air quality requirements and dust control;
  - K. Prevent significant alteration of habitats mapped by the Massachusetts Natural Heritage and Endangered Species Program as endangered, threatened or of special concern, estimated habitats of rare wildlife, certified vernal pools and priority habitats of rare species from the proposed activities;
  - L. Institute interim and permanent stabilization measures as soon as practicable but no more than 14 days after construction activity has temporarily or permanently ceased on a specified portion of the site;

- M. Properly manage on-site construction and waste materials; and
  - N. Prevent off-site vehicle tracking of sediments.
5. The site plans depicting existing and proposed conditions and the Erosion and Sediment Control plan(s) shall be certified by a Professional Engineer or a Certified Professional in Erosion and Sediment Control as applicable and contain the following:
- A. Names, addresses and telephone numbers for the owner, applicant and the person or firm preparing the plan;
  - B. Title, date, north arrow, names of abutters, scale, legend and locus map;
  - C. Location and description of natural features including: watercourses and waterbodies, wetland resource areas and all floodplain information, including the 100 year flood elevation based on the most recent Flood Insurance Rate Map or as calculated by a professional engineer for areas not assessed on maps;
  - D. Existing vegetation including tree lines, canopy layer, shrub layer and ground cover, and trees with a caliper twelve (12) inches or larger, noting specimen trees and forest communities; and habitats mapped by the Massachusetts Natural Heritage and Endangered Species Program as endangered, threatened or of special concern, estimated habitats of rare wildlife, certified vernal pools and priority habitats of rare species within five hundred (500) feet of any construction activity;
  - E. Lines of existing abutting streets showing drainage, driveway and curb cut locations;
  - F. Existing soil volume and nature of imported soil materials;
  - G. Topographical features, including existing and proposed contours at intervals no greater than two (2) feet, with spot elevations provided when needed;
  - H. Surveyed property lines showing distances and monument locations, existing and proposed easements, rights-of-way and other encumbrances, the size of the entire parcel and the delineations and number of square feet of land area to be disturbed;
  - I. Drainage patterns and approximate slopes anticipated after major grading activities;

- J. Location, details, and a narrative of the steps taken to conform with the design standards set forth above (Section 2.3 A-N); and
  - K. Such other information as is required by the Engineering or Water Utilities Departments.
6. Three (3) copies of a post construction Operation and Maintenance Plan for Stormwater Management. The Operation and Maintenance Plan shall be designed to insure compliance with the permit and shall ensure adequate long term operation and maintenance of any stormwater management practices on any drainage systems or appurtenances that discharge to the City storm drain system. The plan shall be signed by the property owners, shall include the name of the owner of each component of the Stormwater Management system and shall contain a maintenance agreement accepting ownership of the private drainage system and specifying:
- A. Names and addresses of persons responsible for operation and maintenance of the stormwater management system;
  - B. Names and addresses of the persons responsible for financing maintenance and emergency repairs of the stormwater management system;
  - C. A maintenance schedule for all drainage structures, including swales and ponds;
  - D. A listing of easements with the purpose and location of each and shall include easements providing:
  - E. Access for facility inspections and maintenance;
  - F. Preservation of stormwater runoff conveyance, infiltration and detention areas and facilities, including flood routes for the 100 year storm event;
  - G. Direct maintenance access by heavy equipment to structures requiring regular cleanout; and
  - H. Unless waived by the City Engineer, easements shall be required for all areas used for off-site stormwater control and shall be recorded in the Middlesex County Registry of Deeds.
7. Verification that an additional copy of required materials have been placed on file in the City Clerk's Office. Filing of a completed application shall constitute permission for the City Engineer and his agents to enter the site to verify information contained in the application, to inspect for compliance with permit

conditions and to make such tests and take such samplings as may be required to determine compliance with the permit or permit conditions.

8. The City Engineer may request additional information as he deems necessary to issue a decision on the application.
9. Upon receipt of a completed application, the City Engineer shall complete a pre-construction review that shall include an evaluation of site design, planned construction operations, planned best management practices to be implemented during both the construction and post construction phases, and an evaluation of opportunities for use of Low Impact Development (LID) and/or green infrastructure.
10. Within 10 days of receipt of a completed application, the City Engineer shall notify abutters that the application is available for inspection at a time and place designated by the Director and that public comment will be accepted for 21 days from the date of notice. Within 14 days of the expiration of the time for public comment, the City Engineer shall render a decision on the permit application in one of the following forms:
  - A. Approve the application and issue the permit;
  - B. Approve the application and issue a permit with such conditions, restrictions or modifications as he deems necessary to protect water resources;
  - C. Disapprove the application and deny a permit as failing to meet the requirements of this ordinance; or
  - D. A permit shall be deemed to be approved if the City Engineer fails to take action within the times specified herein and, upon certification by the City Clerk that allowed times have passed.
11. Prior to any change or alteration of the permitted plan, the permit holder shall notify the Engineering and Water Utilities Department in writing. When, in the opinion of the City Engineer, the change or alteration is significant, he may require the permittee to install interim erosion and sedimentation control measure and to submit an amended Land Disturbance Permit applications, which shall conform to the procedures outlined above.

### **3.0 Inspections and Reporting**

The City Engineer may require the permittee to post a surety bond or other acceptable security prior to the start of work under a Land Disturbance Permit. The form of the bond shall be in an amount deemed sufficient to ensure that the work will be completed in accordance with the approved plan and shall be in a form approved by the City Solicitor. The City Engineer may release portions of the bond on a phased project as each phase

is completed in compliance with the permit; provided that the bond is not fully released until certification of final completion of the project.

Prior to the start of any permitted construction related land disturbance activity, the City Engineer shall meet with responsible representatives of the permittee to review the permitted plans and their implementation. The permit and associated plans shall be maintained at the site until final certification of completion.

The permittee shall conduct and document weekly inspections to determine the overall effectiveness of the control plan and shall cause additional control or maintenance measures to be taken as needed. The permittee shall submit monthly reports to the Engineering Department in a format designated by the City Engineer.

The City Engineer or his properly qualified agents shall inspect work under an approved permit in conformance with the following schedule:

1. Erosion and sediment control measures are in place and stabilized;
2. Site clearing has been substantially completed;
3. Rough grading has been substantially completed;
4. Final grading has been substantially completed;
5. Close of the construction season; and
6. Final stabilization and project completion.

The permittee shall notify the Engineering Department no less than two working days before inspection is required. The City shall utilize the Stormwater Construction Site Inspection Checklist included within Attachment A or a similar form for documenting inspection activities. Each Land Disturbance Permit site shall assigned be assigned a unique tracking number. The Engineering Department will annually track the number of permits issued as well as the number of inspections and any enforcement actions associated with each permit.

#### **4.0 As-Built Plans**

Upon completion of the work, and no later than two (2) years after the completion of construction project, the permittee shall submit a report, including as-built construction plans, from a Professional Engineer, surveyor or Certified Professional in Erosion and Sediment Control as applicable, certifying that all erosion and sediment control devices have been completed in accordance with the approved permit or approved changes or modifications to the permit.

#### **5.0 Enforcement**

The City Engineer may issue a written order to enforce the provisions of this ordinance, including but not limited to:

1. An order to cease and desist from activity pending compliance with City ordinances pertaining to stormwater and/or a permit issued thereunder;

2. Maintenance, installation or performance of additional erosion and sediment control measures;
3. Monitoring, analyses and reporting; or
4. Remediation of erosion and sedimentation resulting directly or indirectly from land disturbing activity.

Where abatement or remediation is required, the order shall set forth a deadline for completion of said abatement or remediation. Said order shall state that, failure to abate the violation or perform the required remediation within the specified time, may result in the city undertaking such work at the expense of the owner.

The city shall, within 30 days of completing abatement or remediation of a violation, notify the property owner of cost incurred in remediation, including administrative costs. If the amount due is not received within 30 days of notification or within thirty days following a final decision of a court of competent jurisdiction affirming or reducing the costs, the costs shall become a special assessment and shall constitute a lien on the owners property for the amount of said costs. Costs remaining unpaid more than 31 days after becoming due shall accrue interest at the rate provided by law.

The City Engineer and his authorized agents may purpose any civil and criminal remedy available in law and in equity to enforce the provisions of this ordinance or permits issued thereunder and may also punish violations in the manner provided in Massachusetts General Laws Chapter 40, Section 21D by a fine of \$300.00. Every twenty-four hours during which a violation exists shall constitute a separate offense punishable by an additional fine.

# **ATTACHMENT A**

## **Stormwater Construction Site Inspection Checklist**

### Stormwater Construction Site Inspection Checklist Template

General Information			
Project Name			
NPDES Tracking No.		Location	
Date of Inspection		Start/End Time	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Describe present phase of construction			
<b>Type of Inspection:</b> <input type="checkbox"/> Regular <input type="checkbox"/> Pre-storm event <input type="checkbox"/> During storm event <input type="checkbox"/> Post-storm event			
Weather Information			
<b>Has there been a storm event since the last inspection?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>If yes, provide:</b> Storm Start Date & Time:                      Storm Duration (hrs):                      Approximate Amount of Precipitation (in):			
<b>Weather at time of this inspection?</b> <input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain <input type="checkbox"/> Sleet <input type="checkbox"/> Fog <input type="checkbox"/> Snowing <input type="checkbox"/> High Winds <input type="checkbox"/> Other:                                              Temperature:			
<b>Have any discharges occurred since the last inspection?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>If yes, describe:</b>			
<b>Are there any discharges at the time of inspection?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>If yes, describe:</b>			

**Site-specific BMPs**

- Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.
- Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
8		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
13		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
14		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

**Overall Site Issues**

*Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.*

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	Are discharge points and receiving waters free of any sediment deposits?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Are storm drain inlets properly protected?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	Is the construction exit preventing sediment from being tracked into the street?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12	(Other)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

**Non-Compliance**

Describe any incidents of non-compliance not described above:

**CERTIFICATION STATEMENT**

“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.”

**Print name and title:** \_\_\_\_\_

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

<p><b>Reviewed By:</b></p> <p><b>Print name and title:</b> _____</p> <p><b>Signature:</b> _____ <b>Date:</b> _____</p>
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# Malden Stormwater Management Program Plan

## ATTACHMENT 19

*MCM 5 Post Construction Stormwater Management*

**BMP 5.1- Post Construction Ordinance**

# Malden Stormwater Management Program Plan

## ATTACHMENT 20

MCM 5 Post Construction Stormwater Management  
**BMP 5.2- Street Design and Parking Lot Guidelines**

# Malden Stormwater Management Program Plan

## ATTACHMENT 21

MCM 5 Post Construction Stormwater Management  
**BMP 5.3- Green Infrastructure Report**

# Malden Stormwater Management Program Plan

## ATTACHMENT 22

MCM 5 Post Construction Stormwater Management  
**BMP 5.4- List of Municipal Retrofit Opportunities**

# Malden Stormwater Management Program Plan

## ATTACHMENT 23

MCM 6 Malden Good Housekeeping and Pollution Prevention  
**BMP 6.1- Parks and Openspace Operations and Maintenance  
Procedures**

# Malden Stormwater Management Program Plan

## ATTACHMENT 24

MCM 6 Malden Good Housekeeping and Pollution Prevention  
**BMP 6.2- Buildings and Facilities Operations and Maintenance  
Procedures**

# Malden Stormwater Management Program Plan

## ATTACHMENT 25

MCM 6 Malden Good Housekeeping and Pollution Prevention

**BMP 6.3- Vehicles and Equipment Operations and  
Maintenance Procedures**

# Malden Stormwater Management Program Plan

## ATTACHMENT 26

*MCM 6 Malden Good Housekeeping and Pollution Prevention*

**BMP 6.4- Infrastructure Operations and Maintenance  
Procedures**

# Malden Stormwater Management Program Plan

## ATTACHMENT 27

MCM 6 Malden Good Housekeeping and Pollution Prevention

**BMP 6.5- Catch Basin Cleaning Program**

## SOP 3: CATCH BASIN INSPECTION AND CLEANING

### *Introduction*

Catch basins help minimize flooding and protect water quality by removing trash, sediment, decaying debris, and other solids from stormwater runoff. These materials are retained in a sump below the invert of the outlet pipe. Catch basin cleaning reduces foul odors, prevents clogs in the storm drain system, and reduces the loading of suspended solids, nutrients, and bacteria to receiving waters.

During regular cleaning and inspection procedures, data can be gathered related to the condition of the physical basin structure and its frame and grate and the quality of stormwater conveyed by the structure. Observations such as the following can indicate sources of pollution within the storm drain system:

- Oil sheen
- Discoloration
- Trash and debris

Both bacteria and petroleum can create a sheen on the water surface. The source of the sheen can be differentiated by disturbing it, such as with a pole. A sheen caused by a oil will remain intact and move in a swirl pattern; a sheen caused by bacteria will separate and appear “blocky”. Bacterial sheen is not a pollutant but should be noted.

Observations such as the following can indicate a potential connection of a sanitary sewer to the storm drain system, which is an illicit discharge.

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

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

### *Cleaning Procedure*

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

Catch basin inspection and cleaning procedures include the following:

1. Work upstream to downstream.
2. Clean sediment and trash off grate.
3. Visually inspect the outside of the grate.

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

### *Disposal of Screenings*

Catch basin cleanings from storm water-only drainage systems may be disposed at any landfill that is permitted by MassDEP to accept solid waste. MassDEP does not routinely require stormwater-only catch basin cleanings to be tested before disposal, unless there is evidence that they have been contaminated by a spill or some other means.

Screenings may need to be placed in a drying bed to allow water to evaporate before proper disposal. In this case, ensure that the screenings are managed to prevent pollution.

### *Attachments*

1. Catch Basin Inspection Form

### *Related Standard Operating Procedures*

1. SOP 10, Addressing Illicit Discharges
2. SOP 13, Water Quality Screening in the Field





Job No.: \_\_\_\_\_ Town: \_\_\_\_\_  
 Inspector: \_\_\_\_\_ Date: \_\_\_\_\_

**CATCH BASIN INSPECTION FORM**

<b>Catch Basin I.D.</b>		<b>Final Discharge from Structure?</b> Yes <input type="checkbox"/> No <input type="checkbox"/> <b>If Yes, Discharge to Outfall No:</b> _____	
<b>Catch Basin Label:</b>	Stencil <input type="checkbox"/> Ground Inset <input type="checkbox"/> Sign <input type="checkbox"/> None <input type="checkbox"/> Other _____		
<b>Basin Material:</b>	Concrete <input type="checkbox"/> Corrugated metal <input type="checkbox"/> Stone <input type="checkbox"/> Brick <input type="checkbox"/> Other: _____ <input type="checkbox"/>	<b>Catch Basin Condition:</b>	Good <input type="checkbox"/> Poor <input type="checkbox"/> Fair <input type="checkbox"/> Crumbling <input type="checkbox"/>
<b>Pipe Material:</b>	Concrete <input type="checkbox"/> HDPE <input type="checkbox"/> PVC <input type="checkbox"/> Clay Tile <input type="checkbox"/> Other: _____ <input type="checkbox"/>	<b>Pipe Measurements:</b>	Inlet Dia. (in): d= _____ Outlet Dia. (in): D= _____
<b>Required Maintenance/ Problems (check all that apply):</b>			
<input type="checkbox"/> Tree Work Required <input type="checkbox"/> New Grate is Required <input type="checkbox"/> Pipe is Blocked <input type="checkbox"/> Frame Maintenance is Required <input type="checkbox"/> Remove Accumulated Sediment <input type="checkbox"/> Pipe Maintenance is Required <input type="checkbox"/> Basin Undermined or Bypassed		<input type="checkbox"/> Cannot Remove Cover <input type="checkbox"/> Ditch Work <input type="checkbox"/> Corrosion at Structure <input type="checkbox"/> Erosion Around Structure <input type="checkbox"/> Remove Trash & Debris <input type="checkbox"/> Need Cement Around Grate <b>Other:</b> _____	
<b>Catch Basin Grate Type :</b>	<b>Sediment Buildup Depth :</b>	<b>Description of Flow:</b>	<b>Street Name/ Structure Location:</b>
Bar: <input type="checkbox"/> Cascade: <input type="checkbox"/> Other: _____ Properly Aligned: Yes <input type="checkbox"/> No <input type="checkbox"/>	0-6 (in): _____ 6-12(in): _____ 12-18 (in): _____ 18-24 (in): _____ 24 + (in): _____	Heavy <input type="checkbox"/> Moderate <input type="checkbox"/> Slight <input type="checkbox"/> Trickling <input type="checkbox"/>	
<b>*If the outlet is submerged check yes and indicate approximate height of water above the outlet invert.</b> h above invert (in): _____		Yes <input type="checkbox"/>	No <input type="checkbox"/>
<input type="checkbox"/> Flow <input type="checkbox"/> Standing Water (check one or both)	<b>Observations:</b> Color: _____ Odor: _____	<b>Circle those present:</b>	
<b>Weather Conditions :</b> Dry > 24 hours <input type="checkbox"/> Wet <input type="checkbox"/>		Sanitary Waste	Bacterial Sheen
<b>Sample of Screenings Collected for Analysis?</b> Yes <input type="checkbox"/> No <input type="checkbox"/>		Orange Staining	Floatables
<b>Comments:</b>		Excessive sediment	Pet Waste
		Other: _____	Optical Enhancers

# Malden Stormwater Management Program Plan

## ATTACHMENT 28

MCM 6 Malden Good Housekeeping and Pollution Prevention

**BMP 6.6- Street Sweeping Program**

<b>ODD SIDE of streets listed below swept on 1st Monday of month EVEN SIDE of streets listed below swept on 3rd Monday of month Sweeping occurs between 7:30AM-12PM</b>	<b>ODD SIDE of streets listed below swept on 1st Tuesday of month EVEN SIDE of streets listed below swept on 3rd Tuesday of month Sweeping occurs between 7:30AM-12PM</b>	<b>ODD SIDE of streets listed below swept on 1st Wednesday of month EVEN SIDE of streets listed below swept on 3rd Wednesday of month Sweeping occurs between 7:30AM-12PM</b>
Adams Street (Fellsway to Highland)	Acorn Street	Alden Street
Arcola Street	Appleton Court	Almont Street
Avon Street (Quincy to Highland)	Appleton Street	Andrew Court
Blomerth Street	Arlington Street	Andrew Street
Bower Street	Ashland Street	Arch Street
Chandler Road	Barrett Street	Bellvale Street (Eastern to Lynn)
Charles Place	Barstow Street	Bent Avenue
Charles Street (Fellsway to Highland)	Beacon Street	Benner Avenue
Chatham Street	Berry Street	Bowdoin Street
Chatham Street Ext.	Bellrock Street	Boylston Street
Circle Road	Belmont Street	Bryant Street
Clyde Street	Brackenbury Street	Byron Street
Cushing Road	Boston Street	Clayton Street
Davidson Way	Bow Street	Cleveland Street
Desmond Road	Burrige Place	Coburn Street
Devir Street (Medford Line to Highland)	Clarendon Street	Cross Street At Lyme
Emerald Street (Fellsway to Highland)	Converse Avenue	Crystal Street
Estey Street	Crawford Street	Daniels Street
Fall Street	Ellis Street	Davis Street
Fellsmere Road	Fairmont Court	Elmwood Park
Gale Street	Fairmont Park	Essex Street
Girard Road	Fairmont Street	Faulkner Street (Eastern to Lyme)
Grimshaw Street	Fairmont Terrace	Franklin Street (Eastern to Grape)
Harris Street	Fuller Street	Grape Street
Highland Court	Garland Avenue	Grover Street
Holland Street	Garfield Terrace	Hadley Street
Hospital Road	Green Street	Hanover Street
John Street	Gould Avenue	Harvard Street
Julia Street	Hancock Street	Hazelwood Street
Lilly Street	High Street	Henry Street
Malden Street (Fellsway to Highland)	Hills Court	Holloway Street
Maurice Street	Hillside Avenue	Holyoke Street
Mccormack Street	Hillside Park	Kennard Street
Medford Street (Medford Line to Highland)	Hillside Terrace	Linwood Street
Montvale Street	Howard Street	Lisbon Street
Murray Hill Road	James Street	Lodgen Court
Murray Street	Judson Street	Lombard Court
Naomi Street	Kearney Street	Lyme Street
Oakland Street (Julia to Highland)	Leland Street	Magnolia Street
Pamela Circle	Lowell Avenue	Maplewood (Eastern to End)
Pine Street	Lowell Street	Marlboro Street
Presley Street	Madison Street	Marvin Street
Quincy Street	Medford Street	Mills Street
Richard Street	Meridian Street	Newland Street
Savin Street	Newbury Street	Newton Street
Sawyer Street	Newhall Street	Phillips Street
School Street	Newman Road	Prentiss Street
Sheridan Street	Oxford Street	Sammett Street
St. Mary Street	Parker Street	Sargent Street
Talbot Street	Parsonage Road	Sea Street
Thacher Street	Pelham Street	Sharon Street
Thomas Street	Perkins Avenue	Sheafe Street
Timothy Lane	Pratt Street	Silver Street

<b>ODD SIDE of streets listed below swept on 1st Monday of month</b> <b>EVEN SIDE of streets listed below swept on 3rd Monday of month</b> <b>Sweeping occurs between 7:30AM-12PM</b>	<b>ODD SIDE of streets listed below swept on 1st Tuesday of month</b> <b>EVEN SIDE of streets listed below swept on 3rd Tuesday of month</b> <b>Sweeping occurs between 7:30AM-12PM</b>	<b>ODD SIDE of streets listed below swept on 1st Wednesday of month</b> <b>EVEN SIDE of streets listed below swept on 3rd Wednesday of month</b> <b>Sweeping occurs between 7:30AM-12PM</b>
Townsend Street	Regent Road	Stearns Street
Victor Street	Riverside Park	Suffolk Street
Watts Street	Robinson Circle	Taylor Street
Wellington Street	Shawmut Street	Trayes Avenue
Welsh Street	Shawmut Terrace	Upham Street
Wentworth Court	Stevens Street	Upham Terrace
Wentworth Street (West to Highland)	Tufts Street	Warren Avenue
West Street	Wadsworth Street	Wyeth Street
Whitman Street (West to Highland)	Walnut Street	
Wicklow Street	Walnut Terrace	
Wiley Street	Wigglesworth Street	
	Wilson Avenue	
	Winthrop Street	

<b>ODD SIDE of streets listed below swept on 1st Thursday of month</b> <b>EVEN SIDE of streets listed below swept on 3rd Thursday of month</b> <b>Sweeping occurs between 7:30AM-12PM</b>	<b>ODD SIDE of streets listed below swept on 1st Friday of month</b> <b>EVEN SIDE of streets listed below swept on 3rd Friday of month</b> <b>Sweeping occurs between 7:30AM-12PM</b>	<b>ODD SIDE of streets listed below swept on 2nd Monday of month</b> <b>EVEN SIDE of streets listed below swept on 4th Monday of month</b> <b>Sweeping occurs between 7:30AM-12PM</b>
Arcadia Street	Albion Street	Alpine Street
Avalon Road	Auburn Street	Barnes Avenue
Bainbridge Street (Baker to Rockwell)	Autumn Street	Bartlett Street
Baker Street	Bickford Road	Beltran Street
Bayrd Road	Bryant Street (Salem to Eastern)	Beltran Terrace
Beachview Avenue	Clifton Street (Washington to Main)	Boundary Road
Beachview Terrace	Clinton Street	Cedar Street
Blantyre Road	Concord Street	Chestnut Street
Birch Lane	Cottage Place	Clement Street
Bishop Road	Crescent Avenue	Clifton Street
Centennial Circle	Cross Street (Salem to Eastern)	Corey Road
Columbia Street	Dana Street	Dexter Street
Cherry Street (#142 to Lebanon)	Dell Street	Dutton Street
Division Street	Edmund Street	Earl Street
Duke Street	Fairlawn Street	Elliot Street
Fairview Avenue	Faulkner Street (Salem to Eastern)	Elm Street
Fairview Terrace	Franklin Street (Salem to Eastern)	Elsie Street
Ferguson Road	Gellineau Street	Evelyn Place
Garden Street	Hamlet Place	Everett Street
Granville Avenue	Hamlet Terrace	Francis Street
Gibson Street	Harding Avenue	Gleason Street
Gilbert Street	Holden Street	Glen Street
Goodhue Street	Hudson Street	Glenrock Avenue
Havelock Street	Hyde Street	Glenrock Circle
Hurd Street	Joseph Street	Glenrock Road
Ingleside Avenue	Kenmore Road	Glenwood Street
Johnson Street	Kneeland Street	Grace Street
Lora Street	Leonard Street	Greenleaf Street
Mt. Washington Avenue	Linden Avenue	Greystone Road
Neal Street	Marion Street	Grove Street
Olive Avenue	Montrose Court	Harnden Road
Olive Avenue Ext.	Montrose Street	Hawthorne Street
Orchard Street	Mountain Avenue (Main to Mt. Vernon)	Highland Terrace
Pagum Street	Neilon Park	Holmes Street
Preston Street	Norwood Street	Horace Street
Rivers Lane	Orient Street	Ivy Road
Rockwell Street	Page Street	Kernwood Street
Rockwell Terrace	Park Avenue	Las Casas Street
Seaview Avenue	Park Street	Lincoln Street
Summit Terrace	Playstead Road	Lyle Street
Summitt Street	Richardson Street	Maple Street
Sylvan Street (Winship to Lebanon)	Ripley Street	Maude Street
Wilbur Street	Rosemont Street	Oakdale Road
Willard Street	Sprague Street	Oak Terrace
Winnemere Street	Spring Street	Overlook Park
Winship Street	Tremont Street	Pleasant Street Park
	Vernon Street	Prospect Street
	Wallace Street	Ridgewood Road
	Wallace Circle	Rockland Avenue
	Waverly Street	Seery Street
	Wedgemere Road	Summer Avenue
	Whipple Street	Summer Street (Glenwood to End)
	Woodrow Avenue	Upland Road

<b>ODD SIDE of streets listed below swept on 1st Thursday of month</b> <b>EVEN SIDE of streets listed below swept on 3rd Thursday of month</b> <b>Sweeping occurs between 7:30AM-12PM</b>	<b>ODD SIDE of streets listed below swept on 1st Friday of month</b> <b>EVEN SIDE of streets listed below swept on 3rd Friday of month</b> <b>Sweeping occurs between 7:30AM-12PM</b>	<b>ODD SIDE of streets listed below swept on 2nd Monday of month</b> <b>EVEN SIDE of streets listed below swept on 4th Monday of month</b> <b>Sweeping occurs between 7:30AM-12PM</b>
		Vista Street
		Washington Place
		Winn Terrace
		Woodland Road
		Wyoming Avenue

<b>ODD SIDE of streets listed below swept on 2nd Tuesday of month</b> <b>EVEN SIDE of streets listed below swept on 4th Tuesday of month</b> <b>Sweeping occurs between 7:30AM-12PM</b>	<b>ODD SIDE of streets listed below swept on 2nd Wednesday of month</b> <b>EVEN SIDE of streets listed below swept on 4th Wednesday of month</b> <b>Sweeping occurs between 7:30AM-12PM</b>	<b>ODD SIDE of streets listed below swept on 2nd Thursday of month</b> <b>EVEN SIDE of streets listed below swept on 4th Thursday of month</b> <b>Sweeping occurs between 7:30AM-12PM</b>
Adams Street (Highland to Commercial)	Bainbridge Street	Barker Road
Avon Street (Highland to Dead End)	Baincroft Street	Bellvale Street (Salem to Eastern)
Bowman Street	Baldwin Street	Blaine Street
Branch Street	Bayrd Terrace	Bradford Street
Bryer Road	Bond Street	Brentwood Street
Charles Street (Highland to Commercial)	Boulder Street	Central Avenue
Chester Street	Bowers Avenue	Clapp Street
Church Street	Cherry Street (Echo to #148)	Clapp Street Ext.
Cliff Street	Clark Street	Claremont Street
Cliff Terrace	Dale Street	Coleman Street
Constance Street	Echo Street	Delta Terrace
Cottage Street	Eric Street	Dianes View
Devir Street (Highland to Dead End)	Floral Avenue	Education Way
Dodge Street	Forest Court	Fairfield Street
Durso Avenue	Forest Street	Fenwick Street
Emerald Street (Highland to Pearl)	Goldcliff Road	Fleming Road
Ericson Street	Goodwin Avenue	Fulton Street
Evelyn Avenue	Gordon Street	Glendale Avenue
Ferncroft Way	Hill Street	Grant Road
Field Street	Huntley Street	Hancock Road
Fremont Street	Huntley Terrace	Joy Terrace
Granite Street	Kenilworth Street	Kennedy Drive
George Street	Kimball Street	Lawrence Street
Hartshorn Avenue	Knollin Street	Maynard Street
Hartshorn Street	Lanark Road	Monroe Street
Home Street	Lillian Road	Morris Street
Hubbard Street	Lynde Street	Oliver Street
Jacob Street	Mt. Vernon Street	Plainfield Avenue
Laurel Street	Nevada Avenue	Revere Street
Malden Street (Highland to Dead End)	Nira Street	Roberts Street
Manley Terrace	Oakland Road	Salem Street (Broadway to Lynn)
Maplewood Street (Salem to Eastern Avenue)	Otis Street	Shurtleff Street
Mason Street	Pierce Street	Springdale Street
Medford Street (Highland to Commercial)	Plymouth Road	Traverse Terrace
Milton Street	Poplar Street	Vining Street
Mingo Street	Porter Street	Wesley Street
Myrtle Street	Porter Avenue	Wescott Street
Nanapashment Avenue	Princeton Road	Wesmur Road
Noble Street	Prosper Street	Wheeler Street
North Milton Street	Rand Street	Winchester Street
Oakland Street (Highland to Dead End)	Rutland Street	
Pearl Street	Starbird Street	
Reserve Street	Sylvan Street (Forest to Winship)	
Russell Court	Wolcott Street	
Russell Street		
Spruce Street		
Stadium Road		
Standton Street		
Sterling Street		
Thacher Street (Highland to Pearl)		
Tyler Court		
Tyler Street		
Valley Street		

<b>ODD SIDE of streets listed below swept on 2nd Tuesday of month</b>	<b>ODD SIDE of streets listed below swept on 2nd Wednesday of month</b>	<b>ODD SIDE of streets listed below swept on 2nd Thursday of month</b>
<b>EVEN SIDE of streets listed below swept on 4th Tuesday of month</b>	<b>EVEN SIDE of streets listed below swept on 4th Wednesday of month</b>	<b>EVEN SIDE of streets listed below swept on 4th Thursday of month</b>
<b>Sweeping occurs between 7:30AM-12PM</b>	<b>Sweeping occurs between 7:30AM-12PM</b>	<b>Sweeping occurs between 7:30AM-12PM</b>
Waite Court		
Waite Street		
Waite Street Ext.		
Webber Street		
Webster Court		
Webster Street		
Webster Place		
Wentworth Street (Highland to Russell)		
Whitman Street (Highland to Pearl)		
Woodland Street		

<b>ODD SIDE of streets listed below swept on 2nd Friday of month</b> <b>EVEN SIDE of streets listed below swept on 4th Friday of month</b> <b>Sweeping occurs between 7:30AM-12PM</b>	<b>SWEEPING SCHEDULE FOR THE COMMERCIAL AREAS DAILY SWEEPING</b> <b>(Both sides of street affected) Monday through Friday 5:00 AM to 7:30 AM</b>	<b>Weekly Sweeping 5:00 AM to 7:30 AM Monday - Both sides of the street will be swept</b>
Bayrd Street	Abbott Street	Adams Street (Pearl St. to Commercial St.)
Blue Hill Avenue	Commercial Street (Florence St. to Rt. 60)	Canal Street (Charles St. to Medford St.)
Central Avenue (Broadway to Glenmere)	Canal Street (Rt. 60 to Charles St.)	Charles Street (Pearl St. to Commercial St.)
Como Street	Charles Street (Commercial St. to Main St.)	Commercial Street (Medford Line to Rt. 60)
Crescent Lane @ Lebanon	Dartmouth Street	Medford Street (Highland Ave. to Canal St.)
Dennis Road	Eastern Ave. (Main St. to Ferry St.)	Mountain Ave. (Summer St. to Main St.)
Downey Street	Exchange Street	Pleasant Street (Elm St. to Commercial St.)
Elwell Street	Ferry Street (Salem St. to Eastern Ave.)	Rt. 60 (Pleasant St. to Commercial St.)
First Street	Florence Street	Washington Street (Clifton St. to Florence St.)
Glenmere Avenue	Garnet Road	Tuesday
Greenwood Street	Holden Street	Beach Street Odd Side
High Rock Road	Irving Street	Glenwood Street Even Side
Jennifer Lane	Jackson Street	Highland Avenue Odd Side
Jonathan Lane	Linden Avenue (Pleasant St. to Garnet Rd.)	Hunting Street Odd Side
Knoll Street	Main Street (Spring St. to Gould St.)	Pleasant Street (Commercial St. to St. Mary) Odd Side
Lake Street	Middlesex Street	Main Street Even Side
Leonardo Drive	Pleasant Street (Main St. to Government Center)	Salem Street (Holden St. to Beach Street Odd Side)
Loomis Street	Ramsdell Road	Summer Street (Mt. Ave. to Glenwood St.) Even Side
Mark Drive	Rt. 60 (Commercial St. to Holden St.)	Wesley Street Odd Side
Marshall Avenue	Salem Street (Main St. to Holden St.)	Wednesday
Mauriello Drive	Summer Street (Pleasant St. to Mountain Ave.)	Beach Street Even Side
Mt. Pleasant Avenue	Washington Street (Exchange St. to Florence St.)	Ferry Street Odd Side
Nichols Road	<b>All Violators Subject To Fines And/Or Towing!</b>	Glenwood Street Odd Side
Northern Road		Highland Avenue Even Side
Pine Tree Avenue		Hunting Avenue Even Side
Ridge Hill Avenue		Main Street Odd Side
Rockingham Avenue		Pleasant Street (Commercial St. to St. Mary) Even Side
Rudolf Street		Salem Street (Holden St. to Beach St.) Even Side
Sawyer Court		Summer Street (Mt. Ave. to Glenwood St.) Odd Side
Second Street		Wesley Street Even Side
Skyline Drive		Thursday
Swains Pond Avenue		Cross Street Even Side
Swan Street		Ferry Street Even Side
Truman Drive		Lebanon Street Even Side
Tea Party Way		Maplewood Square Intersection
Williams Street		Washington Street (Clifton St. to Melrose Line) Even Side
		Willow Street Even Side
		Winter Street Even Side
		Friday
		Cross Street Odd Side
		Lebanon Street Odd Side
		Washington Street (Clifton St. to Melrose Line) Odd Side
		Willow Street Odd Side
		Winter Street Odd Side
		Saturday
		Both Sides Of The Street Will Be Swept
		Broadway
		Lynn Street

**SWEEPING SCHEDULE FOR THE  
COMMERCIAL AREAS  
Weekly Sweeping  
5:00 AM to 7:30 AM  
Monday  
Both sides of street will be swept**

Adams Street (Pearl St. to Commercial St.)
Canal Street (Charles St. to Medford St.)
Charles Street (Pearl St. to Commercial St.)
Commercial Street (Medford Line to Rt. 60)
Medford Street (Highland Ave. to Canal St.)
Mountain Avenue (Summer St. to Main St.)
Pleasant Street (Elm St. to Commercial St.)
Rt. 60 (Pleasant St. to Commercial St.)
Washington Street (Clifton St. to Florence St.)
<b>Tuesday</b>
Beach Street Odd side
Glenwood Street Even side
Highland Avenue Odd side
Hunting Street Odd side
Pleasant Street (Commercial St. to St. Mary) Odd side
Main Street Even side
Salem Street (Holden St. to Beach St.) Odd side
Summer Street (Mt. Ave. to Glenwood St.) Even side
Wesley Street Odd side
<b>Wednesday</b>
Beach Street Even side
Ferry Street Odd side
Glenwood Street Odd side
Highland Avenue Even side
Hunting Street Even side
Main Street Odd side
Pleasant Street (Commercial St. to St. Mary) Even side
Salem Street (Holden St. to Beach St.) Even side
Summer Street (Mt. Ave. to Glenwood St.) Odd side
Wesley Street Even side
<b>Thursday</b>
Cross Street Even side
Ferry Street Even side
Lebanon Street Even side
Maplewood Square Intersection
Washington Street (Clifton St. to Melrose Line) Even side
Willow Street Even side
Winter Street Even side
<b>Friday</b>
Cross Street Odd side
Lebanon Street Odd side
Washington Street (Clifton St. to Melrose Line) Odd side
Willow Street Odd side
Winter Street Odd side

<b>Saturday</b> <b>Both sides of street will be swept</b>
Broadway
Eastern Avenue
Lynn Street
<b>Daily Sweeping</b> <b>(Both sides of street affected)</b> <b>Monday through Friday</b> <b>5:00 AM to 7:30 AM</b>
Irving Street
Jackson Street
Linden Avenue (Pleasant St. to Garnet Rd.)
Main Street (Spring St. to Gould St. )
Middlesex Street
Pleasant Street (Main St. to Government Center)
Ramsdell Road
Rt. 60 (Commercial St. to Holden St.)
Salem Street (Main St. to Holden St.)
Summer Street (Pleasant St. to Mountain Ave.)
Washington Street (Exchange St. to Florence St.)
Abbott Street
Commercial Street (Florence St. to Rt. 60)
Canal Street (Rt. 60 to Charles St.)
Charles Street (Commercial St. to Main St.)
Dartmouth Street
Eastern Ave. (Main St. to Ferry St.)
Exchange Street
Ferry Street (Salem St. to Eastern Ave.)
Florence Street
Garnet Road
Holden Street

# Malden Stormwater Management Program Plan

## ATTACHMENT 29

MCM 6 Malden Good Housekeeping and Pollution Prevention

**BMP 6.7- Winter Road Maintenance Program**

## WINTER ROAD MAINTENANCE PROCEDURES

### MALDEN DEPARTMENT OF PUBLIC WORKS

ISSUE DATE:

June 2019

Draft

#### PROGRAM:

Snow Removal and De-Icing

### MA SMALL MS4 PERMIT REQUIREMENT SUMMARY:

#### Part 2.3.7.a.iii.5.

The City of Malden's MS4 NPDES General Permit that became effective on July 1, 2018 requires that the city establish and implement procedures for winter road maintenance including the use and storage of salt and sand; minimize the use of sodium chloride and other salts, and evaluate opportunities for use of alternative materials; and ensure that snow disposal activities do not result in disposal of snow into waters of the United States. For purposes of this MS4 Permit, salt shall mean any chloride-containing material used to treat paved surfaces for deicing, including sodium chloride, calcium chloride, magnesium chloride, and brine solutions.

### Personnel

Employees performing the procedures in this SOP shall attend yearly stormwater pollution prevention training.

### Equipment

The municipality owns and maintains ice control and snow removal equipment. Equipment maintenance shall be conducted consistent with current standards and practices.

#### Plowing

When conditions warrant, plows are installed on the larger trucks to move snow from the traveled roadway. Average time to install a plow is approximately 45 minutes. Smaller trucks are available for plowing of residential streets and clearing public lots.

#### Salt Spreaders and Pre-Wetting Devices

When conditions warrant, salt spreaders are installed on the larger trucks to spread salt on the traveled roadway. Each salt spreader is calibrated prior to the deicing season and every 2 weeks or 5 uses thereafter. Salt application shall be calibrated to dispense rates of 200 pounds per lane mile. Several trucks are equipped with pre-wetting brine tanks which are calibrated prior to the deicing season and every 2 weeks or 5 uses thereafter. Pre-wetting application shall be calibrated to dispense rates 8-10 gallons of pre-wet liquid to 1 ton of salt.

#### Anti-Icing Dispensers

Anti-icing dispensers are calibrated prior to the deicing season and every 2 weeks thereafter. Anti-icing dispensers shall be calibrated to apply 35-40 gallons per lane mile. Pre-wetting application shall be calibrated to dispense rates are 8-10 gallons of pre-wet liquid to 1 ton of salt.

**PROGRAM:**

Snow Removal and De-Icing

## **Materials**

The major materials used in snow and ice control are coarse sand, coarse salt, anti-icing agent,. These materials are stockpiled in advance of an event and are immediately available when needed and stocks are replenished between events.

### **Sand**

Sand is used as an abrasive for traction on slick roadways. Approximately 100-200 cubic yards are anticipated to be used per year and are ordered prior to each deicing season. Sand is stored at: 356 Commercial Street. Loading areas and yards are managed to prevent sand build-up and run-off.

### **Salt**

Salt is used to expedite the melting of snow and ice from the street surface and also to keep the ice from forming a bond to the street surface. Salt is stored at: 356 Commercial Street. Loading areas and yards are managed to prevent salt build-up and run-off.

### **Anti-icing and Pre-Wetting Chemical**

Any anti-icing or pre-wetting chemicals are stored at 356 Commercial Street with appropriate spill control.

### **Salt Alternatives**

Each year an evaluation of the potential use of salt alternatives shall be conducted prior to the de-icing season.

## **Procedures**

### **Anti-Icing**

1. Whenever possible, the anti-icing product is applied to the roadway prior to the beginning of a storm to prevent snow from bonding to the roadway surface, and also used when heavy frost or black ice is expected to be an issue for commuters. The Public Works Director or designee will instruct staff when anti icing is appropriate. Anti-icing will not be done prior to freezing rain or when pavement temperatures are below. 10 degrees F.
2. Prior to anti-icing application, equipment will be checked to ensure proper working order and ensure proper calibration of equipment. All fluid levels will be checked and filled to proper levels, all lights must be in working order. A visual walk-around inspection of the truck or equipment must be made. Any repairs must be made and reported to a supervisor or mechanic before leaving the yard.
3. Anti-icing chemical will only be applied to priority routes.
4. Anti-Icing vehicle optimal speed is 15-20 MPH.
5. Before parking any truck or equipment after use, all fluid levels will be checked and filled. All minor repairs will be done by the operator. Any repairs the operator cannot perform will be written up on the proper forms and turned in to the Director of Public Works or his designee, who will determine importance and will assign the repairs according to schedule.

## WINTER ROAD MAINTENANCE PROCEDURES

### MALDEN DEPARTMENT OF PUBLIC WORKS

ISSUE DATE:

June 2019

Draft

#### PROGRAM:

Snow Removal and De-Icing

#### Salt Application

1. Whenever conditions warrant, salt is applied to the roadway prior to accumulation of snow to prevent compacted snow from bonding to the roadway surface. The Public Works Director or his designee will instruct staff when salt application is appropriate. Salting will not be done when pavement temperatures are above 32 degrees F or below 15 degrees F.
2. Prior to salt application, equipment will be checked to ensure proper working order and ensure proper calibration of equipment. All fluid levels will be checked and filled to proper levels, all lights must be in working order. A visual walk-around inspection of the truck or equipment must be made. Any repairs must be made and reported to a supervisor or mechanic before leaving the yard.
3. The standard salt application speed is: 15-20 mph.
4. Follow the prioritized route or schedule.
5. Before parking any truck or equipment after use, all fluid levels will be checked and filled. All minor repairs will be done by the operator. Any repairs the operator cannot perform will be written up on the proper forms and turned in to the Public Works Director or his designee who will determine importance and will assign the repairs according to schedule. All deicing chemical will be washed from equipment at the wash bay or designated wash area.

#### Snow Plowing

1. As the storm develops and 2 to 4 inches of snow has accumulated, all of the drivers and available equipment will begin to plow their assigned routes.
2. Prior to plowing operations, equipment will be checked to ensure proper working order. All fluid levels will be checked and filled to proper levels, all lights must be in working order. A visual walk-around inspection of the truck or equipment must be made. Any repairs must be made and reported to a supervisor or mechanic before leaving the yard.
3. Avoid plowing, pushing, blowing or storing excess snow, deicer, or other debris in or near creeks, watercourses or storm drainage systems. No snow shall be disposed of into any surface water bodies.
4. Reduce plowing speed in sensitive areas (near creeks, wetlands or other water courses) to prevent snow and deicing materials from entering waterways.
5. The standard plowing speed is: 15-20 mph.
6. Follow the prioritized route or schedule.
7. Before parking any truck or equipment after use, all fluid levels will be checked and filled. Blades or bolts, which need replacing, will be taken care of unless told to do otherwise. Chains that need repairs will be repaired. All minor repairs will be done by the operator. Any repairs the operator cannot perform will be written up on the proper forms and turned in to the Public Works Director or his designee who will determine importance and will assign the repairs according to schedule.

#### Sand Application

1. Whenever conditions warrant, sand is applied to the roadway to increase traction. The Public Works Director or his designee who will instruct staff when sand application is appropriate. Sanding will not be done when pavement temperatures are above 15 degrees F.
2. Prior to sand application, equipment will be checked to ensure proper working order and ensure proper calibration of equipment. All fluid levels will be checked and filled to proper levels, all lights must be in working order. A visual walk-around inspection of the truck or equipment must be made. Any repairs must be made and reported to a supervisor or mechanic before leaving the yard.
3. The standard sanding speed is: 15-20 mph.

## WINTER ROAD MAINTENANCE PROCEDURES

### MALDEN DEPARTMENT OF PUBLIC WORKS

ISSUE DATE:

June 2019

Draft

#### PROGRAM:

Snow Removal and De-Icing

4. Follow the prioritized route or schedule.
5. Before parking any truck or equipment after use, all fluid levels will be checked and filled. Blades or bolts, which need replacing, will be taken care of unless told to do otherwise. Chains that need repairs will be repaired. All minor repairs will be done by the operator. Any repairs the operator cannot perform will be written up on the proper forms and turned in to the Public Works Director or his designee who will determine importance and will assign the repairs according to schedule.

#### Salt Alternative Application

1. Salt alternatives are used in environmentally sensitive areas and applied to the roadway prior to accumulation of snow to prevent compacted snow from bonding to the roadway surface. The Public Works Director or his designee who will instruct staff when salt alternative application is appropriate.
2. Prior to salt alternative application, equipment will be checked to ensure proper working order and ensure proper calibration of equipment. All fluid levels will be checked and filled to proper levels, all lights must be in working order. A visual walk-around inspection of the truck or equipment must be made. Any repairs must be made and reported to a supervisor or mechanic before leaving the yard.
3. Salt alternatives will only be applied to priority routes.
4. Salt alternative delivery optimal speed is 15-20 MPH.
5. Before parking any truck or equipment after use, all fluid levels will be checked and filled. All minor repairs will be done by the operator. Any repairs the operator cannot perform will be written up on the proper forms and turned in to the Public Works Director or his designee who will determine importance and will assign the repairs according to schedule. All deicing chemical will be washed from equipment at the wash bay or designated wash area.

#### Record Keeping and Documentation

1. Maintain a master schedule of prioritized snow and sanding routes and the miles or roads plowed or sanded.
2. Keep copies of manufacturer's recommendations for equipment calibration, plowing speed and salt/sand application rates.
3. Keep records of the amounts of salt, sand, liquid deicer, and salt alternatives applied per season.
4. Keep a list of all employees trained in the facility's Stormwater Pollution Prevention binder or computer file.

*This draft winter road maintenance procedure document has been prepared utilizing a Template prepared by the Massachusetts Department of Environmental Protection (MDEP) and provided by the USEPA and will be reviewed and revised as necessary prior to each winter deicing season.*

# Malden Stormwater Management Program Plan

## ATTACHMENT 30

MCM 6 Malden Good Housekeeping and Pollution Prevention

**BMP 6.8- Stormwater Treatment Structures Inspection and  
Maintenance Procedures**

## **SOP 9: INSPECTING CONSTRUCTED BEST MANAGEMENT PRACTICES**

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

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

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

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

### **Bioretention Areas and Rain Gardens**

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

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

### *Inspection & Maintenance*

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

**Maintenance Schedule: Bioretention Areas and Rain Gardens**

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

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

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

**Constructed Stormwater Wetlands**

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

*Inspection & Maintenance*

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

**Maintenance Schedule, Constructed Stormwater Wetlands: Years 0-3**

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

**Maintenance Schedule, Constructed Stormwater Wetlands: Years 4-Lifetime**

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

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

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

**Extended Dry Detention Basins**

Extended dry detention basins are designed to control both stormwater quantity and quality. These BMPs are designed to hold stormwater for at least 24 hours, allowing solids to settle and to reduce local and downstream flooding. Pretreatment is required to reduce the potential for overflow clogging. The

outflow may be designed as either fixed or adjustable. Additional nutrient removal may be achieved by a micropool or shallow marsh.

### *Inspection & Maintenance*

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

### **Maintenance Schedule: Extended Dry Detention Basins**

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

### **Proprietary Media Filters**

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

### *Inspection & Maintenance*

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

**Maintenance Schedule: Proprietary Media Filters**

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

**Sand and Organic Filters**

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

*Inspection & Maintenance*

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

**Maintenance Schedule: Proprietary Media Filters**

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

**Wet Basins**

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

*Inspection & Maintenance*

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

**Maintenance Schedule: Wet Basins**

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

**Dry Wells**

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

*Inspection & Maintenance*

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

**Maintenance Schedule: Dry Wells**

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

**Infiltration Basins**

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

*Inspection & Maintenance*

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

**Maintenance Schedule: Infiltration Basins**

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



**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 <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
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 <input type="checkbox"/> No <input type="checkbox"/>	
Inspect for invasive species and remove if present	Monthly	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Remove trash	Monthly	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Mulch void areas	Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Remove dead vegetation	Bi-Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Replace dead vegetation	Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Prune	Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Replace all media and vegetation	As Needed	Yes <input type="checkbox"/> No <input type="checkbox"/>	



**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 <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
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 <input type="checkbox"/> No <input type="checkbox"/>	
Replace all media and vegetation	As Needed	Yes <input type="checkbox"/> No <input type="checkbox"/>	

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 <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
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 <input type="checkbox"/> No <input type="checkbox"/>	
Clean forebays	Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Clean sediment in basin/wetland system	Once every 10 years	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Mulch void areas	Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Remove dead vegetation	Bi-Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Replace dead vegetation	Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Prune	Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Replace all media and vegetation	As Needed	Yes <input type="checkbox"/> No <input type="checkbox"/>	



**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 <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
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 <input type="checkbox"/> No <input type="checkbox"/>	
Mow upper stage, side slopes, embankment and emergency spillway	Bi-Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Remove trash and debris	Bi-Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Remove sediment from basin	At least once every 5 years	Yes <input type="checkbox"/> No <input type="checkbox"/>	



**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 <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
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 <input type="checkbox"/> No <input type="checkbox"/>	
Remove trash and debris	Each Inspection	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Examine to determine if system drains in 72 hours	Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Inspect filtering media for clogging	Per manufacturer's schedule	Yes <input type="checkbox"/> No <input type="checkbox"/>	

**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 <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
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 <input type="checkbox"/> No <input type="checkbox"/>	
Rake sand	Every 6 months	Yes <input type="checkbox"/> No <input type="checkbox"/>	



### 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 <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
Describe the weather conditions at time of inspection			
Describe condition of dry well at time of inspection			

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

### INSPECTION OF WET BASINS

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

#### General Information

BMP Description	Wet Basin		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
Describe the weather conditions at time of inspection			
Describe condition of wet basin at time of inspection			

#### Specific Information

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

**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 <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
Describe the weather conditions at time of inspection			

**Specific Information**

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
		Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	



# Malden Stormwater Management Program Plan

## ATTACHMENT 31

MCM 6 Malden Good Housekeeping and Pollution Prevention

**BMP 6.9- SWPPP for City Facilities**

# Malden Stormwater Management Program Plan

## ATTACHMENT 32

MCM 6 Malden Good Housekeeping and Pollution Prevention  
**BMP 6.10 - Malden River Catchment Phosphorus Identification  
Assessment**

# Malden Stormwater Management Program Plan

## ATTACHMENT 33

MCM 6 Malden Good Housekeeping and Pollution Prevention

**BMP 6.11- Phosphorus Removal BMP Plan for City Owned  
Property in Malden River Catchment**

# Malden Stormwater Management Program Plan

## ATTACHMENT 34

MCM 6 Malden Good Housekeeping and Pollution Prevention

**BMP 6.12- Malden River Catchment Phosphorus Removal**

**BMP Demonstration Project Installation**

# Malden Stormwater Management Program Plan

## ATTACHMENT 35

MCM 6 Malden Good Housekeeping and Pollution Prevention

**BMP 6.13 - Malden River Catchment Phosphorus Removal**

**BMP Monitoring**

# Malden Stormwater Management Program Plan

## ATTACHMENT 36

MCM 6 Malden Good Housekeeping and Pollution Prevention

**BMP 6.14 - Installation of Remaining Phosphorus Removal  
BMPs**

# Malden Stormwater Management Program Plan

## ATTACHMENT 37

Annual Evaluations