Stormwater Management Program

Cambridge, MA

EPA NPDES Permit Number: MAR041076

Revised June 2019

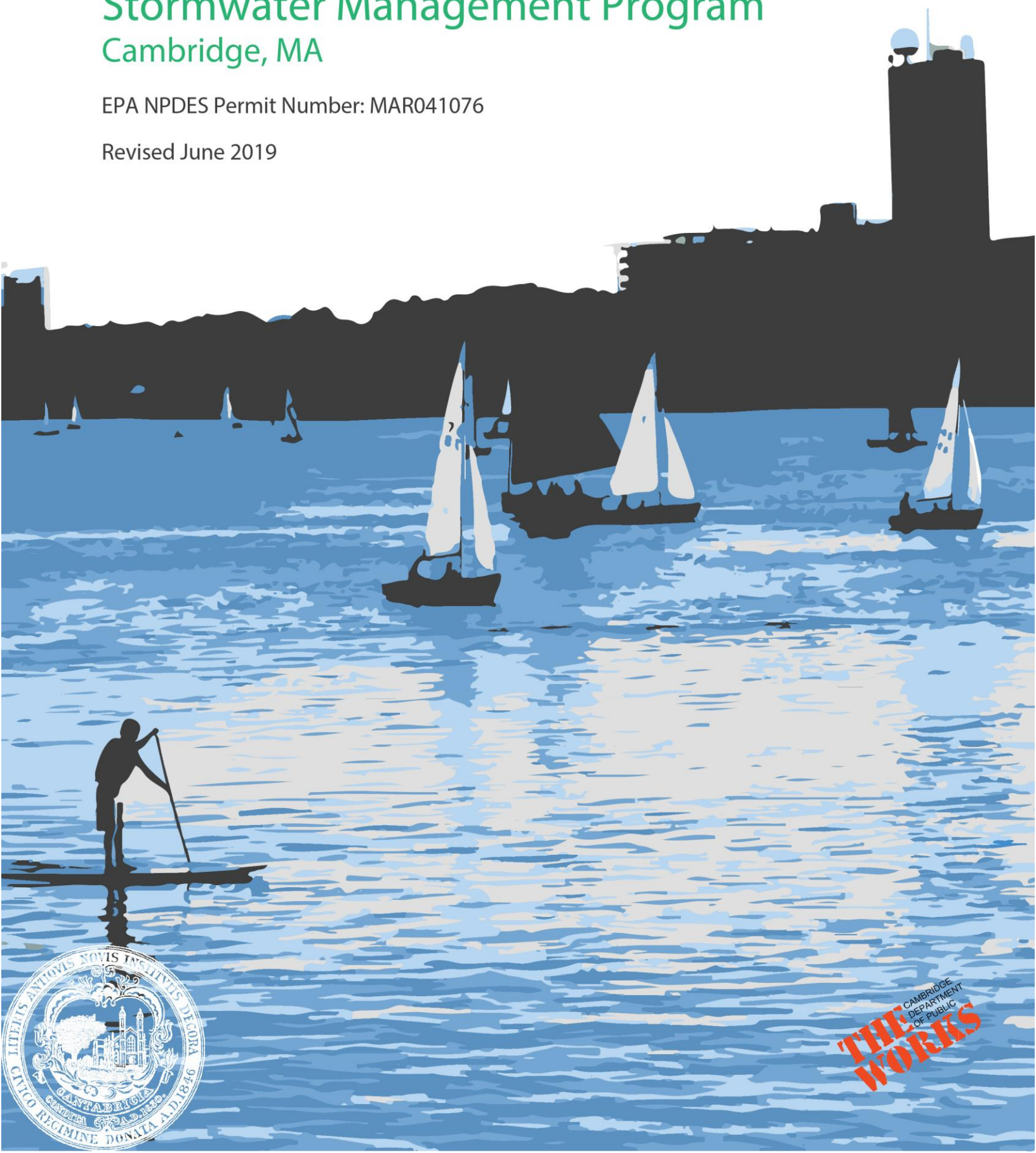


TABLE OF CONTENTS

Section **Page**

TABLES

APPENDICES

LIST OF ACRONYMS:

BMP – Best Management Practice
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
EPA – U. S. Environmental Protection Agency
ESA – Endangered Species Act
GI – Green Infrastructure
IA – Impervious Area
IDDE – Illicit Discharge Detection and Elimination
LA – Load Allocations
MS4 – Municipal Separate Storm Sewer System
MSGP – Multi-Sector General Permit
NHPA – National Historic Preservation Act
NOI – Notice of Intent
NPDES – National Pollutant Discharge Elimination System
NRHP – National Register of Historic Places
PCP – Phosphorus Control Plan (pertaining to Charles River Watershed phosphorus TMDL requirements only – Appendix F Part A.I)
RCRA – Resource Conservation and Recovery Act
SHPO – State Historic Preservation Officer
SWMP – Stormwater Management Program
SWPPP – Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
TSS – Total Suspended Solids
USFWS – U. S. Fish and Wildlife Service
WLA – Waste load Allocation
WQBEL – Water Quality Based Effluent Limitations
WQS – Water Quality Standard

Photo of the Alewife Stormwater Wetland

1 CERTIFICATION

Authorized Representative: 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.

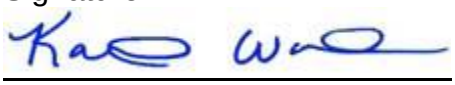
The authorization letter is included as Appendix A.

“I certify under the 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 is submitted, 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:

Katherine F. Watkins

Signature:



Date:

June 27, 2019

2 BACKGROUND

2.1 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 Small Municipal Separate Storm Sewer Systems (MS4s) in urbanized areas and operators of small construction sites, using 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.

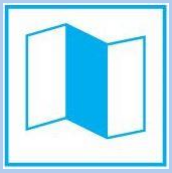
2.2 PERMIT PROGRAM BACKGROUND

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. The 2016 MS4 General Permit is hereinafter referred to simply as the "2016 Permit."

2.3 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 2016 Permit. The SWMP accurately describes the permittee's plans and activities. The document will be updated and/or modified during the

2016 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 contributing to 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

(6) a good housekeeping program to ensure that stormwater pollution sources on municipal properties and from municipal operations are minimized

2.4 CAMBRIDGE MS4 BACKGROUND

The City of Cambridge was permitted under the 2003 Small MS4 Permit. During that Permit term, the City created an initial SWMP, addressed storm system mapping, and submitted Annual Reports. Beyond addressing minimum regulatory requirements, the City made effective stormwater management a priority through proactive approaches to education and engagement with the public, support of third-party groups and special events, publicly available system-wide storm system mapping, and outfall screening and sampling.

The City identified and began to prioritize actions that would help it comply with the 2016 Permit and continue its commitment to enhanced stormwater management. Some of these actions included comprehensive mapping to encompass storm drain, sanitary sewer, catchment areas, and stormwater sampling locations, improvements to maintenance and operations protocols, revisions to existing ordinances to increase the City's ability to implement effective and long-term measures for stormwater control, and identification of resource, staff, and equipment needs to meet the existing and forthcoming regulatory requirements.

View of the Charles River overlooking the Boston skyline from the Dr. Paul White Bike Path

Installation of a rain garden to treat stormwater before it enters the drainage system as part of a sewer separation project.

Removal of invasive species to be revegetated with naïve upland and wetland species at the Alewife Wetland.

To address education and outreach requirements of the 2003 Permit, the City of Cambridge, through the cooperation of many departments, has distributed brochures, newsletters, flyers, and construction notices and promoted community projects and other local events. In the 2016 Permit term, the City will continue to distribute educational materials and will work to enhance the program to include messaging to all City audiences and for all required permit topics.

Examples of education and outreach materials developed by the City

The City demonstrated its commitment to public involvement and participation in the program through an annual public meeting with an in-depth presentation of the previous year's work and successes. The City also maintains close partnerships with the Charles River Watershed Association, the Mystic River Watershed Association, Friends of Fresh Pond and other local organizations and will continue to attend and promote their events in the City.

The City developed and administered an IDDE Program as part of the 2003 Permit. Cambridge amended its Wastewater and Stormwater Drainage System Ordinance to support the enforcement of the IDDE Program.

The IDDE Program is one of the most involved aspects of the 2016 Permit, and Cambridge's outfall sampling work from the prior Permit term aligns with these new requirements. The City will continue to advance efforts from the 2003 Permit term. In addition, the City installed five (5) automatic stormwater sampling stations, three (3) in the Alewife watershed and two (2) in the Charles watershed. These sampling stations will help advance the City's information on water quality during wet weather and assist in its understanding TMDL and pollutant of concern loading at those locations.

To properly manage stormwater runoff from new/redevelopment sites, ensure post construction operation and maintenance is performed, and to enforce construction site stormwater runoff the City developed its Land Disturbance Regulation and supporting Wastewater and Stormwater Guidance document. This regulation became effective in 2008 during the initial 2003 Permit term. To fully address new requirements, the City will amend the Land Disturbance Regulation and updates its guidance document, as necessary.

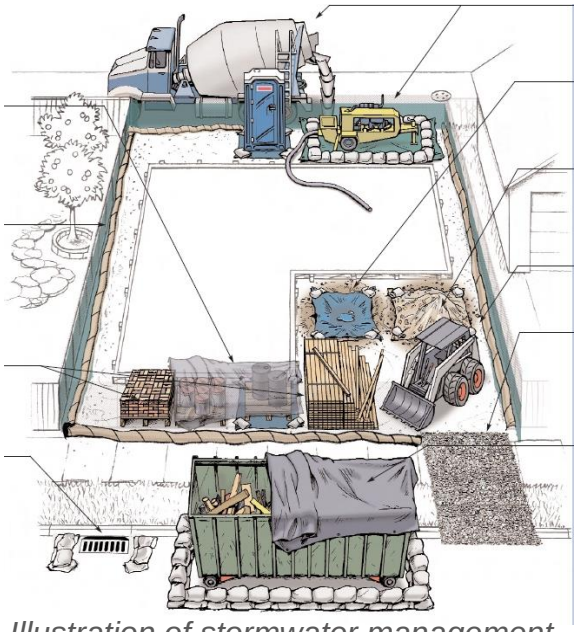


Illustration of stormwater management techniques on a construction site (Greg High)

The City is progressive in its plan to manage post construction stormwater runoff. This includes updating regulations and design guidelines to reflect climate change adaptation and allowing the construction of green infrastructure. The City maintains a database of privately owned BMPs, developed a **Five Year Sidewalk and Street Reconstruction Plan** that includes opportunities for innovative stormwater management, evaluates City-owned properties for retrofits as part of its Climate Change Vulnerability Assessment, and developed a **Ten Year Sewer and Drain Infrastructure Plan** that describes the City's upcoming capital and maintenance programs for these systems.

Five Year Sidewalk and Street Reconstruction Plan

Ten Year Sewer and Drain Infrastructure Plan

The City has a robust operations and maintenance program that already meets many of the 2016 Permit requirements for catch basin cleaning, street sweeping and management, winter road maintenance, and BMP maintenance. Additionally, the City has been training its employees on stormwater pollution prevention, record keeping, and inspection protocols. Some of these procedures will be updated as necessary to adhere to the 2016 Permit, and the City will be developing and implementing SWPPPs for seven permittee-owned or operated facilities during the 2016 Permit term.

Inspection of a stormwater BMP (left) and winter road maintenance (right)

The City of Cambridge demonstrated successful stormwater management through the adherence to the 2003 Permit. The City continued to progress beyond minimum regulatory requirements, and it has proactively worked towards anticipated 2016 Permit requirements. Although some updates and additions are necessary, the City of Cambridge has a substantial stormwater management program ready for the 2016 Permit.

2.5 ANNUAL UPDATES AND REPORTING

Each year since 2003, the has City submitted an MS4 Annual Report to the US EPA since the 2003 Permit term. This yearly reporting requirement will continue, and as described in Section 6, the public will have an opportunity to review and comment on the City's progress every year. In addition, this SWMP is not meant to be a static document, and as

the City's efforts progress and evolve, so too will this program. The SWMP will be routinely updated and the most up to date version of this program will be available to the public on the City's website.

DPW's Stormwater booth at Fresh Pond Day, where staff interacted with attendees, discussed the importance of clean stormwater, and provided educational material for all ages.

The City provides residents with information about stormwater management and pollution prevention at Fresh Pond Day (June 15, 2019)

Large format displays provide information about stormwater and water quality, describes the City's stormwater management program, and educates the public on how individuals can keep the City's waters clean.

3 SMALL MS4 AUTHORIZATION

- The NOI was submitted on September 28, 2018
- The NOI is available on the City's website here: **Notice of Intent (NOI) for coverage under Small MS4 General Permit** and on the **EPA's website**
- Authorization to Discharge was granted by EPA on April 5, 2019
- The Authorization Letter can be found in Appendix B and on the **EPA's website**

4 STORMWATER MANAGEMENT PROGRAM TEAM

4.1 STORMWATER MANAGEMENT PROGRAM TEAM

4.1.1 SWMP Team Responsibilities

The SWMP Team is multidisciplinary and includes members with multiple roles. As a Team, the City is responsible for fully adhering to the 2016 Permit and this SWMP. Team actions include reviewing and updating appropriate ordinances, legal enforcement and disciplinary actions, maintaining records, city-wide system mapping, and outfall screening and sampling. The SWMP Team is shown in **Table 4-1.**

Table 4-1: Responsible Parties in Program Team

Department	Title	Name	Role
DPW	Commissioner	Owen O'Riordan	
	City Engineer	Katherine Watkins	Authorized Representative
	Engineering Project Manager	Catherine Woodbury	Team Coordinator
	Director of Engineering Services	James Wilcox	
	Engineer	Yilkal Bekele	Inspector
Water Department	Fresh Pond Watershed Manager	David Kaplan	

4.1.2 SWMP Team Coordinator

The SWMP Team Coordinator will be responsible for directing many of the efforts under this program including assembling and maintaining records detailing SWMP progress, coordinating data collection and records gathering with each department, and facilitating employee training.

4.2 RECEIVING WATERS

Table 4-2 includes all receiving waters within the City of Cambridge that receive stormwater flow from separate storm drain systems, associated impairments, and the number of known outfalls discharging to each water body segment. **Figure 4-1** depicts the waterbodies within the City as well as active, City-owned outfalls discharging to those waterbodies. The waterbody impairments are based on the **Massachusetts Year 2014 Integrated List of Waters**.

Table 4-2: Waterbody Segments in Cambridge that Receive Flow from the Municipal Separate Storm Sewer System

		Impairment Listed in Massachusetts 2014 Integrated List of Waters						
Waterbody	**Number of Outfalls into waterbody**	**Chlorophyll-a**	**Dissolved Oxygen/DO Saturation**	**Oil & Grease/ PAH**	**Phosphorus**	**Solids/ TSS /Turbidity**	**E. coli**	**Other Pollutants Causing Impairments**
Alewife Brook (MA 71-04)	5		X		X	X	X	Copper, Lead, Foam/flocs/sum/oil/slicks, secchi disk transparency (TSS), PCBs in fish tissue, sediment bioassays - chronic toxicity (freshwater), taste and odor
Charles River (MA 72-36)	13	X	X	X	X	X	X	DDT, fishes bioassessments, nutrient/eutrophication biological indicators (phosphorus), other, PCBs in fish tissue, high pH, secchi disk transparency (TSS), sediment bioassays - acute toxicity (freshwater)
Charles River (MA 72-38)	14	X	X	X	X	X	X	Combined bioata/habitat bioassessments, DDT, Excessive algal growth, nutrient/eutrophication biological indicators, PCBs in fish tissue, salinity, secchi disk transparency (TSS), sediment screening value (exceedance), taste and odor, water temperature
Fresh Pond	3							
Wellington Brook	3							
Jerry's Pond	3							

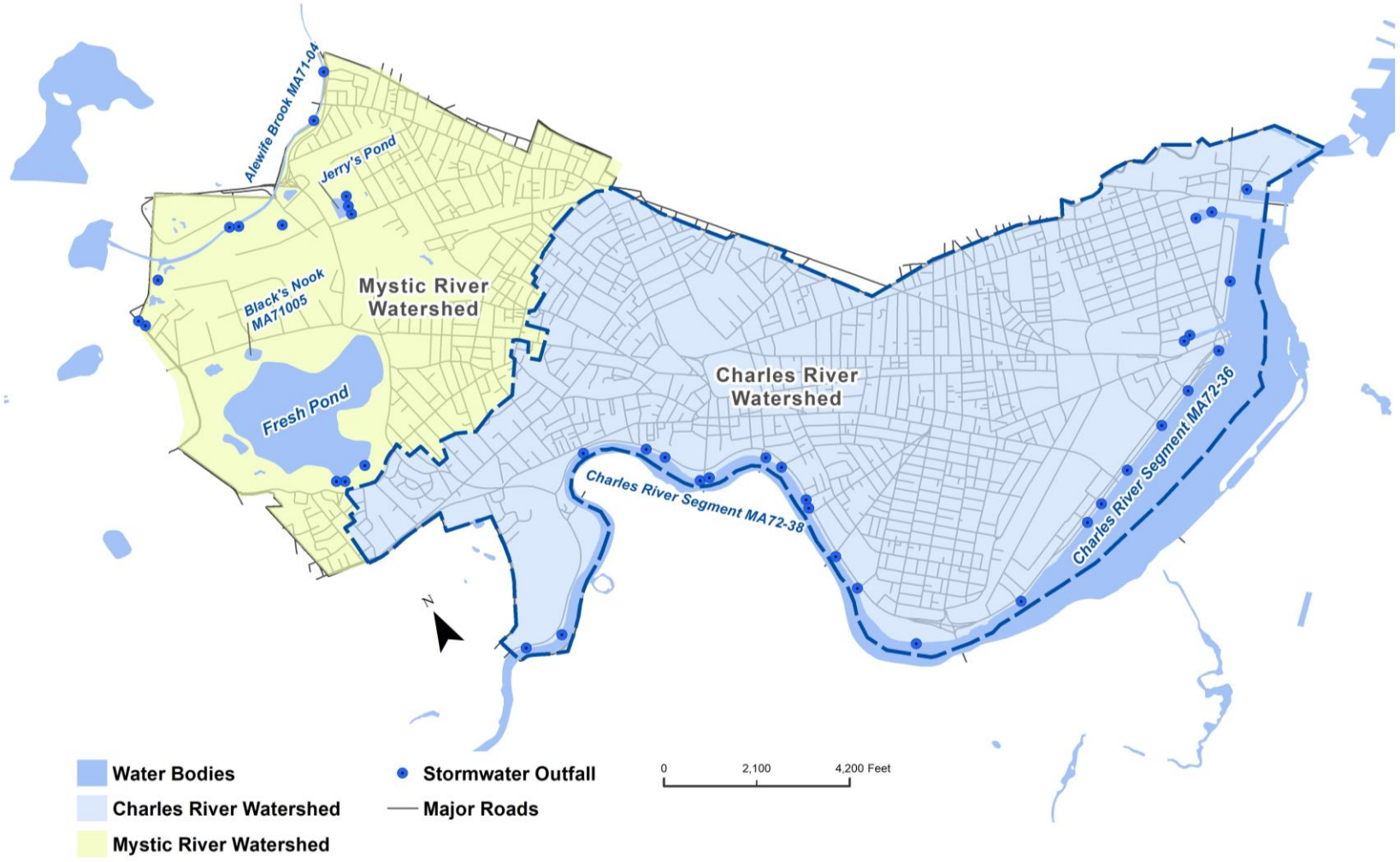


Figure 4-1: Map of Waterbodies and Active, City-Owned Stormwater Outfalls

According to the most recent final version of the **Massachusetts Integrated List of Waters** (2014), there are three water body segments with an approved Total Maximum Daily Load (TMDL) associated with them and four water body segments that are considered to be water quality limited. The waterbody segments and the associated cause(s) of the impairments are included in **Table 4-3**. These impairments trigger additional 2016 Permit requirements in Appendices F and H.

Table 4-3: Impaired Waters in the City of Cambridge

Water Quality Limited Waterbodies (Appendix H)		
River Name	**Segment ID**	**Impairment Cause**
Charles River	MA 72-36 & MA 72-38	Oil and Grease, TSS
Alewife Brook	MA 71-04	Copper, Lead, TSS, E. coli, Phosphorus
Water Bodies with Approved TMDLs (Appendix F)		
Charles River Watershed	MA 72-36 & MA 72-38	Bacteria/Pathogen
Lower Charles River	MA 72-36 & MA 72-38	Phosphorus

4.3 ELIGIBILITY

The City of Cambridge is in the Commonwealth of Massachusetts and its drainage system is defined as a small municipal storm sewer system (MS4) as defined in 40 CFR §122.26(b)(16). The City is located within an urbanized area as determined by the 2000 census data provided by the Bureau of Census. The Notice of Intent and Stormwater Management Program have been developed to obtain coverage for stormwater discharges to waters of the United States. The following certifications are made as identified by the 2016 Permit limitations on coverage in Section 1.3 of the regulations.

4.3.1 Endangered Species

The City of Cambridge understands that the Environmental Protection Agency (EPA) is seeking to ensure the activities regulated by the 2016 Permit do not adversely affect endangered and threatened species or critical habitat. The City has assessed the impacts of stormwater discharges and discharge-related activities on federally listed endangered and threatened species ("listed species") and designated critical habitat ("critical habitat").

During the NOI submission process, the City referenced the U.S. Fish and Wildlife Information, Planning, and Conservation (IPaC) system and MA GIS database and determined that the City of Cambridge's MS4 contains the Northern Long-eared Bat. The **Natural Heritage & Endangered Species Program web-based map** shows that there is no roost trees within a 0.25 mile radius of the City's regulated area as of its update on June 4, 2019. Therefore, the City adheres to the 4(d) rule under the Endangered Species Act (ESA) that prohibits tree removal within a 0.25-mile radius of bat habitat and any activity that cuts or destroys known occupied maternity roost trees or any other trees within a 150 foot radius from the maternity tree from June 1st through July 31st. Using the ESA Eligibility criteria as referenced in Appendix C of the MA Small MS4 General Permit, the City certified eligibility according to the USFWS **Criterion C**. Under Criterion C, the City has affirmed that there are no discharge-related activities involving the habitat of this species of bat and therefore the City's MS4 system does not affect any federally threatened or endangered listed species. The results of this screening are including in Appendix C.

Photo of a Northern Long-eared Bat (USFWS)

MS4 Outfall at Dewolfe Street

4.3.2 Historic Properties

Much of the land abutting the Charles River is listed in the National Registry, and the City is planning to create new outfalls in these areas in the coming years. The Cambridge Historical Commission provides an electronic map of listed properties here: **Cambridge - National Register Map**. While the City was previously covered under the 2003 MS4 Permit, the City's plans for creating new outfalls in this area qualifies for Criterion C, using the eligibility criteria in Appendix D of the 2016 Permit, as follows:

- Stormwater outfalls created since 2003 have undergone the Massachusetts Historical Commission Project Notification process with the State Historic Preservation Officer (SHPO). Based on this process, these projects had no related activities with adverse discharge effects on historic properties.
- The City certifies that during the 2016 Permit term, if new structural BMPs with potential discharge related activities are planned, the City will provide Project Notification to the SHPO and comply with any measures required to prevent or mitigate any adverse discharge effects on historic properties.

5 MINIMUM CONTROL MEASURES (MCM)

The City of Cambridge developed a Stormwater Management Program for compliance with the NPDES Stormwater Phase II Rule. The review of the existing conditions and identification of stormwater needs provided the framework for identifying best management practices under the six minimum control measures (MCM). The aim of this stormwater management program is to reduce pollutant loads from stormwater systems to the maximum extent practicable, protect water quality, and meet the requirements under the Clean Water Act. The stormwater management program was developed to manage the City of Cambridge's stormwater systems over the next five-year period. A summary of the MCM objectives and requirements are detailed in the following sections along with specific actions and measurable goals. Some BMPs have specific deadlines that must be met, and those that have been started are designated as in progress, while others are on-going efforts that must be completed or updated on an annual basis.

The aim of this stormwater management program is to reduce pollutant loads from stormwater systems to the maximum extent practicable, protect water quality, and meet the requirements under the Clean Water Act.

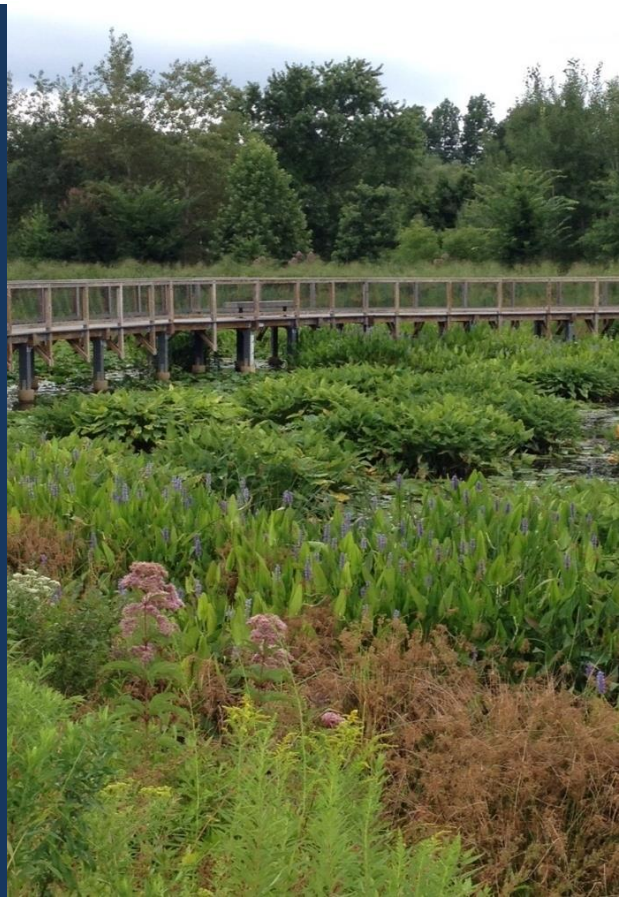
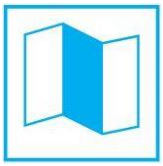


Photo of the Alewife Stormwater Wetland

5.1 MCM 1: PUBLIC EDUCATION AND OUTREACH

5.1.1 Objective



The Permit states that: "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."

5.1.2 Permit Summary

Part 2.3.2. of the MS4 Permit requires the City to develop and implement an ongoing Public Education and Outreach Program. The Public Education and Outreach Program must include focused educational messages targeted at four (4) audiences:

- Residents
- Businesses, institutions (churches, hospitals), and commercial facilities
- Developers (construction)
- Industrial facilities

Educational messages can be printed materials, electronic materials, mass media, social media, targeted workshops, events, or public area displays. These messages should consider stormwater pollution and prevention topics that are relevant to the City. The Permit dictates the baseline messaging frequency to each of the above audiences, as well as outreach strategies regarding pollutants of concern. Two messages spaced at least one year apart, must be provided to each of the four audiences during the permit term.

Additional educational messaging is needed to address impairments of water bodies within the City. The 2016 Permit includes requirements in Appendix F and Appendix H regarding pet waste management, to be distributed each summer; grass clipping

management, to be distributed each spring; leaf litter management, to distributed in the Fall; and proper septic system maintenance for properties with septic systems.

Additionally, the program will educate the public on the proper management and disposal of pollutants of concern, which are listed in the most recent final version of the **Massachusetts Integrated List of Waters** (2014). The City will focus on actions the public can take to reduce these pollutants at the source. **Table 5-1** describes these pollutants, their potential impacts to Cambridge's waterbodies, and the behaviors that can reduce those impacts.

Table 5-1: Pollutants of Concern

Pollutants of Concern	Waterbodies of Concern	Impact to Waterbodies	Targeted Sources	Desired Behaviors
Bacteria/ Pathogens	Charles River Alewife Brook	Can cause disease and make waters unfit for recreation.	• Pet waste • Illicit Connections	• Properly dispose of pet waste • Prioritized City IDDE Activities
Phosphorus	Charles River Alewife Brook	Excessive amounts of phosphorous can cause harmful algae blooms and create low oxygen conditions that harm aquatic life.	• Pet waste • Grass clippings • Lawn fertilizer • Leaf litter • Sediment (TSS)	• Properly dispose of pet waste • Use fertilizer sparingly and never storms • Properly dispose of leaves and grass clippings
Oil and Grease	Charles River	Can reduce aquatic organisms' ability to reproduce and survive.	• New and Redevelopment • Permittee owned and operated properties and infrastructure	• Use of stormwater BMPs • Good housekeeping practices
Metals (Copper and Lead)	Alewife Brook	Can be acutely or chronically toxic to aquatic organisms.	• New and Redevelopment • Permittee owned and operated properties and infrastructure	• Use of stormwater BMPs • Good housekeeping practices
Total Suspended Solids (TSS)	Charles River Alewife Brook	Can reduce the penetration of light in the water and limit the growth of aquatic plants.	• Leaf litter • Soil and sediment erosion	• Properly dispose of leaves and grass clippings • Adequate soil erosion and sediment controls • Street sweeping • Catch basin cleaning

5.1.3 Existing and Updated Program

In the 2003 Permit term the City of Cambridge developed and implemented education and outreach materials as required by the 2003 Permit. Through the development of the NOI for the 2016 Permit, the DPW evaluated and determined multiple types of stormwater messaging that can be added to the City's current efforts that will be effective for meeting the requirements of this MCM. The City is committed to continue to inform residents about stormwater issues and is focusing on reaching an appropriate audience for each message.

Since there are impaired water bodies in Cambridge, under the 2016 Permit term, the City is responsible for adhering to additional messaging requirements in Appendix F and Appendix H. These requirements include specific messaging for pet waste management distributed annually in the summer, grass clipping management delivered annually in the spring, leaf litter management delivered annually in the fall, and septic system maintenance information delivered annually.

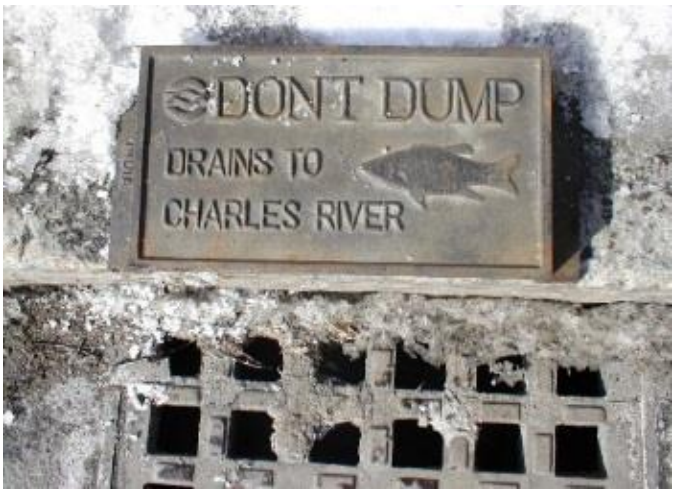
There are multiple education and outreach programs that currently seek to raise the public's awareness of environmental and stormwater-specific issues. New programs and resources are continuously considered and will be implemented to advance Cambridge's commitment to the Public Education and Outreach Program for the SWMP. The City uses various strategies to reach the public including:

- Department websites and social media platforms
- Cooperative efforts with local organizations and environmental advocates such as
    - *Charles River Watershed Association*
    - *Cambridge Public Schools*
    - *Mystic River Watershed Association*
- Direct mailings and distributing information door-to-door
- Cambridge-specific newsletters and magazines such as
    - *CityView (City of Cambridge Newsletter)*
    - *The Cambridge Life (City of Cambridge Blog)*
    - *CityLife (City of Cambridge magazine)*

- Environmental stewardship and volunteer events
- Workshops, presentations, and other special events such as
    - *Cambridge Science Festival*
    - *River Festival*
    - *Fresh Pond Day*
    - *PARKing Day*
- Public Service Announcements on local cable TV

Table 5-2 details Cambridge's Public Education and Outreach Program and implementation plan under the 2016 Permit term. Each Best Management Practice (BMP) includes the responsible department. During the 2016 Permit term, the success of each BMP will be measured and evaluated against the metrics provided in the "Measurable Goal" category below. Data collected for each BMP will be recorded, and the efficacy of each BMP towards reaching the public education goals and will be presented in each years' Annual Report.

Cambridge is working with both the Mystic River Watershed Stormwater Collaborative and the Charles River Stormwater Coalition/Think Blue Massachusetts on stormwater public education and outreach efforts. These collaborative education and outreach campaigns will be incorporated into the City's program.



Fish plates installed at each catch basin encouraging proper use of the City's infrastructure to protect water quality

Table 5-2: Implementation Program for MCM 1, Public Education and Outreach Program

BMP #	BMP	Media/Category	Targeted Audience	Responsible Department	Measurable Goal	Beginning Year of BMP Implementation	Status
1-1	Distribute Brochures/Fact Sheets/Newsletters	Brochures/Pamphlets	Residents	DPW	Number of brochures/fact sheets distributed	2018	Ongoing
1-2	Distribute Brochures/Fact Sheets/Newsletters	Brochures/Pamphlets	Businesses, Institutions, and Commercial Facilities	DPW	Number of brochures/fact sheets distributed	2018	Ongoing
1-3	Include Stormwater Information in permit package	Brochures/Pamphlets	Developers (Construction)	DPW	Include in 100% of applications and permit packages	2018	Ongoing
1-4	Distribute brochures/fact sheets	Brochures/Pamphlets	Industrial Facilities	DPW	Number of brochures/fact sheets distributed	2018	Ongoing
1-5	Distribute Annual messaging on Pet Waste (Summer).	Brochures/Pamphlets	Dog Owners - Residents	DPW	Number of Dog Licenses/materials distributed	2019	Ongoing
1-6	Distribute Annual messaging on proper septic system maintenance	Brochures/Pamphlets/ Letter	Residents with Septic Systems	DPW	Number of residents reached	2018	Ongoing
1-7	Distribute Annual messaging on Leaf Litter (Fall)	Brochures/Pamphlets	Residents	DPW	Number of brochures/fact sheets distributed	2018	Ongoing
1-8	Distribute Annual messaging on Leaf Litter (Fall)	Brochures/Pamphlets	Businesses, Institutions, and Commercial Facilities	DPW	Number of brochures/fact sheets distributed	2018	Ongoing
1-9	Distribute Annual messaging on grass clippings and fertilizers (Spring)	Brochures/Pamphlets	Residents	DPW	Number of brochures/fact sheets distributed	2018	Ongoing
1-10	Distribute Annual messaging on grass clippings and fertilizers (Spring)	Brochures/Pamphlets	Businesses, Institutions, and Commercial Facilities	DPW	Number of brochures/fact sheets distributed	2018	Ongoing
1-11	Post stormwater information on webpage	Web Page	Residents	DPW	Number of website views	2020	Ongoing
1-12	Post stormwater information on webpage and on DPW social media accounts	Web Page; Social Media	Businesses, Institutions, and Commercial Facilities	DPW	Number of website views/social media followers	2020	Ongoing
1-13	Post stormwater information on webpage	Web Page	Developers (Construction)	DPW	Number of website views/clicks on link	2020	Ongoing
1-14	Post stormwater information on webpage	Web Page	Industrial Facilities	DPW	Number of website views/clicks on link	2020	Ongoing

1-15	Conduct trainings and presentations	Presentations/Trainings	Developers (Construction)	DPW	Number of participants	2020	In Progress
1-16	Rain Barrel Program	Special Events	Residents	DPW	Number of rain barrels sold	2019	Ongoing
1-17	Post stormwater information on DPW social media accounts	Social Media	Residents	DPW	Number of social media followers	2018	Ongoing
1-18	Post stormwater information at the DPW office	Displays/Posters/Kiosks	General Public	DPW	Number of posters/handouts displayed	2018	In Progress
1-19	Distribute stormwater fact sheet at events	Special Events	General Public	DPW	Number of events and participants	2019	Ongoing
1-20	Post stormwater videos on either local cable, web site, or social media	Videos	General Public	DPW	Number of videos posted	2018	Ongoing

5.2 MCM 2: PUBLIC INVOLVEMENT AND PARTICIPATION

5.2.1 Objective

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

5.2.2 Permit Summary

Part 2.3.3 of the Permit requires the City provide an annual opportunity for the public to participate in the review and implementation of the SWMP, including allowing the public to provide comments and feedback. The City will adhere to state public notice requirements (MGL Chapter 30A, Sections 18-25 – effective 07/10/2010), for all public involvement activities and report on activities in the annual report.

5.2.3 Existing and Updated Programs

Over the previous permit term, the City made significant progress in engaging the community around stormwater related topics. The City is proactive about involving the community in stormwater management leading up to this 2016 Permit term and supporting volunteer efforts. Instead of sponsoring a public meeting to discuss the SWMP the City will engage a broader audience by participating in public events.

The City made significant progress in engaging the community around stormwater related topics and is proactive about involving the community in stormwater management.

Photo at neighborhood event with an educational display about stormwater

The City engages the public on stormwater through a variety of events such as tours of stormwater wetlands (above) and Household Hazardous Waste events (below)

Table 5-3: Implementation Program for MCM 2

BMP #	BMP Description	Responsible Department	Measurable Goal	Beginning Year of BMP Implementation
2-1	Public Review of Stormwater Management Program	DPW	Post Stormwater Management Program on City Website and allow for public review annually	July 1, 2019
2-2	Annual Public Meeting to discuss SWMP and program status and provide comments	DPW	Allow public to comment on stormwater management program annually. Track number of comments or participants	2019
2-3	Promote participation in Household Hazardous Waste collection program	DPW	Track number of participants	2018
2-4	Continue to hold Stormwater Outreach Activities for children	DPW	Track number of activities and children participating at each event	2019
2-5	Continue to hold tours of the City's Stormwater Wetlands	DPW	Number of tours and participants	2018
2-6	Continue to participate in community/neighborhood events	DPW	Number of events and participants	2019
2-7	Continue promotion of Solid Waste, Recycling, and Compost Program	DPW	Track tonnage of waste collected	2019

5.2.4 Public Participation in the Stormwater Management Program

The Stormwater Management Program is posted online at the following location: **www.cambridgema.gov/theworks/ourservices/stormwatermanagement/stormwatermanagementplan.** A hardcopy of the program is also available for public review at the DPW Office located at 147 Hampshire Street, Cambridge, MA. The City will continue its promotion of ways for the public to report activities that negatively impact water quality to provide further opportunities for public participation. The City will include meeting dates, attendance, and public input in the Annual Report.

5.3 MCM 3: ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE) PROGRAM

5.3.1 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."

5.3.2 Permit Summary

The Permit requires the City to maintain an adequate legal authority to prohibit, investigate, and eliminate illicit discharges, and implement appropriate enforcement mechanisms. Illicit discharges have been defined in 40 CFR 122.26(b)(2) as "any discharge to a municipal separate storm sewer that is not composed entirely of stormwater…" with some exceptions. These exceptions include discharges from NPDES-permitted industrial sources and discharges from fire-fighting activities. EPA studies have shown that pollutant levels from illicit discharges have been high enough to significantly degrade receiving water quality and threaten aquatic wildlife and human health. Illicit discharges include sanitary wastewater (sewage), car wash wastewaters, improper oil disposal, laundry wastewater, spills from roadway accidents, and improper disposal of auto and household toxics. The MS4 Permit and the City's **Wastewater and Stormwater Drainage Use Regulations** list the allowable non-stormwater discharges to the MS4.

Under MCM 3, the City is required to implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its MS4 and implement procedures to prevent such discharges. **Table 5-4** summarizes major requirements related to MCM 3 and the City's status with implementing these requirements.

Table 5-4: IDDE Program Timeline

IDDE Program Requirement	Estimated Completion Date from July 1, 2018*						Status
	1 Year	1.5 Years	2 Years	3 Years	7 Years	10 Years	
Written IDDE Program	X						Completed
SSO Inventory	X						Completed
Written Catchment Investigation Procedure		X					Completed
Phase I Mapping			X				Completed
Phase II Mapping						X	In progress
IDDE Regulatory Mechanism or By-law				X			Completed
Dry Weather Outfall Screening				X			In progress
Follow-up Ranking of Outfalls and Interconnections				X			Not started
Catchment Investigations – Problem Outfalls					X		In progress
Catchment Investigations – all Problem, High and Low Priority Outfalls						X	In progress

*****Effective date of 2016 Permit*

5.3.3 Existing Program

Written IDDE Program including Written Catchment Investigation Procedures

The City documented and revised its written IDDE program during Year 1 of the 2016 Permit term. The City's written IDDE Program, which is included as Appendix D, includes procedures for dry weather outfall screening and sampling and for catchment investigation. The procedures were adapted from the Central Massachusetts Regional Stormwater Coalition, the Center for Watershed Protection, the New England Interstate Water Pollution Control Commission, and the U.S. EPA.

The City provides annual training to staff involved in the IDDE Program. The training adheres to the requirements specified in the 2016 Permit and includes information on how to identify illicit discharges and SSOs. Additionally, during the training, specific functions of personnel responsible for implementing the IDDE program are reviewed, such as outfall sampling and screening procedures.

Outfall screening and sampling during IDDE training

Sanitary Sewer Overflows (SSOs)

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 sanitary sewer blockages, line breaks, sewer defects that allow stormwater and groundwater to overload the system, power failures, improper sewer design, and vandalism.

The City maintains an inventory of SSOs that have discharged to the MS4 within the five (5) years prior to the effective date of the 2016 MS4 Permit. 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. The SSO inventory is included as an Appendix C to the IDDE Plan.

The SSO inventory will be updated by the City when new SSOs are detected and included in each annual report with information on the status of mitigation and corrective measures to address each identified SSO. Additionally, the City will provide oral notice to EPA, MassDEP, and others as applicable within 24 hours, and written notice to EPA and MassDEP within five (5) days of becoming aware of the SSO occurrence. The City 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.

Table 5-5 Contact Information to Report an SSO by Phone within 24 hours (Oral Notice)

Agency	Contact	Requirements
MassDEP	During Business Hours: (978) 694-3215, or 24-Hour Emergency Line: (888) 304-1133	Report all SSO events
EPA	EPA New England: (617) 918-1510, or Northeast Region, Douglas Koopman (617) 918-1747	Report all SSO events
Local Board of Health	Cambridge Public Health Department: (617) 665-3800	Report all SSO events where impacts may occur
Department of Conservation and Recreation	State House Ranger Base: (617) 722-1188	Where DCR beaches or parks are affected
MA Division of Marine Fisheries	Boston/Northeast: (617) 727-3336 x 165	Where shellfish resources may be affected
Drinking Water Resource Managers	Cambridge Water Department Sam Corda, Managing Director: (617) 349-4770	Where drinking water resources may be affected

Contact information to submit a written notice of an SSO event within five (5) calendar days:

Complete MassDEP Sanitary Sewer Overflow (SSO)/Bypass notification form
(Appendix C of the IDDE Program)

Send Notification Form by Fax:
Massachusetts Department of Environmental Protection, Northeast Regional Office, 205B Lowell Street, Wilmington, MA 01887.
Fax: 978-694-3499

AND

EPA Water Technical Unit (OES 04-4), 5 Post Office Square, Suite 100, Boston, MA 02109-3912. Attn: Douglas Koopman. Fax: 617-918-0747

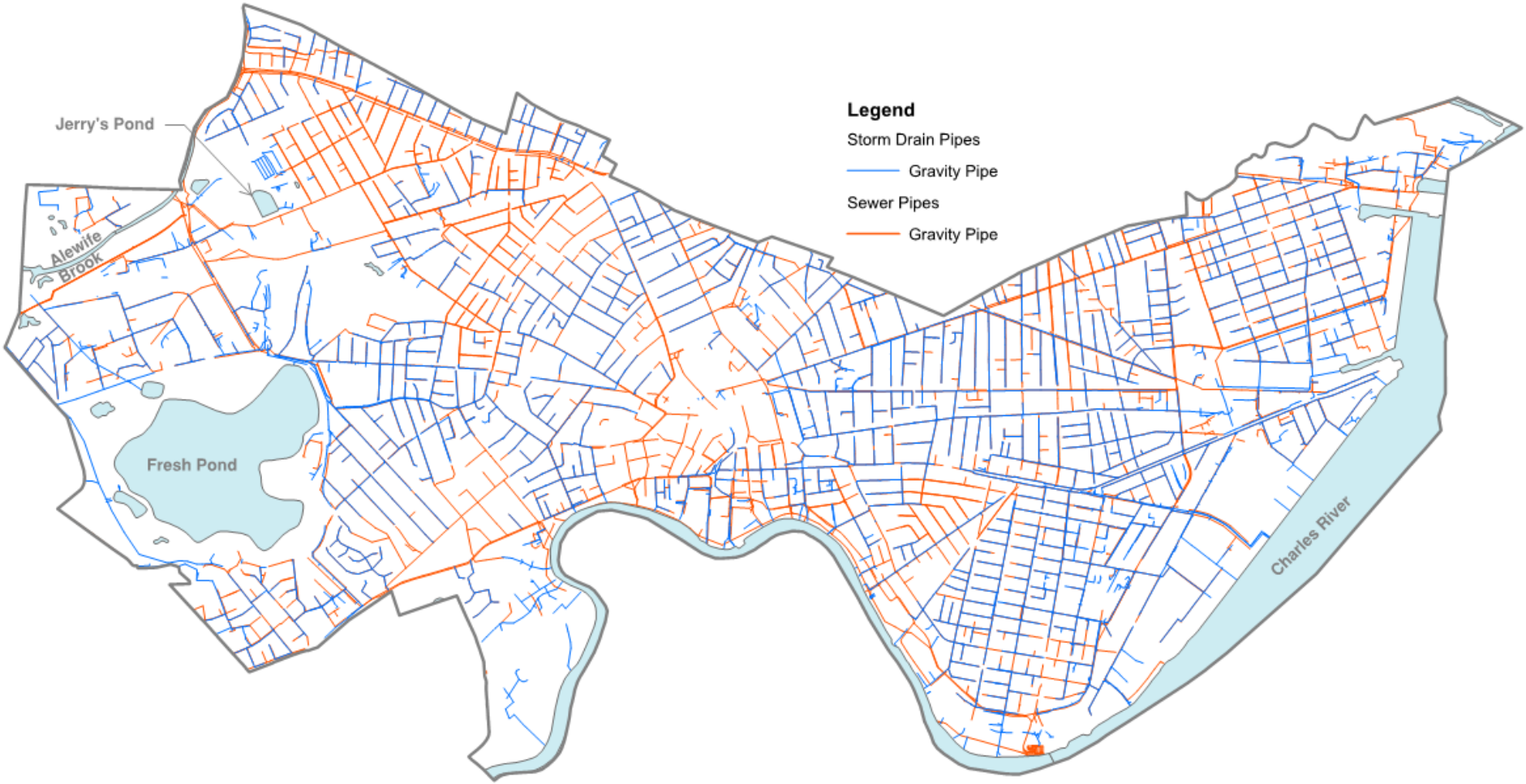


Figure 5-1: The City's sewer and stormwater pipes

Storm System Mapping (Phase 1 and Phase II)

The Permit's mapping requirements are divided into two phases. Phase 1 is due by the end of the 2016 Permit Year 2 (July 1, 2020) and Phase II is due by the end of the 2016 Permit Year 10 (July 1, 2028). The City's mapping of the MS4 and combined sewer system is substantially complete from ongoing efforts to update its GIS system. The City continuously revises its map of the municipal infrastructure system through information gathered from targeted and routine operation and maintenance activities and record drawings. The City will continue updating its system map based upon findings from the implementation of catchment investigations and as the City completes major public infrastructure projects impacting stormwater infrastructure. The storm system map is shown in **Appendix B of the IDDE Plan** and on the City's GIS viewer at the following location: **www.cambridgema.gov/GIS.**

IDDE Regulatory Mechanism

In 2008, the City adopted a revised **Wastewater and Stormwater System Ordinance (Chapter 13.16)** to further regulate, enforce and eliminate illicit discharges and connections to the MS4. This Ordinance, as well as the **Wastewater and Stormwater Drainage Use Regulations**, provide the legal authority for enforcing the City's IDDE Program, and are included in **Appendix D.**

Priority Ranking of Outfalls and Screenings

The City completed an initial outfall inventory and priority ranking for each outfall and interconnection discharging from the MS4. The priority provides an indication of the potential for an outfall to contain an illicit discharge based on components required by the Permit such as past discharge complaints, the receiving water quality, existing stormwater sample results, and other system characteristics. The City also created a framework for tracking inspections, screenings and other IDDE program activities. This information, along with the recommended considerations listed in the MS4 Permit, were used to priority rank outfalls in Permit Year 1.

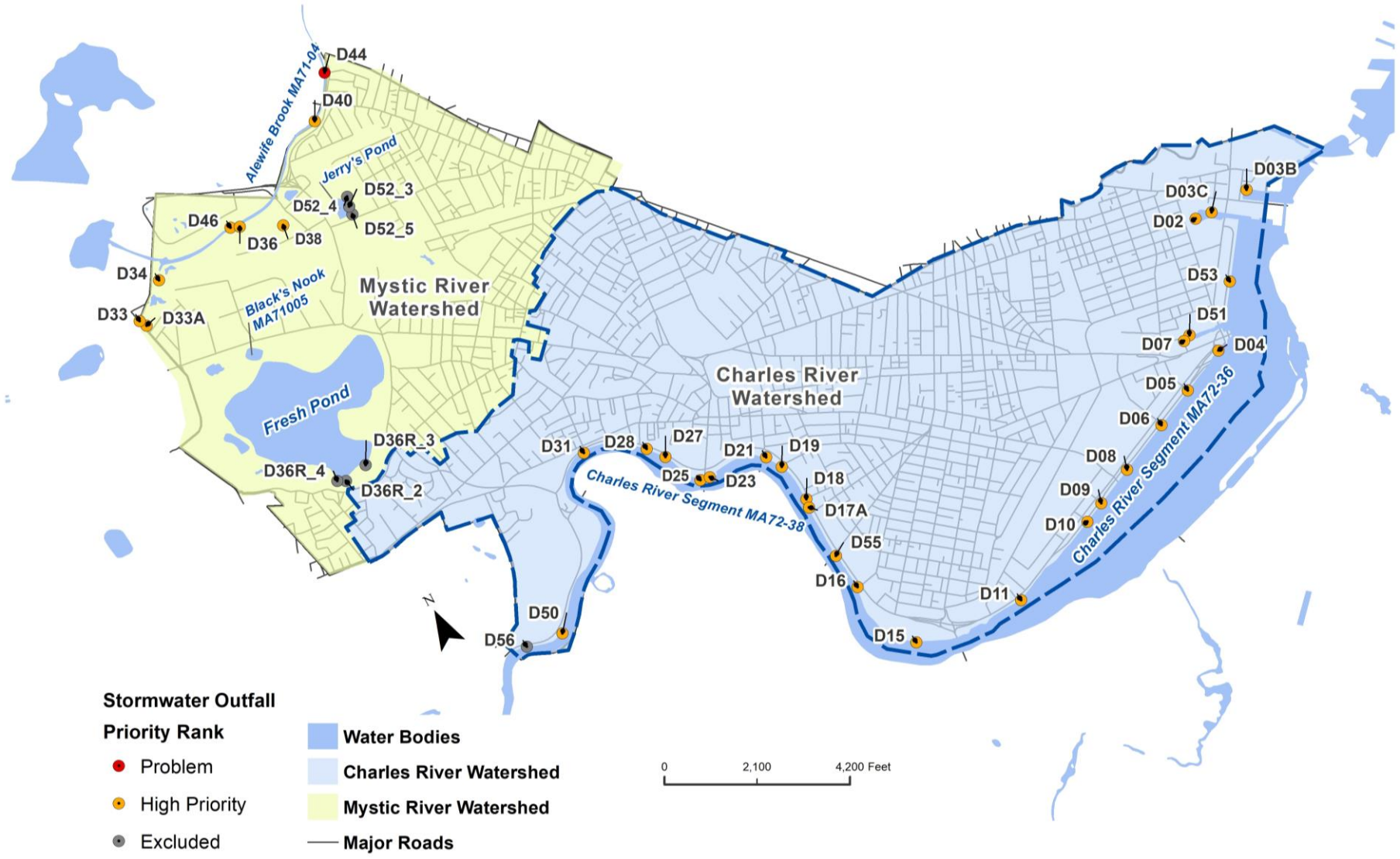


Figure 5-2 : Priority ranking of the City's MS4 outfalls

Dry Weather Outfall Screening / Sampling

The DPW conducted water quality sampling during dry weather conditions at multiple locations to satisfy requirements of the Massachusetts Department of Environmental Protection (DEP) Administrative Consent Order ACOP-96-1004 (Common Manhole Separation), DEP Notice of Non-Compliance NON-NE-00-1004 (Alewife 308 Letter), and EPA's MS4 Permit. The City conducted wet weather sampling to supplement its MS4 dry weather sampling efforts as part of the 2003 Permit.

Additional information and water quality sampling data is available on the City's website:

www.cambridgema.gov/stormwater

Sampling station at the Alewife Stormwater Wetland outlet

5.3.4 Updated Program

The 2016 Permit provides prescriptive requirements on the timeline for implementing the IDDE Program. The City completed multiple requirements through prior efforts, as described and documented in the sections above, and **Table 5-6** details these and other requirements that Cambridge will undertake to adhere to the 2016 Permit requirements.

Table 5-6: Implementation Program for MCM 3

BMP #	BMP	Description	Measurable Goal and Due Date	Status
3-1	IDDE Legal Authority	Create regulation to provide City with legal authority to detect and eliminate illicit discharges	Completed regulation (due in prior Permit term)	Completed
3-2	SSO Inventory	Complete and document a baseline inventory and maintain annually	Complete baseline by July 1, 2019	Completed, update annually
3-3	Storm System Map	Update and enhance existing system map during the IDDE program	Update map by July 1, 2020 and complete full system map by July 1, 2028	Phase 1: Complete Phase 2: On-going
3-4	Written IDDE Program	Update existing written IDDE program	Complete by July 1, 2019	Completed
3-5	Implement IDDE Program	Implement catchment investigations according to program and permit conditions	Complete by July 1, 2028	On-going
3-6	Employee training	Expand existing employees' training program on IDDE implementation	Train annually	On-going
3-7	Conduct dry weather screening	Conduct in accordance with outfall screening procedure and permit conditions	Complete by July 1, 2021	On-going
3-8	Conduct wet weather screening	Conduct in accordance with outfall screening procedure	Complete by July 1, 2028	On-going
3-9	Ongoing screening	Conduct dry and wet weather screening (as necessary)	Complete ongoing outfall screening upon completion of IDDE program. Goal based on number of screenings	Not started

5.3.5 Responsible Parties

The Cambridge Department of Public Works (DPW) is the lead municipal department responsible for implementing the IDDE program pursuant to the provisions of the Wastewater and Stormwater Drainage System Ordinance. The Engineering Division of the DPW will be responsible for day-to-day supervision of the IDDE program and reporting. Other agencies or departments with responsibility for aspects of the program include:

- Sewer Division (DPW) – Maintenance/repairs to the City's MS4
- Water Department – potential use of hydrants during dye testing
- DPW – Ordinance and Drainage Use Regulations, Enforcement
- Law Department – Ordinance, Enforcement
- DPW – GIS/Mapping
- Traffic, Parking, and Transportation Department – Permits/no parking manhole inspections.
- Cambridge Police Department – Police Details

5.3.6 Implementation Deadlines

Proper adherence to MCM 3 will include an adequate legal authority and enforcement strategy for illicit discharges, an up to date SSO inventory, a robust system wide map, a written IDDE plan, trained field staff, and an enhanced understanding of catchments, interconnections, and water quality in the City. Each aspect of the IDDE program will be reported in the annual report, and the IDDE plan will be updated to reflect reprioritizations, mapping, and other gathered data. As this section of the 2016 Permit is highly prescriptive, the measurable goals consist of completing the requirements by the specified dates shown in **Table 5-6.**

5.4 MCM 4: CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

5.4.1 Objective

Unmanaged sediment from construction site runoff can also clog waterways at a high rate, causing physical and biological harm to local habitat and exacerbating flooding. "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."

5.4.2 Permit Summary

The City is required to enforce a program that reduces pollutants in any stormwater runoff discharged to the MS4 from all construction activities that result in a land disturbance of greater than or equal to one (1) acre within the MS4 area. Construction activities that disturb less than one (1) acre but are part of a larger common plan are also included. This program must include a regulatory mechanism that requires the use of sediment and erosion control practices at construction sites, written procedures for site inspections and enforcement, and requirements for construction site operators that contribute stormwater discharges to the MS4 implement appropriate BMPs such as those described in the Massachusetts Stormwater Handbook.

5.4.3 Existing and Updated Program

Consistent with the requirements of the MS4 Permit, the City is implementing and enforcing a program to reduce pollutants in stormwater runoff discharged from construction activities. The City's **Land Disturbance Regulations**, adopted on March 31, 2008, regulates erosion and sedimentation in stormwater from construction sites that receive a Stormwater Control Permit from the DPW. These regulations include site inspection procedures and authorize the City DPW to conduct site inspections, as well as the authority to take enforcement actions.

The City's Land Disturbance Regulations are more stringent than the 2016 Permit's erosion and sediment control requirements, in that they apply to activities that disturb one or more acres of land; exceed fifty thousand square feet of Gross Floor Area; have a project parcels(s) equal to or greater than one acre in size; include outdoor parking for ten (10) cars or more; require a Special Permit from the Planning Board; or in the opinion of the City Engineer may result in an adverse impact of the municipal Sewer, Combined Sewer, Stormwater Drainage Systems or Water Resources. The written site plan review procedures include a pre-construction review of the site design, the planned operations at the construction site, planned BMPs during the construction phase, and the planned BMPs to be used to manage runoff created after development. Construction site operators performing land disturbance activities within the MS4 will be required to use BMPs appropriate for site conditions and likely potential sources of stormwater pollution. The selected BMPs will be evaluated for applicability during the site plan review, and opportunities for Low Impact Development (LID) and green infrastructure (GI) will also be investigated.

Operators are also required to control wastes such as discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes. Additionally, operators

The City's program includes a regulatory mechanism requiring the use of sediment and erosion control practices at construction sites, written procedures for site inspections and enforcement, and requirements for construction site operators that contribute stormwater discharges to the MS4 implement appropriate BMPs such as those described in the Massachusetts Stormwater Handbook.

Silt sack installed in a catch basin to manage stormwater pollution during construction

must post signage with information on how the public can notify the City of construction-related issues that impact stormwater management requirements.

Required actions related to this MCM are described in **Table 5-7.**

Table 5-7: Implementation Program for MCM 4

BMP #	BMP	Description	Measurable Goal	Status
4-1	Site Inspection and Enforcement of Erosion and Sediment Control (ESC) Measures	Review and enhance existing written procedures for site inspections and enforcement procedures	Complete by July 1, 2019	Completed
4-2	Site Plan Review	Review and enhance existing procedures for site plan review and begin implementation	Complete by July 1, 2019	Completed
4-3	Sediment and Erosion Control Ordinance	Review and enhance existing construction operations to implement a sediment and erosion control program	Completed by July 1, 2019	Completed
4-4	Waste Control	Enhance existing Land Disturbance Regulation to control wastes, including but not limited to, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes	Completed by July 1, 2019	Completed

5.4.4 Responsible Parties

The Department of Public Works is responsible for the enforcement of the Construction Site Stormwater Runoff Control Program. The Department of Public Works is responsible for coordinating the efforts of other departments when needed, ensuring that necessary interdepartmental communication occurs in a timely manner, and following up with other departments as needed regarding the status of their efforts.

5.5 MCM 5: POST CONTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

5.5.1 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."

5.5.2 Permit Summary

The City is required to develop, implement, and enforce a program to reduce pollutants in post-construction runoff to their MS4 from new development and redevelopment projects that result in land disturbance of greater than or equal to one acre. Many studies indicate that prior planning and design for the minimization of pollutants in post-construction stormwater discharges is the most cost-effective approach to stormwater quality management. This is best accomplished through good municipal planning thorough project review during the proposal and permitting stages.

5.5.3 Existing Program

Regulatory Mechanisms

Consistent with the requirements of the 2003 Permit, the City's existing post construction stormwater management program incorporated in the Land Disturbance Regulations already addresses many of the regulatory requirements for post construction stormwater management in new development and redevelopment projects.

Land Disturbance Regulations

DPW's Land Disturbance Regulations and the Wastewater and Stormwater Management Guidance document governs construction, development and redevelopment requirements. This regulation and guidance document will be

updated, as needed, to comply with the 2016 Permit per the schedule described in **Table 5-8.** Currently, the City's stormwater management standards include the following:

- Store on site the difference in volume between the 2-year 24-hour preconstruction runoff and the 25-year 24-hour post construction runoff
- Peak development discharge rate less than existing conditions
- Manage stormwater runoff to reduce 80% TSS and 65% TP from site.
- Manage sewer discharge to ensure no increase in CSOs or SSOs
- If feasible, build to the 2070 10-year storm with a recovery plan for the 2070 100-year storm

These standards are primarily intended to improve water quality and to mitigate potential flooding impacts to the project site (and abutters) and ensure that City infrastructure has the capacity to manage flows generated from developed or redeveloped properties. In response to ongoing climate change and resiliency planning efforts the City is considering modification to the onsite storage requirements to consider projected 2070 storm events.

As described in the City's existing Land Disturbance Regulation, the DPW reviews site plans for development projects that will:

- disturb one or more acres of land
- exceed fifty thousand square feet of gross floor area
- have project parcels(s) equal to or greater than one acre in size
- includes outdoor parking for ten cars or more
- requires a Special Permit from the Planning Board or
- in the opinion of the City Engineer the project may result in an adverse impact on the municipal sewer, combined sewer, stormwater drainage system or water resources

The submission of plans and details related to development activities [Stormwater Management Plan, Erosion and Sediment Control Plan, Operation and Maintenance Plan (for post construction BMP maintenance)], are required to receive a Stormwater Control Permit (SCP) (formerly called a Land Disturbance Permit). The SCP requires the submittal of as built record drawings of the improvements, a schedule for preventative maintenance measures and allows the City to access the site for periodic inspections.

5.5.4 Updated Program

The 2016 Permit provides prescriptive requirements on the timeline of implementing Post Construction requirements. The City adopted post construction requirements as described above. Additional actions that Cambridge will undertake to adhere to the 2016 Permit are described below and this aspect of the program is summarized in **Table 5-8**.

Street and Parking Lot Guideline Report

The City will develop a report assessing current street design, parking lot guidelines, and other applicable local requirements that impact the creation of impervious cover. This report will focus on highlighting current impediments to using low impact design options, and detailing improvements for promoting the use of such options. If options to improve regulations to allow for LID are available, the report will include recommendations for policies or standards and relevant documents and procedures to minimize impervious cover attributable to parking areas and street design.

Rain garden installed at Western Avenue and Pleasant Street

Low Impact Design & Green Infrastructure Report

In addition to local guidelines regarding the creation of impervious cover, the City will develop a report assessing existing local regulations to determine how to promote the implementation of green infrastructure. In particular, the City will assess the feasibility of allowing green roofs, infiltration practices, and water harvesting devices. During this investigation, the City may decide to include other types of green infrastructure as well.

Municipal Retrofit Opportunities

The City will also continue to identify permittee-owned properties to retrofit with BMPs designed to reduce frequency, volume, and pollutant loads of stormwater discharges to and from its MS4 area. This list of potential retrofit opportunities will be maintained and updated annually. Additionally, the City intends to retrofit or modify one permittee-owned property per year with BMPs to reduce impervious area. Information about these properties will be tracked and reported on annually.

Table 5-8: Implementation Program for MCM 5

BMP #	BMP	Description	Measurable Goal	Status
5-1	As-built plans for on-site stormwater control	The procedures to require submission of as-built drawings and ensure long term operation and maintenance will be a part of the SWMP	Require submission of as-built plans for completed projects. (required under prior Permit term)	Completed
5-2	Target properties to reduce impervious areas	Continue identifying permittee-owned properties that could be modified or retrofitted with BMPs to reduce impervious areas and update annually. Identify at least five (5) properties	Complete July 1, 2022 and report annually on retrofitted properties.	In progress
5-3	Allow green infrastructure	Develop a report assessing existing local regulations to determine the feasibility of making green infrastructure practices allowable when appropriate site conditions exist.	Complete by July 1, 2022 and implement recommendations of report.	Not started
5-4	Street Design and Parking Lot Guidelines Report	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.	Complete by July 1, 2022 and implement recommendations of report.	Not started

BMP #	BMP	Description	Measurable Goal	Status
5-5	Ensure 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	Amendment or modification of the regulatory mechanism (Land Disturbance Regulations) to meet permit requirements.	Complete by July 1, 2020	Not started
5-6	Implement BMPs on permittee-owned properties	Retrofit or modify one permittee-owned property per year with BMPs to reduce impervious areas	Annually	In progress

5.5.5 Responsible Parties

The Department of Public Works is responsible for the enforcement of the post construction stormwater management program. The Department of Public Works will coordinate efforts of other departments when needed, ensuring that necessary interdepartmental communication occurs in a timely manner, and following up with other departments as needed regarding the status of their efforts.

5.6 MCM 6: POLLUTION PREVENTION / GOOD HOUSEKEEPING

5.6.1 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."

5.6.2 Permit Summary

The City is required to develop an operation and maintenance program for all municipal facilities where pollutants are or could be exposed to stormwater runoff, and to optimize inspections, cleaning and maintenance of its infrastructure including catch basins and other stormwater BMPs.

5.6.3 Existing and Updated Program

Operations and Maintenance Programs

The requirements of MCM 6 are aimed at reducing pollutant runoff from all permittee-owned operations. Within two years of the Permit effective date, the City must have an inventory of City owned parks and open spaces, buildings and facilities where pollutants are exposed to stormwater runoff, as well as vehicle and equipment usage and staging areas.

The City maintains an inventory of all its owned and operated facilities as spreadsheet that includes the following information: site name, facility type, address, contact person name and phone number, and previous inspections dates. Currently the list includes a total of 156 facilities, of which 72 facilities are in the separated storm sewer area and subject to the 2016 Permit requirements. The City is updating the list with additional stormwater related information, including the number of catch basins, floor drains, and oil-water separators available at each facility. This list will be expanded to include vehicles, equipment, and parks and open space, to adhere to 2016 Permit requirements.

The 2016 Permit requires that within two years of its effective date (July 1, 2020), the City must develop written operations and maintenance procedures for municipal operations at inventoried properties. Beyond operations and maintenance of the facilities, the City is also responsible for keeping all MS4 infrastructure in good working order with timely maintenance. The 2016 Permit requires that the following items are included:

- the optimization of routine catch basin inspections
- the procedures for street sweeping and cleaning of City-owned parking lots
- details for proper storage of street sweepings and catch basin materials
- winter road maintenance policies and procedures
- maintenance and inspection frequency of stormwater treatment structures

In 2006, the City prepared a Draft Good Housekeeping Manual with written procedures relevant to each type of property. This document includes a collection of factsheets for the maintenance and operation of 21 Good Housekeeping BMPs and provides municipal employee with a single reference document for standard operating procedures to properly inspect infrastructure and to minimize stormwater pollution from municipal operations.

There is substantial overlap between the contents of the existing manual and the maintenance procedures required under the 2016 Permit. While the Draft Manual is comprehensive, to fully comply with the 2016 Permit, the City is updating this document to include procedures for waterfowl congregation areas, management of trash containers, optimization of routine inspections and cleaning of catch basins to ensure that they are not more than 50 percent full, and stormwater treatment structure inspection protocols and frequencies. An updated manual will be prepared prior to the end of Permit Year 2.

The City maintains its stormwater infrastructure through drain cleaning (left) and street sweeping (right)

Stormwater Pollution Prevention Plan

The 2016 Permit requires the development and implementation of Stormwater Pollution Prevention Plans (SWPPPs) for permittee-owned and operated facilities including maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater. No SWPPP is required for facilities covered under the Multi-Sector General Permit (MSGP) or if the discharge is authorized under another NPDES permit. SWPPPs describe potential pollutant sources, site activities, and stormwater controls.

The City identified seven (7) permittee owned or operated facilities that require SWPPPs. These include:

1. **Alewife Staging Area,**
2. **Cambridge Rindge and Latin School Garage –**
   'The Gustave M. Solomons Transportation Career Center',
3. **Police Maintenance Garage,**
4. **Fire Maintenance Garage,**
5. **Water Department Garage,**
6. **Cemetery Garage, and**
7. **Fresh Pond Golf Course Garage.**

Each of the above facilities require an individual SWPPP, quarterly inspections, and employee training. An overview of the requirements and BMPs for this MCM is included in **Table 5-9.**

Table 5-9: Implementation Program for MCM 6

BMP #	BMP	BMP Description	Measurable Goal	Status
6-1	Stormwater Pollution Prevention Plan (SWPPP)	Create SWPPPs for maintenance garages, transfer stations, and other waste-handling facilities..	Complete and implement SWPPPs for seven facilities by July 1, 2020 and implement requirements for quarterly inspections and annual employee training	In-progress
6-2	Stormwater Treatment Structures Inspection and Maintenance Procedures	Update and enhance existing inspection and maintenance procedures and frequencies.	Update procedures by July 1, 2019 and inspect and maintain treatment structures annually. Report number of structures maintained	Completed
6-3	O&M Procedures	Update existing written O&M procedures including all requirements contained in 2.3.7.a.ii for parks and open spaces, buildings and facilities, and vehicles and equipment. Update Good Housekeeping Manual.	Complete by July 1, 2020 and implement	In-progress
6-4	Inventory all permittee-owned parks and open spaces, buildings and facilities, and vehicles and equipment	Update existing inventory.	Complete by July 1, 2020 and implement annually	In-progress
6-5	Infrastructure O&M	Update and enhance existing program for repair and rehabilitation of MS4 infrastructure.	Complete by July 1, 2020	In-progress
6-6	Catch Basin Cleaning Program	Update schedule for catch basin cleaning such that each catch basin is no more than 50% full and clean catch basins on that schedule.	Clean catch basins on established schedule and report number of catch basins cleaned and weight of material removed annually	On-going

BMP #	BMP	BMP Description	Measurable Goal	Status
6-7	Street Sweeping Program	Continue the street sweeping program and update in accordance with permit conditions.	Sweep all streets at least twice per year (spring and fall) and report tonnage of material collected. Sweep permittee-owned parking lots once per year (spring) and report number of parking lots swept.	On-going
6-8	Road Salt Use Optimization Program	Continue the existing program and update as necessary to minimize the use of road salt.	Document procedures by July 1, 2019 and Implement salt use optimization during deicing season	Completed

5.7 ADDITIONAL REQUIREMENTS FOR DISCHARGES TO SURFACE DRINKING WATER SUPPLIES AND THEIR TRIBUTARIES

The City has three (3) outfalls that discharge to Fresh Pond in the northwestern portion of Cambridge. Fresh Pond Reservoir is a crucial part of the drinking water supply system for the City of Cambridge and is regulated under Massachusetts Class A Surface Water Standards and is part of the Massachusetts Source Water Assessment Program (SWAP). Since the contributing area to these outfalls is considered drainage for athletic fields, parks or undeveloped green space and associated parking without services, these three outfalls are excluded from this Stormwater Management Plan and the 2016 Permit.

6 TMDLS AND WATER QUALITY LIMITED WATERS

6.1 ACTIONS FOR MEETING TOTAL MAXIMUM DAILY LOAD REQUIREMENTS

Due to past and current conditions, specific water bodies have been identified as impaired by MassDEP and by EPA with regards to certain pollutants. The 2016 Permit includes additional requirements for such water bodies with impairments and Total Maximum Daily Loads (TMDLs). The City of Cambridge must abide by two (2) TMDLs approved by the EPA. The portion of the Charles River within Cambridge is designated as the Lower Charles River and is subject to a TMDL for phosphorus. Additionally, as a contributor to the watershed, the City is subject to the Bacteria/Pathogen TMDL for the Charles River Watershed. The applicable TMDLs are summarized in **Table 6-1.**

Table 6-1: Applicable TMDLs in the City of Cambridge

Applicable TMDL	Waterbody Segment	Impairment
Pathogen TMDL for the Charles River Watershed	MA72-36,38	Bacteria/Pathogens
Total Maximum Daily Load for Nutrients in the Lower Charles River Basin, Massachusetts	MA72-36,38	Phosphorus

6.1.1 Part A.I of Appendix F – Lower Charles River (Phosphorus)

The EPA approved the Total Maximum Daily Load (TMDL) for Nutrients in the Lower Charles River on October 17, 2007, and a portion of the City of Cambridge is within this watershed. As a result, the City must adhere to Part A.1 of Appendix F of the 2016 Permit for the outfalls discharging to the Charles River (segments MA 72-36 and MA72-38).

The City will develop a Phosphorus Control Plan (PCP) designed to reduce the amount of phosphorus in stormwater discharges. The PCP will be completed in three phases based upon existing data and considering resources from the U.S. EPA Region 1[1], and

[1] https://www3.epa.gov/region1/npdes/stormwater/presentations/20110603FranklinPCP.pdf

relevant training materials prepared by other organizations[2]. The City will add the PCP as an attachment to this SWMP upon completion.

- Phase I of the plan will be developed in Permit years one through five and implemented in years five through ten. Phase I includes the creation of a regulatory mechanism to enforce the PCP, a funding source assessment, an analysis of the scope of the baseline phosphorus loading, a description of planned Phase I non-structural and structural controls, planned operation and maintenance practices, an implementation schedule, estimated Phase I costs, a written plan, and a plan for performance evaluation.

- Phase 2 will be developed in years five through ten and completed in years ten through fifteen. Phase 2 will extend the content developed through Phase I and includes an update to the regulatory mechanism if required, planned Phase 2 structural and non-structural controls, an update to operation and maintenance protocols, an implementation schedule, estimated Phase 2 costs, a written plan, and a plan for performance evaluation.

- Phase 3 will be developed in years ten through fifteen and be implemented in years fifteen through twenty. While finalizing the PCP Phase 3 will contain the same elements as Phase 2 with updates to the regulatory mechanism, if necessary; planned Phase 3 structural and non-structural controls; an update to operations and maintenance protocols; an implementation schedule; Phase 3 costs; a written plan; and a plan for performance evaluation.

[2] https://www.crwa.org/hubfs/MS4_CharlesTMDL_PhosphorusControlPlans.pdf

The City will submit a progress report on the PCP with each annual report. In year five, and every year after, Cambridge will report on all implemented structural and non-structural controls and the corresponding phosphorus reduction, any phosphorus load increases due to development, and an estimated yearly phosphorus export rate. The City will include certification that all structural BMPs were inspected and maintained and that all municipally owned turf grass areas are managed in accordance with Massachusetts Regulation 331 CMR 31.

In 2018, a study of BMPs and the development of a BMP Accounting and Tracking Tool (BATT) was undertaken for Cambridge to track its phosphorus loading to the Charles River. The study included calculation comparisons between BATT and regulations, sensitivity analysis of inputs, model validation, and application of the model to BMP design. The goal of the project was to help Cambridge effectively use BATT to analyze site design improvements that will reduce phosphorus loading in the Charles River. BATT emulates the MS4 Permit Appendix F methodology for calculating phosphorus removals. The project also included draft design retrofits for three municipal sites and a developer template that included inputs for BATT, BMP decision flowchart, and list of distinguishing characteristics for BATT BMPs. Initial results indicate that BATT could be useful for Cambridge in their development of their phosphorus control plan. The PCP will be developed and implemented according to the schedule in **Table 6-2.**

Table 6-2: Phosphorous Control Plan Timeline

1-5 years after Permit effective date (July 1, 2023)	5-10 years after Permit effective date (July 1, 2018)	10-15 years after Permit effective date (July 1, 2023)	15-20 years after Permit effective date (July 1, 2028)
Create Phase 1 Plan	Implement Phase 1 Plan		
	Create Phase 2 Plan	Implement Phase 2 Plan	
		Create Phase 3 Plan	Implement Phase 3 Plan

6.1.2 Part A.III of Appendix F – Charles River Watershed (Bacteria/Pathogen)

The EPA approved the Final Pathogen TMDL for the Charles River Watershed in January 2007. As a contributing community to the Charles River Watershed, Cambridge must comply with Part A. III of Appendix F of the Permit.

To comply with the permit, the City must include enhanced BMPs as part of their public education program. Cambridge must distribute annual messaging informing the public about the proper management of pet waste and the detrimental impacts of improper management. In addition, the City must provide information to owners of septic systems regarding proper maintenance. The City addressed this requirement in Section 5.1 as part of MCM 1 and it is reiterated below in Section 6.2.1. Additionally, during the development and implementation of the IDDE Plan, catchments draining to the Charles River were designated as High Priority Catchments. The IDDE Plan is included in Appendix C.

6.2 ACTIONS FOR MEETING WATER QUALITY LIMITED WATERS REQUIREMENTS

6.2.1 Part II Appendix H Requirements

Alewife Brook (MA 71-04) is classified as impaired for phosphorus, and therefore the City is required to adhere to Part II of Appendix H of the Permit. The City will include annual messages for proper disposal of grass clippings in March or April, annual messages for the proper management of pet waste in June or July, and an annual message for proper disposal of leaf litter in August, September, or October. These messages were included as part of MCM 1, Section 5.1.

6.2.2 Part III Appendix H Requirements

Due to the bacteria impairments (E. coli) in Alewife Brook (MA 71-04), the City is required to adhere to Part III of Appendix H. Beginning in Year 1, as part of the IDDE program, outfalls discharging to Alewife Brook will be designated as high priority in the initial outfall ranking. As described in Section 5.1, the City is required to include annual messaging encouraging the proper management of pet waste. In addition to distributing the messaging to pet owners, the City will continue to post signage at dog parks where pet waste is collected. The City of Cambridge has identified properties with septic systems and will provide information regarding proper maintenance to those residences.

6.2.3 Part V Appendix H Requirements

The City of Cambridge has three waterbody segments with impairments that require adherence to Part V of Appendix H of the Permit. The Charles River (MA 72-36 and 72-38) and the Alewife Brook (MA 71-04), are impaired for oil and grease and total suspended solids (TSS), and copper, lead, and TSS, respectively. Due to these impairments, the City will have additional requirements for new and redevelopment projects draining to the Alewife Brook and both sections of the Charles River. Industrial and commercial projects in this area will need to utilize designs that allow for shutdown and containment where appropriate to isolate the system in the event of an emergency or spill or another unexpected event. Although not required, EPA recommends that the City require any stormwater management system designed to infiltrate stormwater on commercial and industrial sites provide the level of pollutant removal equal to or greater than the level of pollutant removal provided using biofiltration of the same volume of runoff to be infiltrated prior to infiltration. The City does not currently require infiltration to this level but will consider including it as part of MCM 5, Section 5.5.

7 ANNUAL EVALUATION

Each annual report will include the City's activities and progress with regards to this SWMP from the previous year. The EPA plans to distribute an annual report template for each year of the Permit. The City plans to utilize the template to provide updates with regards to applicable MCMs and BMPs completed within the prior year.

7.1 YEAR ONE ANNUAL REPORT

Report Due Date: September 29, 2019
Document Name and/or Web Address:

7.2 YEAR TWO ANNUAL REPORT

Report Due Date: September 29, 2020
Document Name and/or Web Address:

7.3 YEAR THREE ANNUAL REPORT

Report Due Date: September 29, 2021
Document Name and/or Web Address:

7.4 YEAR FOUR ANNUAL REPORT

Report Due Date: September 29, 2022
Document Name and/or Web Address:

7.5 YEAR FIVE ANNUAL REPORT

Report Due Date: September 29, 2023
Document Name and/or Web Address:

8 REFERENCES

- *General Permits for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts*. United States Environmental Protection Agency, issued April 4, 2016.
- *General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts*. United States Environmental Protection Agency, issued May 1, 2003.
- *Massachusetts Year 2014 Integrated List of Waters, Final Listing of the Condition of Massachusetts' Waters Pursuant to Sections 305(b), 314 and 303(d) of the Clean Water Act.* Massachusetts Department of Environmental Protection, December 2015.
- *Stormwater Management Plan Template v1.1*. United States Environmental Protection Agency, Fall, 2018.

APPENDIX A

Delegation of Authority Letter

City of Cambridge
Department of Public Works
Owen O'Riordan, Commissioner

147 Hampshire Street
Cambridge, MA 02139
theworks@cambridgema.gov

Voice: 617 349 4800
TDD: 617 499 9924

MEMO TO FILE

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

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

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

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

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

Louis A. DePasquale
City Manager

6/26/19
[Date]

APPENDIX B

Authorization to Discharge

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

VIA EMAIL

April 5, 2019

Louis A. DePasquale
City Manager

And;

Catherine Daly Woodbury
Project Manager, Department of Public Works
147 Hampshire Street
Cambridge, MA. 02139
cwoodbury@cambridgema.gov

Re: National Pollutant Discharge Elimination System Permit ID #: MAR041076, City of Cambridge

Dear Catherine Daly Woodbury:

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

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

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

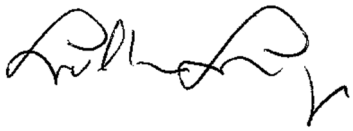
Information about the permit and available resources can be found on our website: https://www.epa.gov/npdes-permits/massachusetts-small-ms4-general-permit. Should you have

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

Sincerely,

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

and;



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

APPENDIX C
Endangered Species Review

City of Cambridge, MA M4 Permit Notice of Intent Eligibility Screenings Documentation

As a part of compliance with the Massachusetts MS4 General Permit, permittees are required to perform screenings to assess discharge impacts on both federally listed endangered species and historic properties. This memorandum is meant to formally document the steps taken by the City of Cambridge in certifying which eligibility criteria can be applied for both the Endangered Species Act (ESA) and National Historic Preservation Act (NHPA) Determinations.

Following MS4 Permit Appendices C and D, respectively, for the ESA and NHPA Determinations, respectively, the City of Cambridge can certify the following:

1. Cambridge certifies under Criterion C for the Endangered Species Act screening;
2. Cambridge certifies under Criterion C for the National Historical Preservation Act screening.

Since previous MS4 Permit became effective in 2003, the City of Cambridge has created or accepted three new stormwater outfalls: Western Avenue, the Alewife Stormwater Wetland, and Binney Street. These outfalls were created as part of larger projects, and therefore each underwent extensive permitting processes involving review under the Massachusetts Endangered Species Act and the MassHistoric Project Notification process with the State Historic Preservation Officer (SHPO). Based on compliance with these permitting processes, it is our determination that these activities did not adversely impact either any federally listed endangered species or any national historic properties, as certified below. The Alewife Stormwater Wetland was covered under the Construction General Permit, while the other two outfalls underwent permit review at the state and local level. Any new structural BMP activity moving forward under the new MS4 General Permit term will follow the same permitting process and be assessed accordingly to comply with the criterion identified. Additional detail is provided below.

ENDANGERED SPECIES ACT DETERMINATION

The ESA determination requires permittees to use the resources provided in the Information, Planning, and Conservation (IPaC) online mapping tool to assess endangered and threatened species within the permit area. Cambridge mapped the city extents to determine which federally listed endangered species are listed in the area. The results from the U.S. Fish and Wildlife IPaC system indicated that Cambridge's MS4 area contains habitat for the Northern Long-eared Bat. See below for IPaC results and a Massachusetts NHESP Habitats map from the MassGIS Oliver map viewer. Using the ESA Eligibility criteria as referenced in Appendix C of the MA Small MS4 General Permit, Cambridge falls under criterion C, as follows:

- Although federally listed endangered species (Northern long eared bat) are present in the permit coverage area, stormwater structures installed since 2003 were created as a part of larger projects, which underwent extensive permitting processes involving review under the Massachusetts Endangered Species Act (MESA). Based on compliance with MESA, these projects had no effect on the listed species.
- Cambridge certifies that during the course of the new Permit term, if new structural BMPs are planned, endangered species review will be conducted to ensure no effect on federally listed species. If any new activity is deemed "may affect" or is "not likely to affect" federally listed species or critical habitat the City of Cambridge will contact the USFWS.

Documentation of ESA eligibility will consist of the following, in accordance with Permit Appendix C:

- A dated copy of EPA concurrence with the above will consist of the issuance of the Permit. This will be included as documentation in the City's written Stormwater Management Program Plan.

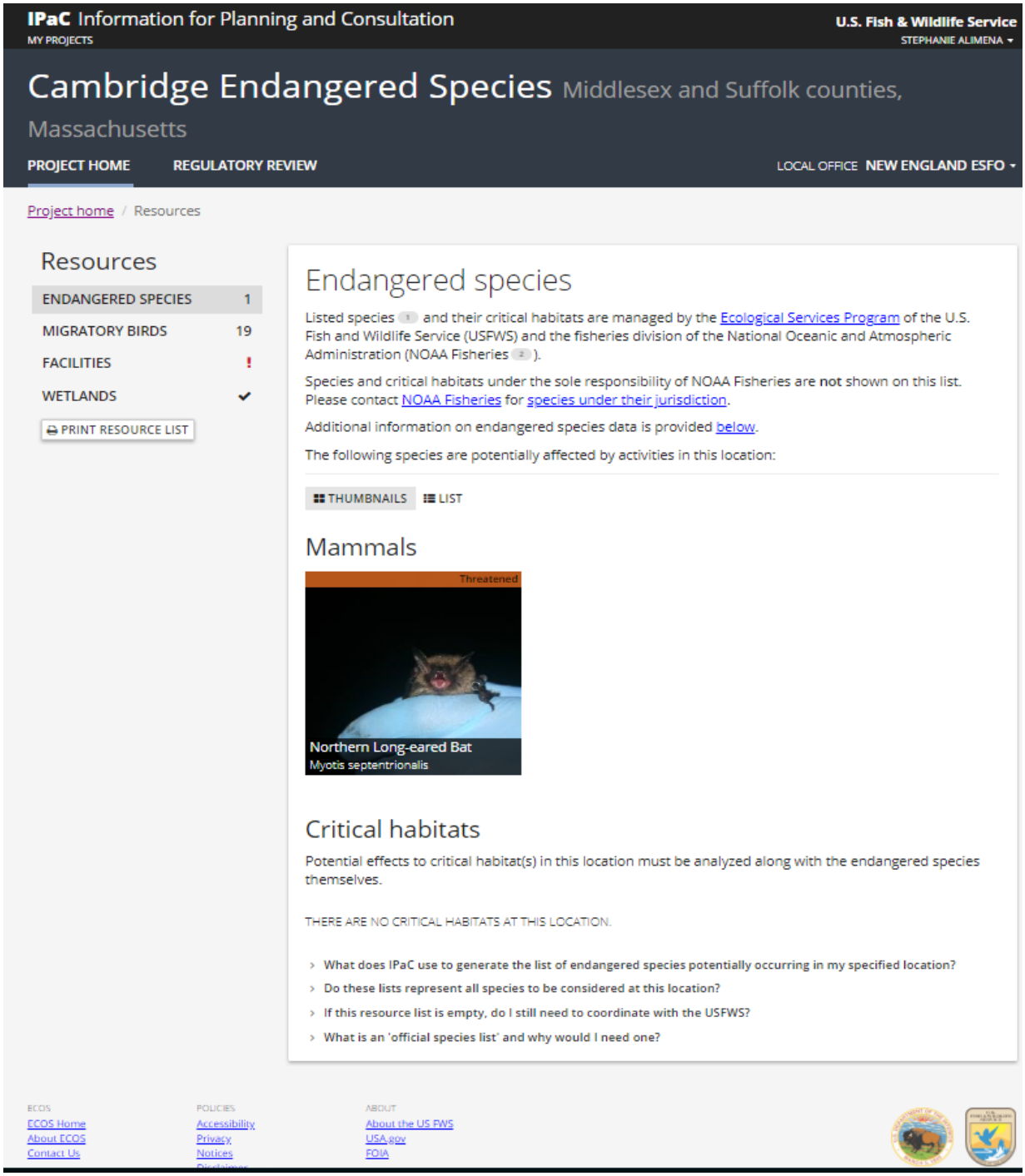


Figure 1. IPaC Screening - Northern Long-eared Bat in Cambridge

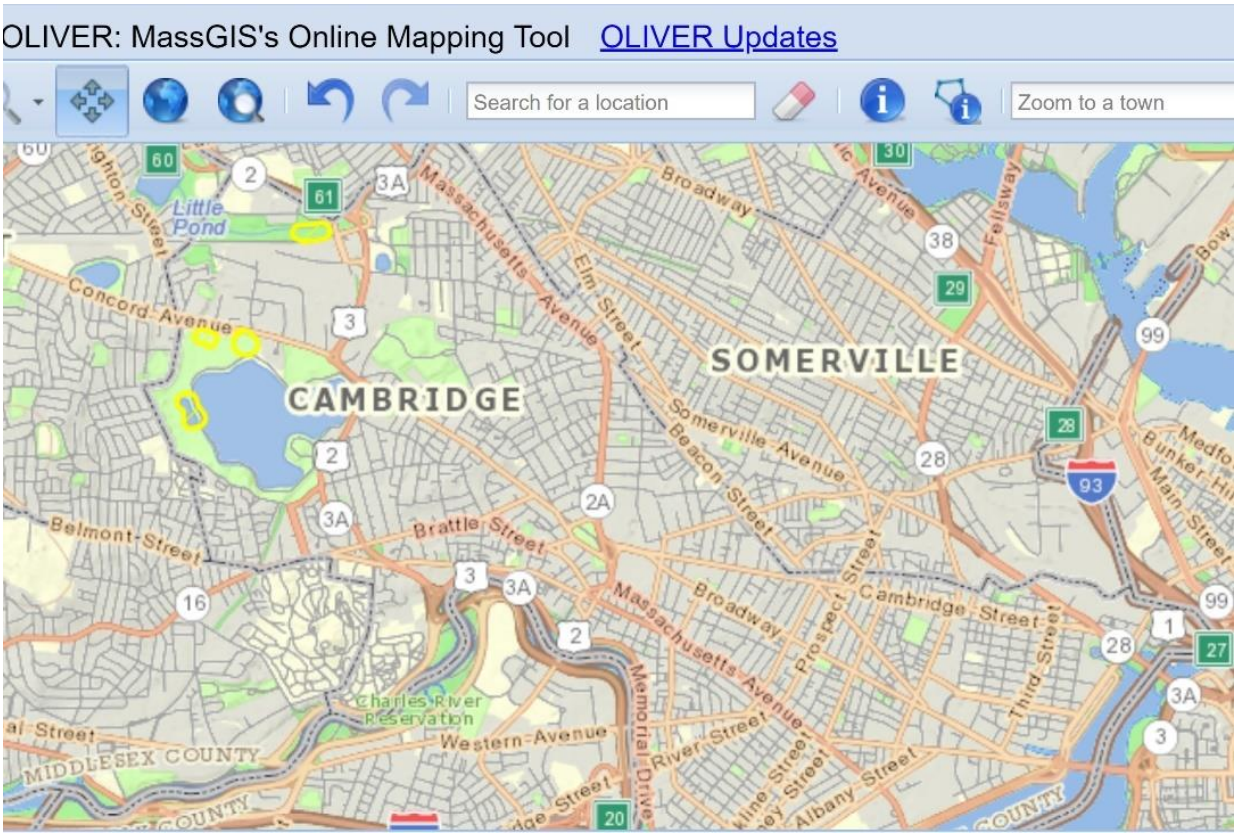


Figure 2. National Heritage & Endangered Species Program (NHESP) priority habitats for rare species (yellow) for Cambridge (Source: MassGIS)

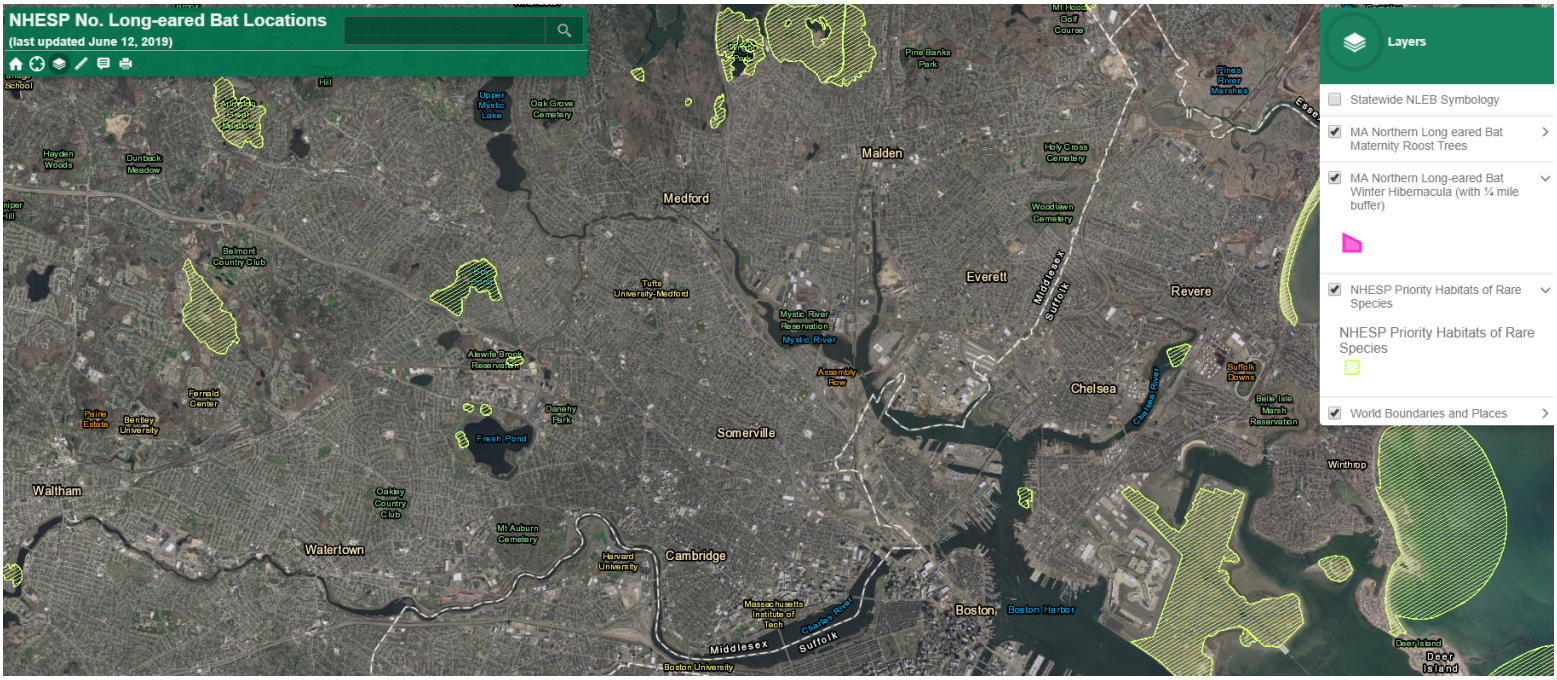


Figure 3: Map indicating that there are no identified habitat areas for the MA Northern Long-eared Bat within a 1/4 mile distance of the City of Cambridge's MS4 regulated area (Updated June 12, 2019)

APPENDIX D
Historic Properties Review

NATIONAL HISTORIC PRESERVATION ACT DETERMINATION

The City of Cambridge also completed an eligibility screening through the National Registry of Historical Places. The map below shows the spatial location of historic properties (shown in brown), which was last updated in 2014. Since the most recent addition to the National Registry for Cambridge was in 2005, this data is current.

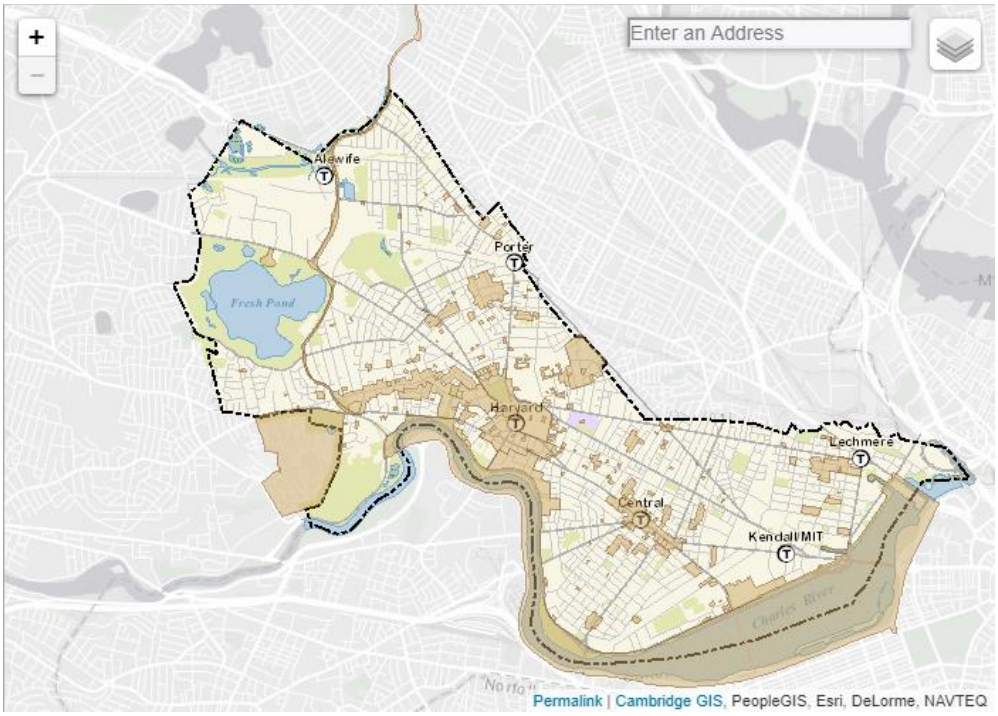


Figure 3. Historical Places in Cambridge (Source: Cambridge Historical Commission National Register Map)

Much of the land abutting the Charles River is listed in the National Registry, and the City of Cambridge is planning to create new outfalls in these areas in the coming years. While Cambridge was previously covered under the 2003 permit, the City's plans for creating new outfalls in this area qualifies it for Criterion C, using the eligibility criteria in Appendix D as follows:

- Stormwater outfalls created since 2003 have undergone the MassHistoric Project Notification process with the SHPO. Based on this process, these projects had no related activities with adverse discharge effects on historic properties.
- Cambridge certifies that during the course of the new Permit term, if new structural BMPs with potential discharge related activities are planned, the City will provide Project Notification to the SHPO and comply with any measures required to prevent or mitigate any adverse discharge effects on historic properties.

Documentation of NHPA eligibility will consist of the following, in accordance with Permit Appendix D:

- A dated copy of EPA concurrence with the above will consist of the issuance of the Permit. This will be included as documentation in the City's written Stormwater Management Program Plan.

APPENDIX E

Illicit Discharge Detection and Elimination (IDDE) Program

The IDDE Manual is posted on the City's website:
https://www.cambridgema.gov/theworks/ourservices/stormwatermanagement/stormwatermanagementplan

APPENDIX F
Good Housekeeping Manual

City of Cambridge

Department of Public Works

Municipal
Good Housekeeping Manual

Draft
Updated:
June 2019

City of Cambridge, MA
Department of Public Works
Implementation of Stormwater Management Plan
Inspector's Good Housekeeping Manual

Table of Contents

LIST OF APPENDICES

SECTION 1.0 INTRODUCTION

As part of the National Pollutant Discharge Elimination System (NPDES) Phase II Permit, the City of Cambridge (City) has adopted pollution prevention and good housekeeping controls intended to ensure that City operations and activities conducted at City-owned facilities do not contribute to stormwater pollution. In most urbanized areas such as Cambridge, stormwater is conveyed through a system of catch basins and pipes commonly referred to as a stormwater drainage system. Stormwater pollution can be conveyed through the stormwater drainage system and affects the quality of the City's surface waters including Little River/Alewife Brook, Blair Pond, Charles River, Wellington Brook, and Fresh Pond.

These good housekeeping controls, referred to as best management practices (BMPs), are standard operating procedures for City personnel and for use at all City-owned facilities. These BMPs are intended to serve as guidance for properly conducting City-wide operations such as street sweeping, cleaning out catch basins, and general maintenance of the stormwater drainage system, and City-owned facilities including vehicle maintenance, vehicle washing, lawn care, and materials management.

SECTION 1.1 MANUAL PURPOSE AND SCOPE

The purpose of the Good Housekeeping Manual (Manual) is to provide standard operating procedures for typical municipal operations and facility activities to reduce and eliminate contamination that may enter the City's stormwater drainage system and combined sewer. These standard operating procedures are referred to as best management practices (BMPs) in this manual.

The BMPs in this Manual were selected based on a review and inventory of City operations and activities at numerous City-owned or operated facilities. The BMPs are intended to provide straightforward and up-to-date procedures for personnel to follow in conducting their day-to-day activities. The Manual should be reviewed annually and periodically revised whenever City operations and/or activities at City-owned facilities change, or in response to regulatory changes or permit conditions.

SECTION 1.1.1 USERS OF MANUAL

The Good Housekeeping Manual is a guidance document prepared by the Department of Public Works (DPW) in cooperation with other municipal departments, for all City staff. Specific users and department with activities at facilities, which interact with stormwater, include the following departments and divisions:

- DPW Department Division Staff
  - Administration
  - Engineering
  - Public Buildings
  - Vehicle Maintenance
  - Cambridge Cemetery
  - Parks and Urban Forestry
  - Recycling
  - Street Maintenance
  - Sewer Maintenance
  - Sanitation
  - Street Cleaning

- Traffic, Parking, and Transportation
- School Department
- Fire Department
- Water Department
- Police Department
- Libraries
- Human Services Program

SECTION 1.1.2 ORGANIZATION OF MANUAL

The Good Housekeeping Manual is organized into the following sections:

- **Section 1.0:** Provides an overview of the Manual's purpose, content, and the Environmental Protection Agency's (EPA's) regulatory requirements. In addition, requirements for lessees and City contractors are stipulated.

- **Section 2.0:** Provides a listing of documented City policies and procedures related to good housekeeping controls and practices that serve as additional references for facility personnel to use.

- **Section 3.0:** Provides BMP fact sheets for operations and activities conducted at City-owned facilities. These BMP fact sheets are intended to be used as guidance that include suggested best management practices, inspection procedures, and maintenance procedures. Each BMP fact sheets includes a list of targeted facilities and pollutant constituents. These fact sheets are simple (two to three pages), intended to be copied and distributed as necessary to facility personnel.

- **Section 4.0:** Provides an overview of the Good Housekeeping Inspection Form, Schedules for conducting activities and inspections, and inspection protocols.

- **Appendix A:** Includes facility site drainage locus maps for select buildings inspected as part of the good housekeeping inspections. The maps identify the location of storm drainage and sewer system components including the location of catch basins that facility personnel should be consonant of during their daily activities to ensure proper measures are taken to eliminate discharges to them.

- **Appendix B:** Includes a Good Housekeeping Inspection Form that should be used at each facility on an annual basis. It serves as a checklist for facility managers to ensure that BMPs are being properly implemented and that if any new activities are being conducted, additional BMPs are implemented.

SECTION 1.1.3 MANUAL UPDATES

The Good Housekeeping Manual should be reviewed and updated on an annual basis after the Good Housekeeping Inspection Form (Appendix A) is completed for the various City facilities. If during any Citywide facility inspections, additional activities are identified, additional BMPs should be placed in this Manual. In addition, BMPs should be revised based on updated procedures and protocols adopted by the City, or in response to regulatory changes or permit conditions.

SECTION 1.2 STORMWATER POLLUTANTS, OUTFALL MAPS AND IMPACTS ON WATER QUALITY

Pollutant impacts to the receiving surface waters of Cambridge can be attributable to an extent by contaminated runoff that enters the City's stormwater drainage system and discharges through outfalls. DPW and other City department activities as previously identified can have an impact.

SECTION 1.2.1 CITY WATERSHEDS AND POLLUTANTS OF CONCERN

Receiving surface waters and pollutants of concern for Cambridge include the following:

RECEIVING WATER	WATERSHED	NO. OF OUTFALLS	IMPAIRED?	IMPAIRMENT
Alewife Brook (includes Little River)	Boston Harbor: Mystic River	3	YES	• Metals • Nutrients • Organic Enrichment/Low Dissolved Oxygen • Pathogens • Oil and Grease • Taste • Odor and Color • Objectionable deposits
Charles River	Charles River	27	YES	• Unknown Toxicity • Priority Organics • Metals • Nutrients • Organic Enrichment/Low Dissolved Oxygen • Pathogens • Oil and Grease • Taste • Odor and Color • Noxious Plants • Turbidity
Wellington Brook	Boston Harbor: Mystic River	2	NO	
Fresh Pond	Boston Harbor: Mystic River	2	NO	
Blacks Nook	Fresh Pond		YES	• Nutrients • Noxious Plants
Unnamed Tributary ("Millers River")	Charles River		YES	• Organics • Metals • Oil and Grease • Taste, odor, color

The MS4 outfalls that are covered by the NPDES permit are provided on the storm drainage system maps on file at the DPW. These maps also provide details on the layout of the storm drainage system including catch basins, manholes, and drainage flow paths. The outfall maps provide important information to guide actions described in this Manual.

SECTION 1.2.2 POLLUTANT IMPACTS ON WATER QUALITY

Typical pollutants, including environmental affects and sources, found in stormwater runoff include the following:

Sediment

- Sediment is often viewed as the largest pollutant load associated with stormwater runoff in an urban setting. The loadings have been shown to be exceptionally high in the case of construction activity.
- Sediment is associated with numerous impacts in surface waters including increased turbidity, effects on aquatic and benthic habitat and reduction in capacity of impoundments.
- A number of other pollutants often attach to, and are carried by, sediment particles.

Nutrients

- The nutrients most often identified in stormwater runoff are phosphorus and nitrogen.
- In surface waters, these nutrient loads can lead to heavy algae growth, eutrophication and low dissolved oxygen levels. Nutrients enter the storm drainage system in a variety of ways, including landscaping practices in parks and recreation areas, leaks from sanitary sewers, and animal wastes.

Organic Matter

- Various forms of organic matter may be carried by stormwater in urban areas. Decomposition of this material by organisms in surface waters results in depleted oxygen levels.
- Low levels of dissolved oxygen severely impact water quality and life within surface waters.
- Sources of organic matter include garbage and yard waste.

Bacteria	• High bacterial levels may be found in stormwater runoff as a result of garbage, pet waste, illegal connections to sanitary sewers, and/or combined sewer overflows (CSOs). • The impacts of bacteria on surface waters may affect recreational uses and aquatic life as well as impose health risks.
Oil and Grease	• Numerous activities in urban areas produce oil, grease, and lubricating agents that are readily transported by stormwater. • The intensity of activities, including vehicle traffic, maintenance and fueling activities, leaks and spills, and manufacturing processes within an urban setting contribute heavily to the level of these pollutants present in adjacent surface waters.
Heavy Metals	• Heavy metals such as copper, lead, zinc, arsenic, chromium and cadmium may be typically found in urban stormwater runoff. • Metals in stormwater may be toxic to some aquatic life and may accumulate in aquatic animals. • Urban sources of metals in stormwater may include automobiles, paints, preservatives, motor oil and various urban activities.
Temperature	• Stormwater runoff increases in temperature as it flows over impervious surfaces. In addition, water stored in shallow, unshaded ponds and impoundments can increase in temperature. • Removal of natural vegetation (such as tree canopy) opens up water bodies to direct solar radiation. • Elevated water temperatures can impact a water body's ability to support certain fish and aquatic organisms.
Pesticides and Herbicides	• Pesticides and herbicides in stormwater runoff can be toxic, even at low concentrations, to aquatic life and the birds that feed on them.
Trash and Debris	• Trash and debris including floatables, plant debris, animal wastes, street litter, and other material may contain pollutants including metals, pesticides, bacteria, and other toxins. • Trash and debris can harbor bacteria, vectors, and lower dissolved oxygen concentrations in surface waters affecting aquatic life.

Vectors

- Vectors including mosquitoes and rodents can frequent in standing waters, including drainage structures, and eventually live and reproduce in such structures resulting in disease spread and a City nuisance.

SECTION 1.3 REGULATORY REQUIREMENTS

Stormwater rules promulgated under the 1987 Clean Water Act Amendments are found in Title 40 Code of Federal Regulations (CFR) Parts 122-124. These rules establish an application process for obtaining NPDES stormwater discharge permits and categorizes stormwater discharges as either "Phase I" or "Phase II." Stormwater in Cambridge is regulated under Phase II.

SECTION 1.3.1 CLEAN WATER ACT

Pollutants in stormwater have a significant impact on water quality in the U.S. In response to the need for comprehensive requirements to control the discharge of pollutants in stormwater, Congress amended the Clean Water Act (CWA) in 1987 requiring the EPA to establish a phased schedule for the submittal of National Pollutant Discharge Elimination System (NPDES) permits. The NPDES permit provides a mechanism by which the EPA can implement programs and practices to control polluted stormwater runoff.

SECTION 1.3.2 STORMWATER PHASE II RULE

In December 1999, the EPA promulgated the second phase of the stormwater regulations (Phase II) with the intent of capturing all of the stormwater polluting sources that were not already regulated under Phase I including runoff from housing and large parking areas, construction sites between 1 and 5 acres, and Municipal Separate Storm Sewer Systems (MS4s) serving less than 100,000. The City of Cambridge is a Phase II community.

SECTION 1.4 GLOSSARY OF TERMS

Activities: Daily practices that occur at City-owned facilities and as part of City-wide operations.

Best Management Practices (BMPs): Includes schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent, eliminate, or reduce the pollution of the receiving waters. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Catch Basin: An underground structure used to collect runoff and divert it to the stormwater or combined sewer system.

Clean Water Act (CWA): (33 U.S.C. 1251 et seq.) Requirements of the NPDES program are defined under Sections 307, 402, 318 and 405 of the CWA.

Construction Activity: Includes clearing, grading, excavation, and contractor activities that result in soil disturbance.

Discharge: A release or flow from a canal, conduit, sewer, drain, outfall, pump, stack, tank or treatment process, or any emission, intentional or unintentional, including but not limited to, flow resulting from spilling, leaking, seeping, pumping, pouring, emitting, emptying, depositing, dumping, releasing, injecting, escaping, leaching or infiltration whether direct or indirect.

Hazardous Waste: A waste or combination of wastes that, because of its quantity, concentration, or physical, chemical or infectious characteristics, may either cause or significantly contribute to an increase in mortality or an increase in serious irreversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed. This type of waste possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or appears on special EPA or Massachusetts Department of Environmental Protection (DEP) lists. Regulated under the federal Resource Conservation and Recovery Act.

Illicit Discharges: Any direct or indirect discharge to the stormwater drainage system that is not in compliance with applicable laws and regulations as discussed in this document.

Integrated Pest Management (IPM): An ecosystem-based strategy that focuses on long term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism.

Municipal Separate Storm Sewer System (MS4): A conveyance or system of conveyances designed or used for collecting or conveying stormwater, including any road with a drainage system. Street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention

basin, natural or manmade or altered drainage channel, reservoir, and other drainage structure that together comprise the stormwater drainage system owned or operated by the City.

Non-Stormwater Discharge: Any discharge to a municipal separate storm sewer (MS4) that is not composed entirely of stormwater.

Non-point Source Pollution: Pollution which occurs when water runs over land or through the ground and picks up natural and human-made pollutants, and discharges them in surface waters or introduces them into groundwater.

NPDES Permit: NPDES is an acronym for National Pollutant Discharge Elimination System. The NPDES Permit is the permit required and issued by EPA to control point source discharges of pollutants to waters of the United States or separate stormwater drainage systems. It shall also mean the permit issued to the City by EPA for its combined sewer and stormwater discharges.

Oil/Water Separator: A receptacle designed to separate petroleum-based oil and grease from water body, wetland or land surface. Also called a trap or interceptor.

Outfall: The point of discharge from a stormwater drain or combined sewer overflow to a water body, wetland or land surface. Also called an outlet.

Point Source: Any discernible, confined, and discrete conveyance from which pollutants are or may be discharged.

Pollutant: An element, constituent, or property of wastewater, or of agricultural, industrial, manufacturing, or commercial process water, or leachate, or any other substance which causes the alteration of chemical, physical, biological, or radiological integrity of water through its introduction therein. Generally, any substance introduced into the environment that adversely affects the usefulness of a resource.

Pollution Prevention: Practices and actions that reduce or eliminate the generation of pollutants.

Pretreatment: The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater to a less harmful state prior to or in lieu of discharging or otherwise introducing such pollutants into the wastewater system. Pretreatment shall include the reduction or alteration of pollutants by physical, chemical or biological processes, process changes, or other means. Except as prohibited by 40 CFR Part 403. Dilution is not pretreatment.

Runoff: Water originating from rainfall, melted snow, or irrigation water, which is not absorbed into the ground. Instead, it flows over the land into streams, other surface bearing water or drainage structures.

Run-on: Off-site stormwater surface flow or other surface flows which enters your site.

Secondary Containment: Structures, usually dikes or berms, surrounding tanks or other storage containers, designed to catch spilled materials from the storage containers.

Sedimentation: The process of depositing soil particles, clays, sands, or other sediments that were picked up by runoff.

Sediments: Soil, sand, and minerals washed from land into water, usually after rain, that collect in reservoirs, rivers, and harbors, destroying fish nesting areas and clouding the water, thus preventing sunlight from reaching aquatic plants. Farming, mining, and building activities without proper implementation of BMPs will expose sediment materials, allowing them to be washed off the land after rainfalls.

Significant Materials: Includes (but not limited to): raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designed under Section 101(14) of CERLCA; any chemical the facility is required to report pursuant to Section 313 of Title III of SARA; fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with stormwater discharges.

Significant Quantities: The volume, concentrations, or mass of a pollutant in stormwater discharge that can cause or threaten to cause pollution, contamination, or nuisance that adversely impact human health or the environment and cause or contribute to a violation of any applicable water quality standards for receiving water.

Source Control BMPs: Operational practices that reduce potential pollutants at the source.

Source Reduction (also Source Control): The technique of stopping and/or reducing pollutants at their point of generation so that they do not come into contact with stormwater.

Stormwater: Defined as any water resulting from rainfall or other precipitation that runs off surfaces during or after a storm.

Stormwater Drainage System: Above- and below-ground structures for transporting stormwater to streams or outfalls for flood control purposes.

Toxicity: Adverse responses of organisms to chemicals or physical agents ranging from mortality to physiological responses such as impaired reproduction or growth anomalies.

SECTION 2.0 CITY POLICIES AND PROTOCOLS

SECTION 2.1 STORMWATER MANAGEMENT POLICY

The City of Cambridge recognizes and is in full agreement with the Clean Water Act's National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems. The City's approach and detailed implementation schedule is provided in the Stormwater Management Plan (draft dated July 2003). A copy is available at the Department of Pubic Works.

SECTION 2.2 OTHER RELATED CITY POLICIES AND PROTOCOLS

The City's current documented policies and protocols that are applicable to good housekeeping include the following:

- **Road Sand/Salt Application and Storage:** *"Cambridge Public Works Snow Operations".*
- **Snow Stockpiling/Removal:** *"Cambridge Public Works Snow Operations"*.
- **Sidewalk Repair:** "Standard Specifications for Street Excavations and Construction", Section II, 2F Sidewalks, Curbing, and Bicycle Racks.

In addition, the DPW has the following guidance document for Vehicle Maintenance and Storage and Spill Prevention and Response: DPW's "*Spill Prevention, Control, and Countermeasure Plan (SPCC) Plan"*. These documents supplement the above referenced BMPs for further information. The most recent versions of these documents reside with the DPW. The Assistant Commissioner for Operations can be contacted on how to receive a copy of any one of these.

SECTION 2.3 REQUIREMENTS OF LEASES

The following is an example language that can be inserted into City leases:

"The City of Cambridge has submitted a Notice of Intent (NOI) to the Massachusetts DEP and EPA to obtain coverage under the NPDES Small MS4 General Permit. A copy of the NOI is available for review. In order to comply with the Permit requirements, the City has developed Best Management Practices (BMPs) that parties leasing City owned properties must adhere to. These BMPs contain pollution prevention and source control techniques to minimize the impact of those activities upon dry-weather urban runoff, stormwater runoff, and receiving water quality.

Activities performed at the facility leased shall conform to the Permit and BMPs and must be performed as described within all applicable BMPs. The lessee shall fully understand the BMPs applicable to activities conducted at the facility leased prior to conducting them and maintain copies of the BMPs at the leased facility throughout the agreement duration.

Evaluation (or cost) of activities performed at the facility leased may be conducted by the City to verify compliance with BMP requirement and may be required through lessor self-evaluation as determined by the City."

SECTION 2.4 REQUIREMENTS OF CONTRACTORS ON CITY PROPERTY

The following is example language that can be inserted into municipal field program contracts:

"The City of Cambridge has submitted a Notice of Intent (NOI) to the Massachusetts DEP and EPA to obtain coverage under the NPDES Small MS4 General Permit. A copy of the NOI is available for review. In order to comply with Permit requirements, the City has developed Best Management Practices (BMPs) that parties conducting the municipal activities must adhere to. These BMPs apply to any party conducting municipal activities and contain pollution prevention and source control techniques to minimize the impact of those activities upon dry-weather urban runoff, stormwater runoff, and receiving water quality.

Work performed under this CONTRACT shall conform to the Permit requirements and BMPs and must be performed as described within all applicable BMPs. The CONTRACTOR shall fully understand the BMPs applicable to activities that are being conducted under this CONTRACT prior to conducting them and maintain copies of the BMPs throughout the CONTRACT duration. The applicable BMPs are included as Exhibit of this CONTRACT.

Evaluation of activities subject to BMPs performed under this CONTRACT may be conducted to verify compliance with BMP requirements and may be required through CONTRACTOR self-evaluation as determined by the City."

SECTION 3.0 BEST MANAGEMENT PRACTICE FACT SHEETS

Guidance on good housekeeping BMPs to be performed in the City of Cambridge is presented using the fact sheets provided in this section. Each of the fact sheets provides a description of the practice, the pollution prevention approach, suggested practices, inspection procedures, and maintenance procedures. In addition, the targeted facilities, operations, and pollutant constituents are identified. All of the suggested Best Management Practices do not need to be implemented for the targeted facilities and operations. The BMPs that reduce an influx of pollutants to the stormwater drainage system to the maximum extent practicable should be considered for implementation.

Appendix A includes facility drainage locus maps for the specific City properties and facilities inspected. Attributes including stormwater drainage and sewer system components (storm drains, sewers, manholes, catch basins, and gravity mains) and, if applicable, discharge points (stormwater outfalls and CSOs) are shown for each inspected facility and the immediate surrounding area.

BMP 1- ROAD SAND/SALT APPLICATION AND STORAGE

DESCRIPTION

Public Works is responsible for maintaining safe, unobstructed public ways during the winter months. As the command center for the City's salting and snow plowing operations, Public Works coordinates different departments and contractors, purchases materials and equipment, maintains vehicles, and provides public information and assistance during snow events. Salting and plowing operations cover 125 miles of roadway and over 23 miles of sidewalk, including sidewalks and ramps abutting schools, public buildings, high volume bus stops, parks, and other public areas. Public Works also promotes sidewalk snow and ice clearance by private property owners and works with the Traffic, Parking & Transportation Department to investigate complaints and issue citations for sidewalks that have not been cleared.

DPW pre-treats major roadways prior to snow/ice events. A program to pre-treat 44.5 lane miles of major road surfaces using a brine solution of salt (solar salt) and water is being piloted citywide. A brine solution is sprayed on streets in advance of a predicted storm, creating a layer that prevents snow and ice from bonding with the surface. This process offers protection against ice formation, but uses only a quarter of the salt that is normally used in treating these areas.

Proper road salt and facility salt applications and storage is necessary to prevent contamination to surface and ground water supplies. Salts are very soluble—once in contact with water there is no way to remove salt. The major reasons for keeping salt covered and controlling use are that salt:

- Kills vegetation
- Corrodes infrastructure
- Blocks storm drains and swales
- Increases sedimentation to streams and rivers
- Small quantities (5% road salt) contain phosphorus, nitrogen, copper, and cyanide

POLLUTION PREVENTION APPROACH

Implement applicable suggested Best Management Practices to reduce the influx of pollutants to the stormwater system to the maximum extent practicable.

SUGGESTED BEST MANAGEMENT PRACTICES

Proper Storage

Storage facilities for salt and deicing mixtures should have the following key elements:

- Covered structure on impervious surface.
- Drainage should be diverted away from storage facility.
- Salt handling should be done within storage facility.

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Facilities
- Street Rights-of-Way

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Organics
- Low Dissolved Oxygen

- Should not be located in a water supply watershed or within 100 year floodplain.

Proper Disposal

Disposal of salt/deicing mixtures should not be done in the following areas:
- Wetlands
- Any surface waters
- Well locations and public drinking supplies

Proper Removal

- Street cleaning of all City roadways in the Spring.
- Catch basin cleaning completed as necessary.

Proper Use

- Establish a low salt area near any water bodies or residential areas.
- Minimize the use and optimize the amount of sodium chloride and chloride containing materials applied to prevent over-salting of motorways and increasing runoff concentrations.
- Vary the amount of salt applied to reflect site-specific characteristics, such as road width and design, traffic concentration, and proximity to surface waters.
- Provide calibration devices for spreaders in trucks to aid maintenance workers in the proper application of road salts.
- Establish air temperature and snow depth conditions favorable for successful use of salt.
- Optimize chemical application rates through the use, where practicable, of automated application equipment (e.g., zero velocity spreaders), anti-icing and pre-wetting techniques, implementation of pavement management systems, and alternate chemicals.

INSPECTION PROCEDURES

- Inspect salt storage shed for leaks on a regular basis including Fall and Spring.
- Inspect salt application equipment including calibration equipment and spreaders.
- Inspect salt regularly for lumping or water contamination.
- Inspect surface areas for evidence of runoff – salt stains in ground near and around the salt storage shed, loading area, or downslope.
- Inspect for excessive amounts of salt on roads.

MAINTENANCE PROCEDURES

- Service trucks and calibrated spreaders regularly to ensure accurate, efficient distribution of salt.
- Educate and train operators on hazards of over-salting to roads and environment at the beginning of the snow season as part of meetings with supervisors and drivers.
- Repair salt storage shed leaks.

BMP 2- SNOW STOCKPILING AND REMOVAL

DESCRIPTION

Proper snow management in terms of stockpiling and removal can prevent or minimize runoff and pollutant loading impacts. Snow piles can contain trash, nutrients, sediments, salt, sand, and vehicle pollutants (petroleum, antifreeze, and oil) that can directly be carried into surface waters during snowmelt.

POLLUTION PREVENTION APPROACH

Implement applicable suggested Best Management Practices to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

SUGGESTED BEST MANAGEMENT PRACTICES

The City's Policy is to restrict stockpiling of snow. Snow disposal activities, including selection of appropriate snow disposal sites, will adhere to the Massachusetts Department of Environmental Protection Snow Disposal Guidance, Guideline No. BWR G2015-01 (Effective Date: December 21, 2015), located at: http://www.mass.gov/eea/agencies/massdep/water/regulations/snow-disposal-guidance.html

During extreme conditions when stockpiling is necessary the following practices should be applied:

- Do not dispose of snow into waterways, wetlands or sensitive areas.
- Do not stockpile snow near or within direct drainage to surface waters.
- Do not stockpile snow in wooded areas, around trees, or in vegetated buffer zones due to sediment and salt damage to vegetation.
- Stockpile snow in pervious areas where it can slowly infiltrate.
- During plowing activities on pervious surfaces, blading (plow lowers blade below ground surface level and plows the upper layers of soil in addition to overlying snow) should be avoided to prevent erosion.

INSPECTION PROCEDURES

- Check snow piles for debris that could be windblown.

MAINTENANCE PROCEDURES

- Contain sediments as snow melts and removed every Spring from snow storage areas. This includes sweeping roadways and parking lots or other impervious areas.
- During plowing activities, avoid blocking drainage structures including catch basins, swales, and channels.

TARGETED FACILITIES AND OPERATIONS

- City-Wide Operations
- Street Rights-of-Way

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Oil & Grease

BMP 3- MATERIALS MANAGEMENT

DESCRIPTION

Materials management entails the selection of the individual product, the correct use and storage of the product, and the proper disposal of associated waste(s). It is important to be responsible with common chemicals and solvents including paints, cleaners, and automotive products to reduce contamination to stormwater runoff.

POLLUTION PREVENTION APPROACH

Proper management reduces the likelihood of accidental spills or releases of hazardous materials into storm drains or during storm events. In addition, health and safety conditions at the facility will improve.

Implement applicable suggested Best Management Practices to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

SUGGESTED BEST MANAGEMENT PRACTICES

Material Inventory

- Identify all hazardous and non-hazardous substances by reviewing purchase orders and conducting a walk-through of facility.
- Compile Material Safety Data Sheets (MSDS) for all chemicals. These should be readily accessible to all facility employees.
- Label all containers of significant materials that include cleaners, fuels, and other hazards.
- Identify handling, storage, and disposal requirements of all chemicals.
- Use environmentally friendly or non-hazardous substitutes when appropriate that include but not limited to $H_2Orange_2$, Orange Thunder, and Simple Green®.
- Keep hazardous materials and waste off the ground.
- All drums and containers should be in good condition and properly labeled.
- Loose materials including any gravel piles should be covered or placed in shelter.

Solid Waste

- Trash storage bins, dumpsters, and disposal areas should be clean and free of debris, especially those located near catch basins.
- Dumpsters maintained in good condition and securely closed at all times.
- Clean up equipment and materials.
- Dispose of within local, state, and federal laws. This includes Section 8.24 of the City Ordinance.
- Temporary trash storage should be inspected weekly before taken to the local privately owned transfer station.
- Debris piled including sweepings, construction, and wood debris should be inspected weekly before removed off site.

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Facilities
- All City-Owned Parks and Open Spaces
- All Fleet Vehicle and Equipment Operations

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Organics
- Low Dissolved Oxygen

INSPECTION PROCEDURES

- Physical on-site verification of sealed floor drains (or redirected to sanitary sewer).
- Regular inspection of material storage areas (inside and outside) to verify items are not exposed to precipitation and are covered or in enclosed areas.
- Regular inspection and cleaning of oil/water separators by qualified contractor or facility personnel.
- Inspect stormwater discharge locations and onsite stormwater drainage infrastructure (e.g., catch basins) regularly (for contaminants, soil staining, plugged discharge lines).

MAINTENANCE PROCEDURES

- Repair or replace any leaking/defective containers, and replace labels as necessary.
- Maintain caps and/or covers on containers.
- Maintain aisle space for inspection of products/wastes.
- Routinely clean work spaces.
- Properly collect/dispose of waste.
- Routinely maintain and inspect vehicles and equipment.
- Train employees routinely and when new products enter the facility on proper use, storage, disposal, and safety concerns. MSDS sheets should be reviewed and readily accessible in central facility location.
- Review any Spill Prevention, Control, and Countermeasure (SPCC) Plan. Plans in place for a specific facility for petroleum products.

BMP 4- HAZARDOUS MATERIAL STORAGE

DESCRIPTION

It is important to properly store hazardous materials to prevent them from contaminating stormwater runoff. Hazardous materials include:

- Cleaning agents: solvents, drain cleaners, and bleach
- Vehicle maintenance fluids: motor oil, gasoline, antifreeze, degreasers, and radiator flush
- Water treatment chemicals
- Paints

Refer to Appendix A for list of typical hazardous materials at specific City Facilities.

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Facilities
- All Fleet Vehicle and Equipment Operations

POLLUTION PREVENTION APPROACH

Proper management reduces the likelihood of accidental spills or releases of hazardous materials during storm events. In addition, health and safety conditions at the facility will improve.

Implement applicable suggested Best Management Practices to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Organics
- Low Dissolved Oxygen

SUGGESTED BEST MANAGEMENT PRACTICES

Loading/Unloading

- All facilities should have proper procedures in place for loading and/or unloading hazardous materials received, especially areas located near catch basins.
- Do not conduct loading and unloading of exposed hazards during wet weather, whenever possible.
- If feasible, load and unload all materials and equipment in covered areas such as building overhangs at loading docks.
- Load/unload only at designated loading areas.
- Use drip pans underneath hose and pipe connections and other leak-prone spots during liquid transfer operations, and when making and breaking connections.

Storage

- When possible, store indoors.
- Storage of reactive, ignitable, or flammable liquids must comply with the Massachusetts Fire Prevention Regulations for the Storage of Flammable and Combustible Materials (527 CMR 14.03).
- Place containers in a designated area that is paved, free of cracks and gaps, and impervious in order to contain leaks and spills. The area should also be covered.
- Provide secondary containment for hazardous materials and waste placed outdoors.

- Keep containers away from high traffic areas.
- Cover all containers and drums or place under shelter, if stored outdoors.
- MSDSs should be supplied for all stored materials at a specific facility, and in readily accessible location for all facility employees.
- Maintain a log inventory of materials stored at the facility.
- Chemicals should be kept in original labeled containers.
- Containers should not be overfilled.
- Store containers on pallets.
- Properly stack containers and drums.
- Storage areas should be enclosed.
- Minimize storage onsite.
- Keep storage areas clean and organized. Certain materials are collected by the DPW on Household Hazardous Waste Collections conducted several times each year.
- Contractors should be responsible for delivery, storage and waste disposal practices.
- Containers should not be glass.
- Segregate reactive/incompatible materials (such as chlorine and ammonia).
- Place drip pans under container spouts.
- Install overfill protection on storage tanks/drums.
- Lock storage areas and provide warning signs.

INSPECTION PROCEDURES

- Check loading and unloading equipment regularly for leaks, including valves, pumps, flanges and connections.
- Look for dust or fumes during loading or unloading operations.
- Inspect storage areas regularly for leaks or spills.
- Conduct routine inspections and check for external corrosion of material containers.
- Check for structural failure, spills and overfills due to operator error, failure of piping system.
- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.
- Visually inspect new tank or container installations for loose fittings, poor welding, and improper or poorly fitted gaskets.
- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Replace containers that are leaking, corroded, or otherwise deteriorating with ones in good condition. If the liquid chemicals are corrosive, containers made of compatible materials must be used instead of metal drums.
- Label new or secondary containers with the product name and hazards.

MAINTENANCE PROCEDURES

- Conduct regular inspections and make repairs as necessary. The frequency of repairs will depend on the age of the facility.
- Check loading and unloading equipment regularly for leaks.
- Sweep area regularly with dry broom.
- Conduct major clean-out of loading and unloading area and any sumps prior to October 1 of each year.
- Repair or replace any leaking/defective containers and replace labels as necessary.
- Maintain caps and/or covers on containers.
- Maintain aisle space for inspection of products/wastes.
- Train employees on proper procedures and when new hazardous materials are used.

BMP 5-VEHICLE FUELING, MAINTENANCE AND STORAGE

DESCRIPTION

Vehicle repair and service (e.g. parts cleaning and fueling), replacement of fluids (e.g. oil change), and outdoor equipment storage and parking (dripping engines) can impact water quality if stormwater runoff from areas with these activities occurring on them becomes polluted by a variety of contaminants. Spills and leaks that occur during vehicle and equipment fueling can contribute hydrocarbons, oil and grease, as well as heavy metals to stormwater runoff. It only takes 1 gallon of oil to contaminate 1 million gallons of drinking water.

POLLUTION PREVENTION APPROACH

It is important to properly store and discard vehicle fluids including oil, transmission fluid, antifreeze, and lubricants to prevent surface and groundwater contamination from spills or improper disposal.

Implement applicable suggested Best Management Practices to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

SUGGESTED BEST MANAGEMENT PRACTICES

General Practices

- Store fluids in labeled, plastic or metal container with a lid away from drains and catch basins.
- Place flammables in a fire safe cabinet.
- Place drip pans under leaking vehicles, valves, spigots, and pumps.
- Routinely check for leaking vehicles.
- Do not do any vehicle maintenance near storm drains.
- Vehicle maintenance should be done in covered facility.
- Install inlet catch basin equipped with a small sedimentation basin or grit chamber to remove large particles from stormwater in highly impervious areas.

Fueling

- Ensure that all fueling activities are not conducted near storm drains and dry wells or that procedures are in place to control any spills.
- Fuel storage tanks should be placed on impervious surfaces with no cracks or gaps; secondary containment is recommended.
- Provide barriers such as posts, guard rails, or bollards where tanks are exposed, to prevent collision damage with vehicles.
- Post signs at the fuel dispenser or fuel island warning vehicle owners/operators against "topping off" of vehicle fuel tanks.
- Label drains within the facility boundary, by paint/stencil (or equivalent), to indicate whether they flow to an oil/water separator, directly to the sewer, to a storm drain or into a drywall.

TARGETED FACILITIES AND OPERATIONS

- DPW Garage
- Police Maintenance Garage
- Cemetery Facilities
- Water Department
- Cambridge Golf Course Garage
- Cambridge Rindge and Latin School Facilities
- Fire Departments & Headquarters
- All Fleet Vehicle and Equipment Operations
- Police Maintenance Facility
- DPW Maintenance Facility

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Hydrocarbons

Vehicle Maintenance

- Provide a designated area for vehicle maintenance on an impervious surface.
- Keep equipment clean; don't allow excessive build-up of oil and grease.
- If possible, perform all vehicle fluid removal or changing inside or under cover:
  - Keep a drip pan under the vehicle while you unclip hoses, unscrew filters, or remove other parts.
  - Promptly transfer used fluids to the proper waste or recycling drums. Don't leave drip pans or other open containers lying around.
  - Keep drip pans or containers under vehicles or equipment that might drip during repairs.
  - Do not change motor oil or perform equipment maintenance in non-appropriate areas.
- If temporary work is being conducted outside: Use a tarp, ground cloth, or drip pans beneath the vehicle or equipment to capture all spills and drips.
- If equipment (e.g., radiators, axles) is to be stored outdoors, oil and other fluids should be drained first. This is also applicable to vehicles being stored and not used on a regular basis.

Disposal

- Recycle or properly dispose of fluids.
- Dump full pans into 55-gallon drums.
- Dispose of debris including oil filters, oil cans, rags, and clean-up supplies.
- Do not dump vehicle fluids down storm drains.
- Interior floor drains should discharge to holding tanks or be sealed.

Used Oil

- Recycle used oil.
- Do not mix wastes with used oil.

INSPECTION PROCEDURES

- Identify locations of floor drains and catch basins and know where they discharge to. Floor drains should be connected to the sanitary sewer system and catch basins should be connected to the stormwater drainage system.
- Regularly inspect vehicles and equipment for leaks and repair immediately.
- Inspect fuel storage tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Inspect fueling areas, catch basin inserts, containment areas, and drip pans on a regular schedule.

MAINTENANCE PROCEDURES

- Sweep the maintenance area on a regular basis, if it is paved, to collect loose particles. Wipe up spills with rags and other absorbent material immediately. Do not hose down the area to a storm drain.

- Clean oil/water separators, sumps and on-site treatment/recycling units at appropriate intervals.
- Keep ample supplies of spill cleanup materials onsite. Cleanup spills immediately.
- Properly train employees on fueling and handling oil and waste oil.

BMP 6- VEHICLE WASHING

DESCRIPTION

Wash water from vehicle and equipment cleaning activities performed outdoors or in areas where wash water flows onto the ground can contribute toxic hydrocarbons and other organic compounds, oils and greases, nutrients, phosphates, heavy metals, and suspended solids to stormwater runoff.

POLLUTION PREVENTION APPROACH

If possible, take vehicles to commercial car wash facilities. Implement applicable suggested Best Management Practices to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

SUGGESTED BEST MANAGEMENT PRACTICES

General

- Use biodegradable, phosphate-free detergents for washing vehicles as appropriate. Products include Simple Green® biodegradable car wash cleaner.
- Mark the area clearly as a wash area.
- Post signs stating that only washing is allowed in wash area and that discharges to the storm drain are prohibited. Facility employees should know where catch basins are.
- Provide a trash container in wash area.
- Those that use facility to wash vehicles (e.g., students) should be informed of proper washing protocols.

Vehicle and Equipment Cleaning

- Install sumps or drain lines to collect wash water or construction of a berm around the designated area and grading of the area to collect wash water as well as prevent stormwater run-on.
- Consider washing vehicles and equipment inside the building if washing/cleaning must occur on-site.
- If washing must occur on-site and outdoors:
  - Use designated paved wash areas. Designated wash areas must be well marked with signs indicating where and how washing must be done. This area must be covered or bermed to collect the wash water and graded to direct the wash water to a treatment or disposal facility.
  - Cover the wash area when not in use to prevent contact with rain water.
- Use hoses with nozzles that automatically turn off when left unattended. Use high-pressure, low-volume sprays.
- Perform pressure cleaning and steam cleaning off-site to avoid generating runoff with high pollutant concentrations. If done on-site, no pressure cleaning and steam cleaning should be done in areas designated as protection areas for public water supply.

TARGETED FACILITIES AND OPERATIONS

- DPW Garage
- Cemetery Facilities
- Water Department
- Cambridge Golf Course Garage
- Amigos and King Schools
- Cambridge Rindge and Latin Schools
- Tobin School
- Fire Departments & Headquarters
- All Fleet Vehicle and Equipment Operations

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Organics

Disposal

- Filter and recycle wash water if possible.
- If discharging to an oil/water separator, do not use detergents that disperse oil in wash water and make oil/water separators ineffective with oil passing to the sanitary sewer system. It is best to use high pressure water with no cleaning agent. If using a cleaner it must be a non-emulsifying products such as QOR-110 ("Quick Oil Release").

INSPECTION PROCEDURES

- Inspect floor drain systems regularly – use only those that discharge to a sanitary sewer.
- Identify the need for cleaning of catch basins, oil/water separators.

MAINTENANCE PROCEDURES

- Maintain a map of on-site storm drain locations to avoid discharges to the storm drainage system.
- Take precautions against excess use of and spillage of detergents.
- Clean vehicles only where wastes can be captured for proper disposal.

BMP 7-SPILL PREVENTION AND RESPONSE

DESCRIPTION

It is important to have a plan in place in the event a spill should occur so contaminants do not mix with stormwater runoff. A spill prevention and response plan can be effective at reducing the risk of contamination to surface and groundwater contamination—but only with proper personnel training, the availability of cleanup supplies, and when management ensures procedures are followed.

POLLUTION PREVENTION APPROACH

- Create a well thought out and implemented spill prevention and response plan.
- Post a response checklist in any hazardous waste storage area with contact information (including emergency phone numbers), and spill containment procedures.
- Train personnel.
- Regularly update plan, checklists, and contact information.
- Regularly inspect spill potential areas.
- Facilities with aboveground storage tanks (ASTs) and underground storage tanks (USTs) greater than 1,320 gallons and 42,000 gallons must have SPCC Plans in place.

SPILL PREVENTION AND RESPONSE PLAN

An effective Spill Prevention and Response Plan may include one or more of the following:

- Description of the facilities, the address, activities and materials involved.
- Identification of key spill response personnel and hospital contacts.
- Identification of the potential spill areas or operations prone to spills/leaks.
- Identification of which areas should be or are bermed to contain spills/leaks.
- Facility map identifying the key locations of areas, activities, materials, structural BMPs, etc.
- Material handling procedures and safety measures for each kind of waste.
- Spill response procedures including:
  - Assessment of the site and potential impacts
  - Containment of the material
  - Notification of the proper personnel and evacuation procedures
  - Clean up of the site
  - Disposal of the waste material
  - Proper record keeping procedures
- Plan to protect all storm drains in the event of a spill.
- Descriptions of spill response equipment, including safety and cleanup equipment.

TARGETED FACILITIES AND OPERATIONS

- All City Owned Buildings
- Street and Public Rights-of-Way

TARGETED CONSTITUENTS

- Nutrients
- Metals
- Oil & Grease
- Hydrocarbons
- Organics

REFERENCE

- DPW's SPCC Plan

SUGGESTED BEST MANAGEMENT PRACTICES

Spill/Leak Prevention

- If possible, move material handling indoors, under cover, or away from storm drains or sensitive water bodies.
- Properly label all containers so that the contents are easily identifiable.
- Berm storage areas so that if a spill or leak occurs, the material is contained.
- Cover outside storage areas either with a permanent structure or with a seasonal one such as a tarp so that rain will not come into contact with the materials.
- Check containers (and any containment sumps) often for leaks and spills. Replace containers that are leaking, corroded, or otherwise deteriorating with containers in good condition. Collect all spilled liquids and properly dispose of them.
- Store, contain and transfer liquid materials in such a manner that if the container is ruptured or the contents spilled, they will not discharge, flow or be washed into the storm drainage system, surface waters, or groundwater.
- Place drip pans or absorbent materials beneath all mounted taps and at all potential drip and spill locations during the filling and unloading of containers. Any collected liquids or soiled absorbent materials should be reused/recycled or properly disposed of.
- For City programs that involve material transport, only transport the minimum amount of material needed for the daily activities and transfer materials between containers at a municipal yard where leaks and spills are easier to control.
- If paved, sweep and clean storage areas monthly, do not use water to hose down the area unless all of the water will be collected and disposed of properly (e.g., in an oil/water separator).
- Install a spill control device (such as a tee section) in any catch basins that collect runoff from any storage areas if the materials stored are oil, gas, or other materials that separate from and float on water. This will allow for easier cleanup if a spill occurs.
- If necessary, protect catch basins while conducting field activities so that if a spill occurs, the material will be contained.
- Keep ample supplies of spill cleanup materials including Speedi Dry and absorbent boom pads onsite.

Spill Clean Up

- Small non-hazardous spills:
  - Use a rag, damp cloth or absorbent materials for general clean up of liquids.
  - Use brooms or shovels for the general clean up of dry materials
  - If water is used, it must be collected and properly disposed of. The wash water cannot be allowed to enter the storm drain.
  - Dispose of any waste materials properly.

  - Clean or dispose of any equipment used to clean up the spill properly.
- Large non-hazardous spills
  - Use absorbent materials for general clean up of liquids.
  - Use brooms, shovels or street sweepers for the general clean up of dry materials.
  - If water is used, it must be collected and properly disposed of. The wash water can not be allowed to enter the storm drain.
  - Dispose of any waste materials properly.
  - Clean or dispose of any equipment used to clean up the spill properly.
- For hazardous or very large spills, the Fire Department and/or a private cleanup contractor may need to be contacted to assess the situation and conduct the cleanup and disposal of the materials.
- Chemical cleanups of material can be achieved with the use of absorbents, gels, and foams.
- Remove the adsorbent materials promptly and dispose of according to regulations.
- If the spilled material is hazardous, then the used cleanup materials, including rags, are also hazardous and must be sent to a certified laundry facility or disposed of as hazardous waste.

Reporting

- Report any spills immediately to the identified key municipal spill response personnel.
- Report spills in accordance with applicable reporting laws. Spills that pose an immediate threat to human health or the environment must be reported immediately to the City's Health Department at 617-665-3824, DPW at 617-349-4800 and the Fire Department at 911.
- Large spills including those over 10 gallons should be reported to the DPW at 617-349-4800 and the Fire Department at 911.
- Federal regulations require that any oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hour). An oil spill over 10 gallons that reaches a surface water, sewer, storm drain, ditch, or culvert leading thereto requires Massachusetts DEP notification at 508-792-7650.
- After the spill has been contained and cleaned up, a detailed report about the incident should be generated and kept on file. The incident may also be used in briefing staff about proper procedures.

INSPECTION PROCEDURES

- Inspect secondary containment systems and oil/water separators periodically to identify any operational problems.
- Inspect containers for leaks, areas near storm receiver inlets and outlets, and floor drains for indications of spills.

MAINTENANCE PROCEDURES

- Pump out oil water separators as needed.
- Protect drains with oil absorbent materials.
- Clean out receivers on regular schedule.
- Remove spilled salt from salt loading areas, including the City's Salt Shed.

BMP 8- LAWN AND GROUNDS MAINTENANCE

DESCRIPTION

Nutrient loads generated by suburban lawns as well as municipal properties can be significant, and recent research has shown that lawns produce more surface runoff than previously thought. Pesticide runoff can contribute pollutants that contaminate drinking water supplies and are toxic to both humans and aquatic organisms.

POLLUTION PREVENTION APPROACH

It is important to reduce pesticides, herbicides, fertilizers, and lawn debris from entering surface and ground water supplies by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater drainage system.

Implement applicable suggested Best Management Practices to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

SUGGESTED BEST MANAGEMENT PRACTICES

Landscaping Activities

- Do not apply any chemicals (insecticide, herbicide, or fertilizer) directly to surface waters, unless the application is approved and permitted by the Massachusetts DEP.
- Use mulch or other erosion control measures on exposed soils.
- Check irrigation schedules so pesticides will not be washed away and to minimize non-stormwater discharge.
- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the stormwater drainage system.
- Use hand or mechanical weeding where practical.
- Employ mowing techniques to maintain a healthy lawn and minimize chemical use—no more than 1" of lawn should be removed from each mowing (grasses kept at 2.5" to 3.0" high are more heat resistant than close-cropped grass).
- Keep mower blades sharp and leave clippings in place after mowing.
- Water plants in the early morning.

Fertilizer and Pesticide Management

- Follow manufacturers' recommendations and label directions.
- Do not apply insecticides within 100 feet of surface waters such as lakes, ponds, wetlands, and streams.
- Use less toxic pesticides that will do the job, whenever possible and use the minimum amount needed. Avoid use of copper-based pesticides if possible.
- Do not use pesticides/fertilizers if rain is expected.

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Facilities with lawns and grounds
- Street and Public Rights-of-Way

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics
- Low Dissolved Oxygen

- Do not mix or prepare pesticides/fertilizers for application near storm drains.
- Perform a soil analyses prior to applying fertilizers to determine the appropriate nutrients required for soil conditions.
- Calibrate fertilizer distributors to avoid excessive application.
- Apply pesticides/fertilizers only when wind speeds are low.
- Work fertilizers into the soil rather than dumping or broadcasting them onto the surface.
- Irrigate slowly to prevent runoff and then only as much as is needed.
- Dispose of empty pesticide/fertilizer containers according to the instructions on the container label.
- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Implement storage requirements for pesticide products with guidance from the local fire department and the Massachusetts Department of Agricultural Resources.
- Provide secondary containment for pesticides.

Debris Removal

- Use yard waste as mulch and topsoil.
- Compost or mulch yard waste.
- Sweep up yard debris instead of hosing down.
- Clean pavement and sidewalk if fertilizer/pesticide is spilled on these surfaces before applying irrigation water.
- Do not leave yard waste in the street or sweep it into storm drains or streams.

INSPECTION PROCEDURES

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring.
- Minimize excess watering, and repair leaks in the irrigation system as soon as they are observed.
- Inspect and remove accumulated debris from grounds.
- Routinely monitor lawns to identify problems during their early stages.
- Identify nutrient/water needs of plants.
- Inspect for problems by testing soils.

MAINTENANCE PROCEDURES

- Sweep paved areas regularly to collect loose particles.
- Wipe up spills with rags and other absorbent material immediately.
- Do not hose down the area to a storm drain.
- Keep mower blades sharp.

BMP 9- STREET AND PARKING LOT SWEEPING

DESCRIPTION

Street and parking lot sweeping includes self-propelled equipment to remove sediment from paved surfaces that can enter storm drains or receiving waters. Sweeping is most effective for removing coarse particles, leaves, and trash. Regularly sweeping reduces catch basin cleaning. The City's Policy is to sweep every street once per month between April through December (weather permitting) and every square (including Harvard, Porter, and Davis) daily.

POLLUTION PREVENTION APPROACH

Implement applicable suggested Best Management Practices to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

SUGGESTED BEST MANAGEMENT PRACTICES

- Adhere to the City's cleaning schedule – every roadway swept once per month (April through December).
- City parking lots should be checked regularly by Facility personnel and swept when needed.
- Any visible sediment should be swept up (including sand/salt mixtures and granular material).
- Control the number of points where vehicles leave the Facilities to allow sweeping to be focused on certain areas in parking lots.
- Sweep up the smallest particles feasible.
- Sweep in pattern to keep spilled material from being pushed into catch basins.
- Before sweeping, manually rake sand from any turf areas on surfaces to be swept.
- Use hand-held tools to assist with mechanical equipment.
- If possible, recycle Fall leaf sweepings by composting.
- The DPW should maintain a log or schedule of sweeping activities they conduct. Information should include mileage, amount of sweepings removed, and heavily sedimented areas for street rights-of-way.
- Facilities should maintain a log or schedule for their facility parking lots. Information should include amount of sweepings removed, heavily sedimented catch basins, and date of sweeping activities. By recording heavily sedimented areas, prioritizations can be made to sweep these areas or clean catch basins more frequently.

INSPECTION PROCEDURES

- Regularly inspect streets and City-owned parking lots for debris.

MAINTENANCE PROCEDURES

- Adjust broom frequently to maximize efficiency of sweeping operations.

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Facilities
- Street Rights-of-Way

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Organics
- Low Dissolved Oxygen

- After sweeping is finished, properly dispose of sweeper wastes.
- Do not use kick brooms or sweeper attachments that tend to spread dirt.
- When unloading sweeper, make sure there is no dust or sediment release.
- Inspect sweepers to check that the contractor properly maintains and repairs them.

BMP 10- CATCH BASIN CLEANING

DESCRIPTION

It is important to remove sediments from catch basins that can have a high concentration of pollutants including metals and hydrocarbons. These sediments can clog downstream drainage systems and transport pollutants to nearby water bodies.

POLLUTION PREVENTION APPROACH

Implement applicable suggested Best Management Practices to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

SUGGESTED BEST MANAGEMENT PRACTICES

- Prioritize inspection and maintenance for catch basins located near construction activities
- Ensure that no catch basin at anytime will be more than 50 percent full
- Documents catch basins with sumps more than 50 percent full during two consecutive inspections/cleanings
- EPA recommends cleaning basins when solids reach one-third the depth from the basin bottom to the invert of the lowest pipe into or out of the basin.
- Target cleaning for early Spring or late Fall.
- Clean manually or with equipment (i.e., bucket loaders).
- Properly dispose of catch basin material or store until contractor picks up cleanings (Massachusetts DEP and EPA requires chemical analysis to determine if substance is hazardous waste).
- Repair damaged catch basins including outlet traps.
- Install hoods if catch basins do not have them.
- Inform employees that catch basins are part of the stormwater drainage system and not the sanitary sewer system.
- The DPW should maintain a log of cleaning activities (including the Cambridge Request System formerly the Hansen Request System). Information should include amount of cleanings removed and areas with heavily filled basins.
- Facilities should maintain a log of cleaning activities on their parking lots. Information should include amount of cleanings removed, heavily filled catch basins, and dates cleaned by DPW.

INSPECTION PROCEDURES

- Inspect catch basins, grates, and ditches at least once per year (best times are before the start and before the end of the rainy season).
- Inspections should be incorporated during routine cleaning, as part of reconstruction contracts, and through requests made by residents or other City departments.

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Facilities
- Street Rights-of-Way
- Disposal of Removed Solids

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Organics
- Low Dissolved Oxygen

MAINTENANCE PROCEDURES

- Clean catch basins based on the cleaning schedule or as needed. Catch basins should be checked for sediment levels in sump. Those in areas that accumulate a significant amount of sediment should be cleaned more frequently.
- During catch basin repairs, any hoods missing should be replaced.

BMP 11- STORMWATER, SANITARY AND WATER LINE MAINTENANCE

DESCRIPTION

Some operation and maintenance activities of public utilities and accidents can result in the discharge of pollutants that can pose a threat to both human health and the quality of receiving waters if they enter the storm drainage system. Sewage incident response and investigation may involve a coordinated effort between staff from a number of different departments/agencies. Storm drainage systems need to be cleaned regularly. Routine cleaning reduces the amount of pollutants, trash, and debris both in the storm drainage system and in receiving waters.

POLLUTION PREVENTION APPROACH

Inspect potential non-stormwater discharge flow paths and clear/cleanup any debris or pollutants found (i.e. remove trash, leaves, sediment, and wipe up liquids, including oil spills).

SUGGESTED BEST MANAGEMENT PRACTICES

Stormwater Drainage Maintenance

- Cleaning the storm drain by flushing is more successful for pipes smaller than 36 inches in diameter.
- A water source is necessary for cleaning. The wastewater must be collected and treated once flushed through the system.
- Depending on the condition of the wastewater, it may or may not be disposed to sanitary sewer systems.
- The efficiency of storm system flushing decreases when the length of sewer line being cleaned exceeds 700 feet.

Sanitary Sewer Maintenance

- Clean sewer lines on a regular basis to remove grease, grit, and other debris that may lead to sewer backups.
- Establish routine maintenance program. Cleaning should be conducted at an established minimum frequency and more frequently for problem areas such as restaurants that are identified.
- Cleaning activities may require removal of tree roots and other identified obstructions.
- During routine maintenance and inspection note the condition of sanitary sewer structures and identify areas that need repair or maintenance. Items to note may include the following:
  - Cracked/deteriorating pipes
  - Leaking joints/seals at manhole
  - Frequent line plugs
  - Line generally flows at or near capacity
  - Suspected infiltration or exfiltration

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Facilities
- Street Rights-of-Way

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Organics
- Low Dissolved Oxygen

- Prioritize repairs based on the nature and severity of the problem. Immediate clearing of blockage or repair is required where an overflow is currently occurring or for urgent problems that may cause an

imminent overflow (e.g. pump station failures, sewer line ruptures, sewer line blockages). These repairs may be temporary until scheduled or capital improvements can be completed.

- Review previous sewer maintenance records to help identify "hot spots" or areas with frequent maintenance problems and locations of potential system failure.

Spills and Overflows

- Identify and track sanitary sewer discharges. Identify dry weather infiltration and inflow first. Wet weather overflow connections are very difficult to locate.
- The City's 13 permitted combined sewer overflows to the Charles River and the Alewife Brook should be checked monthly and monitored more frequently during wet weather conditions.
- Locate wet weather overflows and leaking sanitary sewers using conventional source identification techniques such as monitoring and field screening. Techniques used to identify other illicit connection sources can also be used for sewer system evaluation surveys.
- Implement community awareness programs for monitoring sanitary sewer wet weather overflows. A citizen's hotline for reporting observed overflow conditions should be established to supplement field screening efforts.
- Establish lead department/agency responsible for spill response and containment. Provide coordination within departments.
- When a spill, leak, and/or overflow occurs and when disinfecting a sewage contaminated area, take every effort to ensure that the sewage, disinfectant and/or sewage treated with the disinfectant is not discharged to the storm drainage system or receiving waters. Methods may include:
  - Blocking storm drain inlets and catch basins.
  - Containing and diverting sewage and disinfectant away from open channels and other storm drain fixtures (using sandbags, inflatable dams, etc.).
  - Removing the material with vacuum equipment.
- Record required information at the spill site.
- Perform field tests as necessary to determine the source of the spill.
- Develop notification procedures regarding spill reporting.

Septic Systems

- Document on a map the City's septic systems.

Planned Water Line Maintenance

- Discharge to a sanitary sewer system with approval.
- Discharge to the storm drainage rain system using applicable pollution control measures. (Only available to clean water discharges such as water main/ water storage tank/water hydrant flushing).

- If water is discharged to a storm drain, control measures must be put in place to control potential pollutants (i.e. sediment, chlorine, etc.).

Examples of some storm drain protection options include:

  - Silt fence – appropriate where the inlet drains a relatively flat area.
  - Gravel and wire mesh sediment filter – Appropriate where concentrated flows are expected.
  - Wooden weir and fabric – use at curb inlets where a compact installation is desired.
- Prior to discharge, inspect discharge flow path and clear/cleanup any debris or pollutants found (i.e. remove trash, leaves, sediment, and wipe up liquids, including oil spills).
- General Design considerations for inlet protection devices include the following:
  - The device should be constructed such that cleaning and disposal of trapped sediment is made easy, while minimizing interference with discharge activities.
  - Devices should be constructed so that any standing water resulting from the discharge will not cause excessive inconvenience or flooding/damage to adjacent land or structures.
- The effectiveness of control devices must be monitored during the discharge period and any necessary repairs or modifications made.

Unplanned Water Line Maintenance

- Stop the discharge as quickly as possible.
- Minor discharges would include direction from the DPW. In most cases, catch basins are protected with filter fabric.
- Major discharges would require the MWRA or Massachusetts DEP to be contacted.
- Inspect flow path of the discharged water:
  - Identify erodible areas which may need to be repaired or protected during subsequent repairs or corrective actions.
  - Identify the potential for pollutants to be washed into the waterway.
- If repairs or corrective action will cause additional discharges of water, select the appropriate procedures for erosion control, chlorine residual, turbidity, and chemical additives. Prevent potential pollutants from entering the flow path.

INSPECTION PROCEDURES

- Inspect for root infiltration. Tree roots are a major cause of backups.
- Inspect for water inflow/infiltration. Rain water entering the sewer pipe causes overflows.
- Inspect for solids. Typical solids that buildup in the pipe and cause backups are grease, dirt, bones, tampons, paper towels, diapers, broken dishware, garbage, concrete, and debris.
- Inspect for structural defects in pipes and manholes - Sags in the line, cracks, holes, protruding laterals, misaligned pipe, and offset joints are all possible causes of backups.

MAINTENANCE PROCEDURES

- Repair structural defects in pipes and manholes immediately.
- Refurbish portions of the utility lines periodically.
- Repairs should adhere to the facility prioritization:
  - High Priority: public health risk, major structural problems, collapsed catch basins with road plates, and illicit connections.
  - Medium Priority: Main pipe lines with significant structural problems, non-functioning catch basins, and street pavements failures caused by minor pipe defects.
  - Low Priority: Installation of non-critical structures and service laterals.
- All maintenance activities should be documented through the Cambridge Request System (formerly the Hansen Request System).

BMP 12-PET WASTE AND LITTER

DESCRIPTION

Pet droppings have been found to be important contributors of pollution in estuaries and bays where there are high populations of dogs. It has been estimated that for a small bay watershed (up to 20 square miles), 2 to 3 days of droppings from a population of 100 dogs contribute enough bacteria, nitrogen, and phosphorus to temporarily close a bay to swimming and shell fishing. The Cambridge Municipal Code, Title 6 Animals, Chapter 6.04 (Section 6.04.060 Dogs – Removal of Waste Required) clearly states that individuals must pick up their pet's waste.

POLLUTION PREVENTION APPROACH

Provide pet awareness and education programs with the following elements:

- Encouraging residents to clean up after their pets and to properly dispose of such wastes that may be deposited in their yards, streets and parks.
- Posting signs in local parks describing the problem and urging cleanup and proper disposal of pet wastes.

SUGGESTED BEST MANAGEMENT PRACTICES

- Put waste in the trash.
- Restrict dog access to areas of parks where swales, steep slopes and streams are.
- Provide vegetated buffers of prescribed widths between dog parks and waterways, swales, storm drain inlets, gulleys and steep slopes.
- Add pooper scooper stations with free sanitary "pick-up" bags and proper receptacles to all City-Owned parks, playgrounds, and reservations.
- Incorporate public outreach elements like signage and informational brochures into and around parks.

INSPECTION PROCEDURES

- Routinely inspect common dog walking areas for pet waste.

MAINTENANCE PROCEDURES

- Remove and properly dispose of pet waste.
- Enforce Cambridge Municipal Code: Section 6.04.060 Dogs – Removal of Waste Required.

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Parks, Playgrounds, and Reservations
- Sidewalk and Street Rights-of-Way

TARGETED CONSTITUENTS

- Nutrients
- Organics
- Low Dissolved Oxygen

BMP 13- SIDEWALK CLEANING AND REPAIR

DESCRIPTION

Pollutants on sidewalks and other pedestrian traffic areas and plazas are typically due to littering and vehicle use.

POLLUTION PREVENTION APPROACH

Implement applicable suggested Best Management Practices to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

SUGGESTED BEST MANAGEMENT PRACTICES

Sidewalk Cleaning

- Post "No Littering" signs and enforce anti-litter laws.
- Provide litter receptacles in busy, high pedestrian traffic areas of the community, at recreational facilities, and at community events.
- Cover litter receptacles and clean out frequently to prevent leaking/spillage or overflow.
- Regularly broom (dry) sweep sidewalk, plaza and parking lot areas to minimize cleaning with water.
- Dry cleanup first (sweep, collect, and dispose of debris and trash) when cleaning sidewalks or plazas, then wash with or without soap.
- Use biodegradable soaps and detergents to wash down sidewalks.
- Block the entrance to the storm drainage system by using filter fabric to block catch basins. Discharge wash water to landscaping or collect water and pump to a tank or discharge to sanitary sewer if allowed.
- Use deicing salts and sands only when snow or ice is present (not as a preventive measure) and apply sparingly. Shoveling of snow is always preferred to dumping excessive amounts of deicing materials in an effort to avoid shoveling. If deicing salts are used, the residues and remaining granules should be swept up when the snow and ice has melted, and reused or disposed of in your garbage. Un-shoveled or icy sidewalks can be reported to the DPW's Snow Hotline at 617-349-4903, as identified in DPW's "Snow: Our Winter Challenge" brochure.

Sidewalk Repair

- Refer to "Standard Specification from Street Excavations and Construction (Section II, 2F).
- Schedule surface removal activities for dry weather if possible.
- Avoid creating excess dust when breaking asphalt or concrete.
- Take measures to protect nearby storm drain inlets prior to breaking up asphalt or concrete (e.g. filter fabric or sand bags around inlets).
- Clean afterwards by sweeping up as much material as possible.
- Designate an area for clean up and proper disposal of excess materials.
- Remove and recycle as much of the broken pavement as possible to avoid contact with rainfall and stormwater runoff.

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Facilities
- Sidewalk and Street Rights-of-Way

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Organics

REFERENCE

- "Standard Specifications for Street Excavations and Construction", Section II, 2F)
- DPW's "Snow: Our Winter Challenge" brochure

- When making saw cuts in pavement, use as little water as possible. Cover each storm drain inlet completely with filter fabric during the sawing operation and contain the slurry by placing straw bales, sandbags, or gravel dams around the inlets. After the liquid drains or evaporates, shovel or vacuum the slurry residue from the pavement or gutter and remove from site.
- Always dry sweep first to clean up tracked dirt. Use a street sweeper or vacuum truck. Do not dump vacuumed liquid in storm drains. Once dry sweeping is complete, the area may be hosed down if needed. Wash water should be directed to the sanitary sewer as allowed by the DPW.

INSPECTION PROCEDURES

- Inspect sidewalks regularly for trash items and stains.

MAINTENANCE PROCEDURES

- Sweep sidewalks at least as necessary to collect loose dirt and debris rather than pushing it into the street or gutter or hosing it down. Collected materials must be disposed of as regular garbage.
- Conduct spot stain removal instead of washing entire sidewalk.

BMP 14- GRAFFITI CLEANING

DESCRIPTION

Graffiti cleaning often results in the discharge of wastewater to the storm drainage system, unless the equipment operator takes steps to collect and dispose of it legally. Discharge of pressure washing wastewater to the storm drainage system is prohibited because it contains pollutants from the cleaning compounds used and/or from the objects or surfaces being cleaned.

POLLUTION PREVENTION APPROACH

Implement applicable suggested Best Management Practices to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

SUGGESTED BEST MANAGEMENT PRACTICES

- Avoid graffiti abatement activities during rain events.
- When graffiti is removed by painting over, ensure that the catch basin inlets are protected.
- Direct runoff from sand blasting and hot water pressure washing (with no cleaning agents) into a dirt or landscaped area after treating with an appropriate filtering device.
- Use hot water for pressure washing. If using a biodegradable soap, plug nearby storm drain inlets and vacuum/pump wash water to the sanitary sewer if a graffiti abatement method generates wash water containing a cleaning compound (such as high pressure washing with a cleaning compound).
- Ensure that a non-hazardous cleaning compound is used or dispose as hazardous waste, as appropriate.

INSPECTION PROCEDURES

- Regularly inspect facilities for graffiti.

MAINTENANCE PROCEDURES

- Remove graffiti as necessary, according to the suggested Best Management Practices.

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Facilities

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Metals
- Oil & Grease
- Organics
- Low Dissolved Oxygen

BMP 15- MOSQUITO CONTROL

DESCRIPTION

Larvicides are placed in the City's catch basins one to three times per year.

POLLUTION PREVENTION APPROACH

Implement applicable suggested Best Management Practices to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

SUGGESTED BEST MANAGEMENT PRACTICES

[TBD]

INSPECTION PROCEDURES

[TBD]

MAINTENANCE PROCEDURES

[TBD]

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Facilities

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Organics
- Low Dissolved Oxygen

BMP 16- WASTE MANAGEMENT

DESCRIPTION

Improper storage and handling of solid wastes can allow toxic compounds, oils and greases, heavy metals, nutrients, suspended solids, and other pollutants to enter stormwater runoff.

POLLUTION PREVENTION APPROACH

The discharge of pollutants to stormwater from waste handling and disposal can be prevented and reduced by tracking waste generation, storage, and disposal; reducing waste generation and disposal through source reduction, re-use, and recycling; and preventing runon and runoff.

Implement applicable suggested Best Management Practices to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

SUGGESTED BEST MANAGEMENT PRACTICES

General

- Cover storage containers with leak proof lids or some other means. If waste is not in containers, cover all waste piles (plastic tarps are acceptable coverage) and prevent stormwater runon and runoff with a berm. The waste containers or piles must be covered except when in use.
- Use drip pans or absorbent materials whenever grease containers are emptied by vacuum trucks or other means. Grease cannot be left on the ground. Collected grease must be properly disposed of as garbage.
- Sweep and clean the storage area regularly. If it is paved, do not hose down the area to a storm drain.
- Dispose of rinse and wash water from cleaning waste containers into a sanitary sewer if allowed by the local sewer authority. Do not discharge wash water to the street or storm drain.
- Transfer waste from damaged containers into safe containers.
- Take special care when loading or unloading wastes to minimize losses.

Controlling Litter

- Post “No Littering” signs and enforce anti-litter laws.
- Provide a sufficient number of litter receptacles for the facility.
- Clean out and cover litter receptacles frequently to prevent spillage.

Waste Collection

- Keep waste collection areas clean before contractor picks up.
- Inspect solid waste containers for structural damage or leaks regularly. Repair or replace damaged containers as necessary.
- Secure solid waste containers; containers must be closed tightly when not in use.
- Place waste containers under cover if possible.
- Do not fill waste containers with washout water or any other liquid.

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Facilities

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Organics
- Low Dissolved Oxygen

- Ensure that only appropriate solid wastes are added to the solid waste container. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc. may not be disposed of in solid waste containers (see chemical/ hazardous waste collection section below).
- Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal.

Good Housekeeping

- Use the entire product before disposing of the container.
- Keep the waste management area clean at all times by sweeping and cleaning up spills immediately.
- Use dry methods when possible (e.g. sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.
- Stencil storm drains on the facility's property with prohibitive message regarding waste disposal.

Chemical/Hazardous Wastes

- Select designated hazardous waste collection areas on-site.
- Store hazardous materials and wastes in covered containers protected from vandalism, and in compliance with fire and hazardous waste codes.
- Place hazardous waste containers in secondary containment.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.

Runon/Runoff Prevention

- Prevent stormwater runon from entering the waste management area by enclosing the area or building a berm around the area.
- Prevent the waste materials from directly contacting rain.
- Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropylene or hypalon.
- Cover the area with a permanent roof if feasible.
- Cover dumpsters to prevent rain from washing waste out of holes or cracks in the bottom of the dumpster.
- Move the activity indoor after ensuring all safety concerns such as fire hazard and ventilation are addressed.

INSPECTION PROCEDURES

- Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.
- Check waste management areas for leaking containers or spills.
- Repair leaking equipment including valves, lines, seals, or pumps promptly.

MAINTENANCE PROCEDURES

- Maintain equipment for material tracking program.

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Facilities

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Organics
- Low Dissolved Oxygen

BMP 17- BUILDING OPERATIONS

DESCRIPTION

Typical building operations include cleaning operations such as outside pressure washing of buildup and repairs.

POLLUTION PREVENTION APPROACH

Implement applicable suggested Best Management Practices to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

SUGGESTED BEST MANAGEMENT PRACTICES

Pressure Washing of Buildings, Rooftops, and Other Large Objects

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a waste/water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.
- If soaps or detergents are not used, and the surrounding area is paved, wash water runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in he catch basin to trap the particles in wash water runoff.
- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement. Ensure that this practice does not kill grass.

Building Repair, Remodeling, and Construction

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.
- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.
- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.
- Clean paint brushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal. Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and solids must be collected and disposed of before removing the containment device(s) at the end of the work day.
- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. In which case you

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Facilities

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Organics
- Low Dissolved Oxygen

should direct the water through hay bales and filter fabric or use other sediment filters or traps.

- Store toxic material under cover with secondary containment during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

INSPECTION PROCEDURES

- Sweep paved areas regularly to collect loose particles, and wipe up spills with rags and other absorbent material immediately; do not hose down the area to a storm drain.

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Facilities

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Organics
- Low Dissolved Oxygen

BMP 18- OIL/WATER SEPARATORS

DESCRIPTION

Oil/Water separators/interceptors are important to prevent gasoline, oil or sand from getting into the drainage systems. In the following places they are always required

- Repair garages where motor vehicles are serviced and repaired, and where floor drainage is provided
- Commercial motor vehicle washing facilities
- Gasoline Stations with grease racks, grease pits or wash racks
- Facilities which have oily and/or flammable waste as a result of manufacturing, storage , repair or testing
- Public storage garages with floor drainage
- Any place where solid, oil, gasoline or other volatile liquids can enter the drainage system

POLLUTION PREVENTION APPROACH

Implement applicable suggested Best Management Practices to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

SUGGESTED BEST MANAGEMENT PRACTICES

- DPW recommends sweeping garage floor frequently, depending on use.
- Target cleaning for early Spring or late Fall.
- Use oil absorbent materials on any liquid spills, such as oil or hydraulic fluid leaks.
- The facility manager should maintain a log of cleaning activities (including the Cambridge Request System). Information should include frequency of cleanings.
- It is important to remove sediments from garage floors that can have a high concentration of pollutants including metals and hydrocarbons. These sediments can clog downstream drainage systems and transport pollutants to nearby water bodies

INSPECTION PROCEDURES

- Oil/Water Separators/interceptors should inspected twice per year (best times are before the start and before the end of the rainy season).

MAINTENANCE PROCEDURES

- Clean oil/Water Separators on when necessary.
- Drains and grates should be free of debris or sediments.
- Dipping pans should be used under vehicles or spigots.
- Spill absorbent material should be ready for use.
- Floors should be kept clean and spill materials should be cleaned up in a timely manner.

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Facilities
- Street Rights-of-Way
- Disposal of Removed Solids

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Organics
- Low Dissolved Oxygen

BMP 19- GREEN ROOFS

DESCRIPTION

Green roofs allow for runoff to be filtered through a soil medium that removes different pollutants before the runoff enters the stormwater drainage system. The green roof area needs to be maintained fairly frequently for the first year and then annually after that. The frequency of inspection also depends on the type of green roof that is installed.

POLLUTION PREVENTION APPROACH

The suggested Best Management Practices should be used to reduce the influx of pollutants into the storm water drainage system and increase the longevity of the green roof.

SUGGESTED BEST MANAGEMENT PRACTICES

- It is recommended that the area be cleaned extensively once in the early spring and once in the late fall.
- The area should be cleaned with hand tools, rakes, and shovels.
- Facilities and personal in-charge of the bio-retention area should keep inspectional logs and cleaning activity logs.
- Frequency of inspection and maintenance should be based on type of green roof:

a) Extensive <3 in. Low Nutrition Substrate

- Drainage outlets and inspection chambers cleared of vegetation, as with any roof.
- Ensure outlets and shingle perimeters clear of dead and live plants.
- Generally they are allowed to develop into dry meadows.

b) Semi Extensive – 3 in. to 6 in. low to medium nutrition substrate

- Drainage outlets and inspection chambers cleared of vegetation.
- Ensure outlets and shingle perimeters clear of dead and live plants.
- Removal of undesirable vegetation 6 monthly.

c) Intensive – 6 in. + medium nutrition substrates and top soils

- Drainage outlets and inspection chambers cleared of vegetation.
- Ensure outlets and shingle perimeters clear of dead and live plants.
- Intensive care of lawns, hedges etc.

TARGETED FACILITIES AND OPERATIONS

- All City-Owned Facilities

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Metals
- Organics
- Low Dissolved Oxygen

REFERENCE

- "Green Roof Guide" United Kingdom
- "Green Roof Standards" City of Toronto
- ASTM Standards for Green Roofs

- Replacement of failed plants exceeding 5% of plants installed.
- Replenishment of any areas of settled substrate.

d) Bio-diverse - very low to low nutrition

- Drainage outlets and inspection chambers cleared of vegetation.
- Ensure outlets and shingle perimeters clear of dead and live plants.
- Low vegetation is common and none is general undesirable.

INSPECTION PROCEDURES

- Green roof areas should be inspected after every rainfall over a half inch of rainfall for the first year.
- Inspection of the green roof should be daily for the first month to ensure the area is taking properly.
- The green roof should be inspected twice a month during the growing season and once in the beginning of spring and at the end of fall.

MAINTENANCE PROCEDURES

Green roofs should be kept free of debris and weeds to ensure a properly working infiltration and stormwater management area. Routine maintenance should be done year round.

After planting:

- The area should be watered daily for two weeks unless significant rainfall has occurred
- Inspect the green roof area for any signs of erosion.
- Ensure that the irrigation system is operational, if necessary.

After first rainfall:

- The green roof area should be free of standing within 12-hours of rainfall. No standing water should be visible within the green roof area. If the area has not drained continue to monitor, soil remediation or an improved under drain system may be needed.
- Inspect all inlets and outlet structure to ensure that runoff has drained properly with the roof.

One month of planting:

- Inspect all plants to ensure that they are free of pest and diseases; do not use any toxic pesticide or other toxic methods to removed pest and diseases. The toxic substance will enter the ground and also the storm sewer system.
- Make repairs to all areas in and around the green roof area that appear to be worn down.

- Remove any weeds from the area, ensure that all root system from the weeds have been destroyed. Do not us any toxic substances to remove weeds.

The following seasons:

- If plants are showing signs of pest, disease or are growing poorly, remove the plant(s) and replace. Inspect the plants surrounding the area to ensure that there is not a greater problem.
- During times of extended drought look for features of stress, wilting, spotted brown leaves, loss of leaves, poor plant health, etc. except when bio-diverse system is used.
- Area should be water, when needed, in the early morning when maximum absorption.
- Prune excess growth annually or more often. Trimmed material maybe recycled in with the mulch.
- Weed the area regularly; however the area should not be mowed.
- Remove plant material away from fire walls, drainage outlets and inlets and other mechanical equipment.

BMP 20- PERVIOUS PAVEMENT

DESCRIPTION

Pervious pavement areas allow for runoff to be filtered through a soil medium that removes different pollutants before the runoff enters the stormwater drainage system. The pervious pavement facility needs to be maintained on a yearly basis. The maintenance is relatively simple and can be done in a short amount of time depending on the size of the area.

POLLUTION PREVENTION APPROACH

The suggested Best Management Practices should be used to reduce the influx of pollutants into the storm water drainage system and increase the longevity of the pervious pavement area.

SUGGESTED BEST MANAGEMENT PRACTICES

- It is recommended that the area be cleaned once in the early spring and once in the late fall.
- The area should be cleaned with a vacuum street sweeper and the surrounding area should be cleaned of all debris.
- Facilities and personal in-charge of the pervious pavement area should keep inspectional logs and cleaning activity logs.
- The area should not have any soil stockpiles, mulch, or other fine materials stored near or on top of the pavement.

INSPECTION PROCEDURES

- Pervious Pavement areas should be inspected after every rainfall over a half inch of rainfall for the first year.
- Inspection of the pervious pavement area should be monthly for the first six months to ensure the pavement and sub-bases were properly constructed.
- The pervious pavement area should be inspected at the end of the winter months to ensure that excessive winter treatment chemicals did not build-up in the pavement cross section.

MAINTENANCE PROCEDURES

Pervious pavement areas should be kept clean through-out the year. A vacuum sweeper is necessary to remove any sediments or other debris that has fallen in the voids of the pavement. During winter months, the pervious pavement section should be salted only. Sand and any other anti-skid product should not be placed on the pervious pavement or any area that drains to the pervious pavement. If at any time standing water is observed on the pervious pavement the area should be excavated and a pavement and below soils should be viewed for excessive sediment build-up.

TARGETED FACILITIES AND OPERATIONS

- City parking lots
- Street Rights-of-Way

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Organics
- Low Dissolved Oxygen

REFERENCE

- StormwaterPA- Pervious Pavement
- Stormwater Solutions

BMP 21- BIO RETENTION FACILITIES

DESCRIPTION

Bio-retention areas allow for runoff to be filtered through a soil medium that removes different pollutants before the runoff enters the stormwater drainage system. The Bio-retention facility needs to be maintained fairly frequently for the first year and then annually after that.

POLLUTION PREVENTION APPROACH

The suggested Best Management Practices should be used to reduce the influx of pollutants into the storm water drainage system and increase the longevity of the bio-retention basin

SUGGESTED BEST MANAGEMENT PRACTICES

- It is recommended that the area be cleaned once in the early spring and once in the late fall.
- The area should be cleaned with hand tools, rakes, shovels and light construction equipment. Vehicles should not be driven on the bio-retention area.
- All damage should be repaired and mulch areas that are exposed should be fixed.
- Facilities and personal in-charge of the bio-retention area should keep inspectional logs and cleaning activity logs.

INSPECTION PROCEDURES

- Bio-retention areas should be inspected after every rainfall over a half inch of rainfall for the first year.
- Inspection of the bio-retention area should be daily for the first month to ensure the area is taking properly.
- The bio-retention area should be inspected once a month during the growing season and once in the beginning of spring and at the end of fall.

MAINTENANCE PROCEDURES

Bio-retention areas should be kept free of debris and weeds to ensure a properly working infiltration and stormwater management area. Routine maintenance should be done year round and does not require much effort if area is well kept.

After planting:

- The area should be watered daily for two weeks unless significant rainfall has occurred
- Inspect the bio-retention area for any signs of erosion.
- Re-mulch any area where bare soil has become exposed or mulch layer has been significantly reduced.

TARGETED FACILITIES AND OPERATIONS

- All City-Owned property
- City parking lots
- Street Rights-of-Way

TARGETED CONSTITUENTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil & Grease
- Organics
- Low Dissolved Oxygen

REFERENCE

- University of Minnesota-Rain gardens and Maintenance
- “Vermont Rain Garden Manual”
- Fairfax County “Public Facility Manual”

- If necessary use stones to stabilize drainage paths within the bio-retention area. If it is possible us a wetland grass mixture if the area will hold the seeds

After first rainfall:

- The bio-retention area should be free of standing within 72-hours of rainfall. No standing water should be visible within the bio-retention area. If the area has not drained continue to monitor, soil remediation or an improved under drain system may be needed.
- Ensure that mulch has not moved and settled in clumps.
- If applicable, inspect all inlets and outlet structure to ensure that runoff has drained properly with the basin.

One month of planting:

- Inspect all plants to ensure that they are free of pest and diseases; do not use any toxic pesticide or other toxic methods to removed pest and diseases. The toxic substance will enter the ground and also the storm sewer system.
- Make repairs to all areas in and around the bio-retention area that appear to be worn down.
- Add mulch to areas that are bare or insufficient mulch coverage exist.
- Remove any weeds from the area, ensure that all root system from the weeds have been destroyed. Do not us any toxic substances to remove weeds.

The following seasons:

- Every 6 month or in spring and fall, whichever comes first, add 1" of mulch.
- Once every 2 to 3 years, in the spring, apply a new 3" layer of mulch in the entire bio-retention garden.
- If plants are showing signs of pest, disease or are growing poorly, remove the plant(s) and replace. Inspect the plants surrounding the area to ensure that there is not a greater problem.
- During times of extended drought look for features of stress, wilting, spotted brown leaves, loss of leaves, poor plant health, etc.)
- Area should be water, when needed, in the early morning when maximum absorption.
- Prune excess growth annually or more often. Trimmed material maybe recycled in with the mulch.
- Weed the area regularly; however the area should not be mowed.

SECTION 4.0 GOOD HOUSEKEEPING FORM, SCHEDULES, AND INSPECTION PROTOCOLS

Appendix B includes a good housekeeping inspection form that should be completed on an annual basis or as necessary by facility personnel for specific City properties or for City operations. The form includes a BMP checklist to identify what BMPs are applicable to the site and an assessment of the effectiveness of the BMPs implemented. The effectiveness of the BMP depends on whether proper procedures and protocols identified in Section 3.0 are currently being implemented. The comments section serves to provide how inadequate BMPs will be addressed. The form includes a section on property changes to evaluate whether new BMPs should be incorporated into the day-to-day activities of the facility.

It is important to keep a record of the inspection forms at an appropriate department designated facility and also to forward a copy to the DPW Stormwater Project Manager. Inspection forms for facilities and City-wide operations should be completed during a time of the year that applicable activities are being conducted. For example, street sweeping activities for City-wide operations should be evaluated during the scheduled times of the year these activities take place. The City is required to submit an annual report to the Massachusetts DEP and EPA on May 1st that includes a status on good housekeeping control measures implemented. Therefore, good housekeeping inspection forms for a given permit year (May 1st to April 30th) should be completed and submitted to the DPW Stormwater Project Manager by February 15th (annually).

APPENDIX G
Site Plan Review and Inspection Procedures

The City of Cambridge
Department of Public Works

The City of Cambridge Commissioner of Public Works ("the Commissioner") hereby adopts these Land Use Regulations pursuant to Cambridge Municipal Code Chapter 13.16 Wastewater and Stormwater Drainage System.

LAND DISTURBANCE REGULATIONS

Article I
General Provisions And Definitions

Section 1 – Reference to Regulations.
These regulations shall be referred to as the Land Disturbance Regulations.

Section 2 – Authority.
Under the authority granted by the Home Rule Amendment of the Massachusetts Constitution, the Home Rule statues and pursuant to the regulations of the federal Clean Water Act found at 40 CFR 122.34 and in furtherance of the goals set forth therein and pursuant to Cambridge Municipal Code, ch. 13.16, the City of Cambridge Commissioner of Public Works has established the following Regulations governing stormwater management standards for land disturbance including but not limited to disturbance from development and redevelopment projects.

Section 3 – Applicability and Purpose.
This Regulation shall apply to all activities that:

(i) disturb one (1) or more acres of land,

(ii) exceed fifty thousand (50,000) square feet of Gross Floor Area,

(iii) have a project parcels(s) equal to or greater than one acre in size,

(iv) include outdoor parking for ten (10) cars or more,

(v) require a Special Permit from the Planning Board, or

(vi) in the opinion of the City Engineer may result in an adverse impact of the municipal Sewer, Combined Sewer, Stormwater Drainage Systems or Water Resources.

The purpose of this Regulation is to reduce pollutants in any stormwater runoff from construction activities and to address post construction stormwater runoff from new development and redevelopment projects.

All federal, state and local permit requirements related to implementation of stormwater management facilities must be met by the owner prior to facility use.

Section 4 – Severability.
The provisions of these Regulations are severable. If any provision of these Regulations or any specific application to any person or circumstance, is held invalid, such invalidity shall not affect other provisions or applications which can be given effect in the absence of the invalid provision or application.

Section 5 – Required Applications and Permits.

(a) Applications and permits required by these Regulations are in addition to applications and permits that may be required by other federal, state (including MWRA) and local laws or Regulations. The

following applications and permits are required by these Regulations and issued by the DPW as they apply:

(i) Land Disturbance Permit
(ii) NPDES General Permit for Discharges from Large and Small Construction Activities as issued by EPA, where applicable

Section 6 – Definitions
All terms used in these Land Disturbance Regulations shall be as defined in the City of Cambridge Wastewater and Stormwater Drainage Use Regulations unless otherwise defined herein:

Certified Professional In Erosion And Sediment Control (CPESC) shall mean a certified specialist in soil erosion and sediment control. This certification program, sponsored by the Soil and Water Conservation Society in cooperation with the American Society of Agronomy, provides the public with evidence of professional qualifications.

Construction and Waste Materials shall mean excess or discarded building or site materials, including but not limited to concrete truck washout, chemicals, litter and sanitary waste at a construction site that may adversely impact water quality.

Clearing shall mean any activity that removes the vegetative surface cover.

Development shall mean the modification of land to accommodate a new use or expansion of use, usually involving construction.

Erosion shall mean the wearing away of the land surface by natural or artificial forces such as wind, water, ice, gravity, or vehicle traffic and the subsequent detachment and transportation of soil particles.

Erosion And Sediment Control Plan shall mean a document containing narrative, drawings and details developed by a Massachusetts registered professional engineer (P.E.), a Certified Professional in Erosion and Sedimentation Control (CPESC) or a Massachusetts Registered landscape architect, which includes best management practices (BMPs), or equivalent measures designed to control surface runoff, erosion and sedimentation during pre-construction and construction related land disturbance activities.

Grading shall mean changing the level or shape of the ground surface.

Impervious Surface shall mean any material or structure on or above the ground that prevents water infiltrating the underlying soil.

Land Disturbance shall mean any action that causes a change in the position, location, or arrangement of soil, sand, rock, gravel of similar earth material.

Land Disturbance Permit is a permit required to conduct land disturbing activities.

Land Disturbing Activity shall mean any activity that causes a change in the position or location of soil, sand, rock, gravel, or similar earth material.

Massachusetts Stormwater Management Policy is the Policy issued by the Department of Environmental Protection, and as amended, that coordinates the requirements prescribed by state regulations promulgated under the authority of the Massachusetts Wetlands Protection Act G.L. c. 131 §. 40 and Massachusetts Clean Waters Act G.L. c. 21, §. 23-56. The Policy addresses stormwater impacts through implementation of performance standards to reduce or prevent pollutants from reaching water bodies and control the quantity of runoff from a site.

Redevelopment shall mean the development, rehabilitation, expansion, demolition or phased projects that disturb the ground surface or increase the impervious area on previously developed sites.

Sediment shall mean mineral or organic soil material that is transported by wind or water, from its origin to another location; the product of erosion processes.

Sedimentation shall mean the process or act of deposition of sediment.

Slope shall mean the incline of a ground surface expressed as a ratio of horizontal distance to vertical distance.

Soil shall mean any earth, sand, rock, gravel, or similar material.

Soil Stabilization shall mean the use, singly or in combination, of mechanical, structural, or vegetative methods, to prevent or retard erosion.

Water Resources shall mean lakes, ponds, streams, rivers, wetlands, and groundwater.

Article II
Permits and Plan Review Procedures

Section 1 – Permits.

(a) **Filing Application.** A Land Disturbance Permit is required when a project:

(i) disturbs one (1) or more acres of land,

(ii) exceed fifty thousand (50,000) square feet of Gross Floor Area,

(iii) has project parcels(s) equal to or greater than one acre in size,

(iv) includes outdoor parking for ten (10) cars or more,

(v) requires a Special Permit from the Planning Board, or

(vi) in the opinion of the City Engineer the project may result in and adverse impact of the municipal Sewer, Combined Sewer, Stormwater Drainage Systems or Water Resources.

The site owner or his/her representative shall file with the DPW, two (2) copies (one paper and one electronic copy on CD)of a completed application package for a Land Disturbance Permit. Permit issuance is required prior to any land disturbing activity. While the applicant can be a representative, the permittee must be the owner of the site. The Land Disturbance Permit Application package shall include:

(i) completed Application Form with original signatures of all owners;

(ii) the Stormwater Management Plan as specified in Article IV, Sections 1 and 2;

(iii) the Erosion and Sediment Control Plan as specified in Article V, Sections 1 and 2;

(iv) the Operation and Maintenance Plan as specified in Article VI, Section 1;

(v) the NPDES General Permit for Discharges from Large and Small Construction Activities, as applicable;

(vi) payment of the application and review fees.

(b) **Entry.** Filing an application for a permit grants the DPW or its agent permission to enter the site to verify the information in the application and to inspect for compliance with the resulting permit

Section 2 – Plan Review Procedures.

(a) **Process.** A written application for approval of the Stormwater Management Plan, Erosion and Sediment Control Plan, and Operation and Maintenance Plan shall be filed with the DPW. Plans that

meet the requirements specified in the City of Cambridge Wastewater and Stormwater Management Guidelines will be reviewed in accordance with the standards of Articles IV, V, and VI. The DPW shall approve, approve with conditions, or deny the Stormwater Management Plan, Erosion and Sediment Control Plan, and Operation and Maintenance Plan within sixty (60) days following the date the application for approval is filed.

(b) **Duration.** Approval of the Stormwater Management Plan, Erosion and Sediment Control Plan, and Operation and Maintenance Plan submitted under the provisions of this Regulation shall expire one year after the date of approval unless land disturbing activities have commenced in accordance with said plans. However, if, not less than forty-five (45) days prior to the expiration of the approval, the applicant makes a written request to the DPW for an extension of time to commence the land disturbing activities setting forth the reasons for the requested extension, the DPW may grant one or more extension, each not to exceed one year, for good cause.

(c) **Conditions.** Plans may be approved subject to adherence with reasonable and necessary conditions to assure compliance with this Regulation. Such conditions may, by way of example but not limitation, require the construction of structures, drainage facilities, storage basins and other facilities, require replacement of vegetation, establish required monitoring procedures, stage the work over time, require alteration of the site design to insure buffering, and require the conveyance to the City or other public entity of certain lands or interests therein as may be needed to comply with such conditions**.**

(d) **Modifications.** The approved plans shall not be changed, modified, or altered without written authorization from the DPW. The applicant shall be required to make any plan modifications needed due to conflicts, omissions or changed conditions that arise in the field and adhere to the standards in Articles IV, V, and VI, subject to written authorization from the DPW. The applicant shall bear all costs to comply with this Section 2 and the City of Cambridge Wastewater and Stormwater Management Guidelines.

(e) **Performance bond.** Prior to approval of the Stormwater Management Plan, Erosion and Sediment Control Plan, and Operation and Maintenance Plan, the applicant shall be required to post a surety bond, irrevocable letter of credit, cash, or other acceptable security. The form of the bond shall be approved by the City Solicitor, and be in an amount deemed sufficient by the DPW to ensure that the work will be completed in accordance with the Land Disturbance Permit. The bond shall guarantee completion and compliance with conditions within a specific time. The adequacy, conditions and acceptability of any bond shall be determined by the DPW. If the project is phased, the DPW may release part of the bond as each phase is completed and in compliance with the permit but the bond may not be fully released until the DPW has received the final inspection report and the applicant has obtained a Certificate of Occupancy, if applicable.

(f) **Fee Structure.** An applicant shall pay to the DPW with each submission an Application Fee established by the DPW to cover expenses connected with the application review of the Land Disturbance Permit, a Technical Review Fee sufficient to cover professional review and an inspection fee sufficient to cover DPW costs in ensuring adherence to the applicant's permit conditions. The DPW may retain a registered professional engineer (P.E.) or other professional consultant to advise the DPW on any or all aspects of these plans at applicant's expense. Applicants must pay review fees before the permit shall issue.

Section 3 – Issuance of Land Disturbance Permit.

(a) No permit shall be issued until the required Stormwater Management Plan, Erosion and Sediment Control Plan, and Operation and Maintenance Plan are approved the DPW.

(b) As a condition of permit issuance, the applicant shall agree to allow or obtain the necessary authorizations to allow all inspections required by the City.

(c) Where a bond, letter of credit or other guarantee is required, the permit shall not be issued until the bond or guarantee has been obtained by the Applicant and received and approved by the City.

Article III
Non-Exclusivity, Exemptions, and Waivers

Section 1 – Non-Exclusivity.
In addition to permits required by these Land Disturbance Regulations, applicants shall be required to obtain all other permits or approvals required by applicable federal, state and local laws, rules, and regulations.

Section 2 – Exemptions.
The provisions of this Regulation do not apply to:

(a) Emergency work to protect life, or property.

(b) Transportation improvements which will not directly increase non-point source pollution or quantity of stormwater runoff once construction has been completed (e.g., pavement overlays).

(c) Normal maintenance and improvement of land in agricultural use as defined by the Wetlands Protection Act regulation 310 CMR 10.04.

Section 3 – Waivers.
(a) The DPW may waive strict compliance with any requirement of this Regulation, where:

(i) such action is allowed by applicable federal, state and local laws, rules and/or regulations,

(ii) is in the public interest, and

(iii) is not inconsistent with the purpose and intent of this Regulation.

(b) Any applicant may submit a written request to the DPW to be granted such a waiver. Such a request shall be accompanied by an explanation or documentation supporting the waiver request and demonstrating that strict compliance of this Regulation does not further the purposes or objectives of this Regulation.

Article IV
Stormwater Management Standards

Section 1 – Stormwater Management Standards.
A Stormwater Management Plan shall meet the following requirements and standards (specific plan requirements and guidance are given in the City of Cambridge Wastewater and Stormwater Management Guidelines).

(a) The quality of stormwater leaving the site after development shall be equivalent to or, to the extent practicable, better than the quality of stormwater leaving the site before development based on the following criteria:

(i) Water quality control facilities required for development shall be designed, installed and maintained in accordance with the City of Cambridge Wastewater and Stormwater Management Guidelines.

(ii) Land use activities of particular concern as pollution sources shall be required to implement additional pollution controls in accordance with the City of Cambridge

Wastewater and Stormwater Management Guidelines.

(iii) Development in a watershed that drains to wetlands or Water Resource shall assure that water quality control facilities meet the requirements for pollutants of concern in accordance with the City of Cambridge Wastewater and Stormwater Management Guidelines and all applicable federal, state and local laws, rules and regulations.

(iv) No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or Water Resources.

(b) The peak discharge rate of stormwater leaving the site after development shall be equal to or less than the peak discharge rate of stormwater leaving the site before development based on the following criteria:

(i) Stormwater discharge leaving the site, during construction and after construction completion, does not have a negative impact on adjacent and abutting properties.

(ii) Stormwater discharge from a site, during construction and after construction completion, will be infiltrated, treated or stored in accordance with the quantity and quality control requirements specified in the City of Cambridge Wastewater and Stormwater Management Guidelines.

Article V
Erosion and Sediment Standards

Section 1 – Erosion and Sediment Standards.
An Erosion and Sediment Control Plan must meet the following objectives applicable to all land disturbance activities:

(a) The objective of this Article is to minimize to the maximum extent practicable sediments or pollutants exiting the site, entering the public right-of-way or being deposited into any Water Resource or stormwater drainage system.

(b) In order to meet the objectives set forth in Section 1 (a) above, the owner or applicant shall:

(i) Implement measures intended to keep soil on site or out of Water Resources, stormwater drainage systems or the public right-of-way as the first step in any development.

(ii) Remove any soil that enters the public right-of-way.

(iii) Protect stormwater inlets that are functioning during the course of the development by approved sediment control measures so that sediment-laden water cannot enter the inlets without first being properly treated.

(iv) Apply permanent or temporary soil stabilization to denuded development site areas in conformance with the City of Cambridge Wastewater and Stormwater Management Guidelines.

(v) Plant replacement vegetative cover in accordance with the City of Cambridge Wastewater and Stormwater Management Guidelines.

(vi) Secure or protect soil stockpiles throughout the project with temporary or permanent soil stabilization measures, protect all stockpiles on the site, and those transported from the site. All handling of soils shall be done in accordance with the City of Cambridge

Wastewater and Stormwater Management Guidelines and all applicable federal, state and local laws, rules and regulations.

(vii) Post signage on the site of the permitted land disturbing activity that identifies the DPW 24-hour Hotline Number (617-349-4800).

(viii) Sequence activities to minimize simultaneous areas of land disturbance.

(ix) Maximize groundwater recharge as approved by DPW.

(x) Properly manage on-site construction and waste materials.

(xi) Site Dewatering: Water pumped from the site shall be treated by temporary sedimentation basins, grit chambers, sand filters, upflow chambers, hydro-cyclones, swirl concentrators or other appropriate controls. Water shall not be discharged in a manner that causes erosion or flooding of the site or receiving channels or a wetland. In the case where a SWIP is granted for construction site dewatering, the owner shall abide by the City of Cambridge Wastewater and Stormwater Drainage Use Regulations and all applicable federal, state and local laws, rules and regulations.

(xii) Tracking: construct graveled roads, access drives and parking areas of sufficient width and length with sufficiently sized and maintained wash bays to prevent sediment from being tracked onto public or private roadways. Any sediment reaching a public or private road shall be removed by street cleaning (not flushing) before the end of each workday.

Section 2 – Additional Erosion and Sediment Requirements for Special Sites.
When the DPW determines that special site conditions may prevent compliance with Section 1, the DPW may require additional erosion, sediment and pollutant control measures as set forth in the City of Cambridge Wastewater and Stormwater Management Guidelines.

(a) Special site conditions may include, but are not limited to, the following:

(i) Slopes before development that are greater than 10 percent (1 Vertical: 10 Horizontal).

(ii) Land disturbance of a natural vegetative buffer within 50 feet of a wetland and or waterbody.

(iii) The development site is located entirely or partially within a Flood Plain Overlay District.

(b) Required additional control measures may include but are not limited to:

(i) Project timing is such that land disturbing activity will take place between October 1 and April 30.

(ii) Requiring that a Massachusetts registered professional engineer (P.E.), other professional certified by the State of Massachusetts with experience or qualifications in preparing erosion and sediment control plans, a registered CPESC or Massachusetts registered Landscape Architect prepare or implement the Erosion and Sediment Control Plan.

(iii) Prohibiting land disturbing activities between October 1 and April 30.

(iv) Limiting the amount of denuded soil at any given time.

(v) Requiring a bond, letter of credit or other guarantee.

Article VI
Operation And Maintenance Standards

Section 1 – Maintenance and Repair.
The owner is responsible for maintenance and shall prepare and submit to the DPW for approval an Operation and Maintenance Plan for the stormwater management measures incorporated in the Land Disturbance Permit. The owner shall notify DPW of any changes in ownership or assignment of financial responsibility. Prior to any transfer of ownership of any property subject to an Operation and Maintenance Plan, the owner shall inform the prospective owner of the requirements of the existing Operation and Maintenance Plan, and of the requirement to file a new Operation and Maintenance Plan upon transfer of ownership. The new owner shall be required to submit an Operation and Maintenance Plan to the DPW for approval within 60 days of the transfer of ownership. Until the new plan is approved by the DPW, the new owner shall be bound by the provisions of the existing Operation and Maintenance Plan.

An Operation and Maintenance Plan must meet the following requirements (specific plan requirements and guidance are given in the City of Cambridge Wastewater and Stormwater Management Guidelines):

(a) If the Operation and Maintenance Plan identifies a person other than the owner (for example, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation satisfactory to DPW of such person's obligation or agreement to assume this responsibility.

(b) Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.

(c) The Operation and Maintenance Plan shall include a schedule for preventative and corrective maintenance to maintain the function of the stormwater management measures, including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of nonvegetated linings.

(d) The person responsible for maintenance identified under Section 1 (a) above shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.

(e) The person responsible for maintenance identified under Section 1 (a) above shall evaluate the effectiveness of the operation and maintenance plan at least once per year and shall note certification of its effectiveness in the log referred to in Section (d) above, or in the event that it is no longer effective, applicant shall provide certification to that effect to DPW with a proposed revised plan for DPW's review and approval.

(f) The person responsible for maintenance identified under Section 1(a) above shall retain and make available, upon request by DPW, the operation and maintenance plan and the documentation required by Sections 1(d) and (e) above.

(g) The provisions of any Operation and Maintenance Plan for a stormwater management facility that is dedicated to and accepted by the City for the City's ownership, operation or control shall terminate upon the City's acceptance of ownership, operation or control of said facility.

Nothing in this Section 1 shall preclude the DPW from requiring the posting of a performance or maintenance guarantee in accordance with the City of Cambridge Wastewater and Stormwater Management Guidelines.

Article VII
Inspections and Plan Revisions

Section 1 – Inspections.

(a) The DPW or its authorized representative may conduct inspections whenever it is necessary to enforce any provisions of this Regulation, to determine compliance with this Regulation.

(b) When an inspection is occurring, the DPW or authorized representative shall first present proper credentials to the responsible party and request entry. If such entry is thereupon refused, the DPW shall have recourse to any remedy provided by law to obtain entry, including obtaining an administrative search warrant.

Section 2 – Permit-Related Inspections.

(a) **Pre-Development Meeting.** Prior to starting clearing, excavation, construction, or land disturbing activity the applicant or designated agent, shall meet with the DPW to review the approved plans and their implementation. The applicant or designated agent shall inspect the project site and provide certification to the DPW of project completeness at the following stages:

(i) Initial Site Inspection: prior to approval of any plan.

(ii) The applicant or designated agent shall make inspections as hereinafter required and shall either approve that portion of the work completed or shall notify the owner if the work fails to comply with the Land Disturbance Permit. The Land Disturbance Permit and associated plans for grading, stripping, excavating, and filling work, as approved by DPW, shall be maintained at the site during the progress of the work. The owner shall notify the DPW at least two (2) working days before each of the following events; the applicant or designated agent shall be responsible to observe and assure the project progresses appropriately at the following events:

a. Erosion and sediment control measures are in place and stabilized;
b. Site Clearing has been substantially completed;
c. Rough Grading has been substantially completed;
d. Final Grading has been substantially completed;
e. Close of the Construction Season; and
f. Final Landscaping (permanent stabilization) and project final completion.

(b) **Owner Inspections.** The owner or designated agent shall conduct and document inspections of all control measures no less than weekly or as specified in the Land Disturbance Permit, and prior to and following anticipated storm events. The purpose of such inspections will be to determine the overall effectiveness of the Erosion and Sediment Control Plan and the need for additional control measures. The owner or designated agent shall retain monthly reports in a format approved by the DPW which shall be made available to the DPW upon request.

(c) **Bury Inspection:** The DPW shall be notified prior to backfilling of any underground drainage or storm water conveyance structures so that inspection, if deemed necessary by the DPW, can take place.

(d) **Final Inspection.** After the storm water management system has been constructed and before the surety bond has been released, the applicant must submit a stamped record plan signed by a Massachusetts Registered Professional Engineer (P.E.) or Massachusetts Registered Land Surveyor

detailing the actual storm water management system as installed. The record plan will include a statement box on the plan certifying the site review was conducted in accordance with this Regulation and all items were constructed in accordance with the Land Disturbance Permit. The applicant or designated agent shall request a final inspection site meeting with the DPW. The DPW shall visit the site with the applicant or designated agent to confirm its "as-built" features. As-Built drawings of structural BMPs shall be submitted to the DPW. A final report as referenced in Article VIII shall be submitted to the DPW for review and approval prior to the issuance of Certificate of Occupancy, if applicable.

(e) **Access Permission.** To the extent permitted by law, or if authorized by the owner or other party in control of the property, the DPW, its agents, officers, and employees may enter upon privately owned property for the purpose of performing their duties under this Regulation and may make or cause to be made such examinations, surveys or sampling as the DPW deems reasonably necessary to determine compliance with the Land Disturbance Permit.

If the system is found to be inadequate by virtue of physical evidence of operational failure, it shall be corrected by the owner before the surety bond is released. If the owner fails to act the DPW may use the surety bond to complete the work.

Section 4 – Other Inspections.
Where the DPW has determined that special site conditions exist, the DPW may designate an inspector to monitor erosion, sediment and pollutant control at that site, or, if deemed necessary by the DPW, the DPW may hire a consultant to serve as the designated inspector, the cost of which shall be borne by the owner.

Section 5 – Refusal of Entry.
No person shall refuse entry or access to a permitted development project to any authorized representative of the DPW who provides proper credentials and requests entry for the purpose of conducting an inspection. In addition, no person shall obstruct, hamper or interfere with any such representative while in the process of carrying out his or her official duties.

Section 6 – Inspection Fees.
The owner or applicant shall be solely responsible for the costs associated with any revisions, including but not limited to, any additional or alternate methods, measures, performance criteria or controls. If the DPW deems it necessary to hire a consultant to assist with same, the cost of such consultant shall be borne by the owner.

Section 7 – Revisions to Plans.

(a) During development, the DPW or the owner or applicant may request revisions to the Land Disturbance Permit. All revisions shall be reviewed and approved by the DPW.

(b) The DPW may require revisions to the approved Stormwater Management Plan, Erosion and Sediment Control Plan or Operating and Maintenance Plan when:

(i) It is determined that measures approved in the Stormwater Management Plan, Erosion, Sediment Control Plan or the Operation and Maintenance Plan do not meet the purposes set forth in Article IV, V or VI.;

(ii) An alternate method, measure or control fails to perform as claimed by the owner or applicant;

(iii) A change in project timing has occurred due to an adverse change in weather;

(iv) During development, relevant new information about soil, site, topography or water conditions is discovered;

(v) Changes to the area or type of land disturbing activity or equipment used are proposed or implemented;

(vi) The project schedule has changed which results in development being conducted at a different time of year than originally accepted or approved; or

(vii) Additional or substitute construction or maintenance materials or chemicals will be used during development that require pollutant BMPs as set out in the City of Cambridge Wastewater and Stormwater Management Guidelines.

(c) Revised plans shall show all actual and proposed changes made on the site, the new locations of the drainage patterns, and the effect that the revisions will have on the site. The new plans shall show how problems associated with the prior plan have been corrected, and indicate all new erosion, sediment and pollutant control measures. The DPW may require that the new plans be prepared by a Massachusetts registered professional engineer (P.E.), a Massachusetts registered landscape architect, or a CPESC, and that the revisions are stamped as such.

(d) The owner or applicant shall be solely responsible for the costs associated with any revisions, including but not limited to, any additional or alternate methods, measures, performance criteria or controls or costs for any consultants that the DPW deems necessary to assist it with its review and approval of any such revisions.

Article VIII
Project Completion

At completion of the project the owner shall submit a final report of all stormwater controls and treatment BMPs. The as-built drawings shall show all deviations from the approved plans, if any, and be certified by a Massachusetts registered professional engineer (P.E.) or a Massachusetts registered land surveyor. Detailed requirements pertaining to the final report and as-built drawings are set forth in the City of Cambridge Wastewater and Stormwater Management Guidelines.

Article IX
Certificate of Occupancy

The DPW will issue a letter certifying completion upon receipt and approval of the final reports and/or upon otherwise determining that all work completed pursuant to the Land Disturbance Permit has been satisfactorily completed in conformance with this Regulation, which letter shall be submitted by the owner or applicant to the City of Cambridge Department of Inspectional Services prior to the issuance of a Certificate of Occupancy, if applicable.

Article X
Compliance and Enforcement

Section 1 – Investigation and Notice of Violations.
If the DPW believes that a violation of this Regulation, a rule promulgated pursuant to this Regulation, or a Land Disturbance Permit issued hereunder may have occurred or exists, the City may investigate. If, after this investigation, the DPW determines that a violation has occurred or exists, the DPW shall issue written notice of a violation to the person or persons alleged to have caused or contributed to a violation of this Regulation, a rule promulgated pursuant to this Regulation, and/or a Land Disturbance Permit issued hereunder. A written notice of violation shall include a statement of facts upon which the violation is based.

Within fourteen (14) days of the issuance of a written notice of violation, the alleged violator shall submit

to the DPW a written response to the notice of violation and a plan for correcting the violation. Submission of this plan in no way relieves the alleged violator of liability for any previous violation not addressed by the plan or future violation(s).

Within fourteen (14) days of the receipt of a written response to a notice of violation, the DPW shall determine whether the response resolves and/or corrects the violation. If the DPW determines that the response resolves and/or corrects the violation, then the plan for correcting the violation shall be incorporated into a consent agreement pursuant to Section 2.

Section 2 – Consent Agreement.
A consent agreement may be entered into at any time by and between the DPW and the person or persons alleged to have caused or contributed to the violation. The consent agreement shall be mutually acceptable to both the DPW and the recipient(s) and shall reflect the recipient's agreement to assume responsibility for and correct violations of this Regulation, rules promulgated or permits issued pursuant to this Regulation.

The consent agreement shall contain a short statement of facts, describe the actions necessary to correct the non-compliance, contain a compliance schedule, and be signed by all parties. The agreement may contain a monetary assessment or other relief as agreed to by the parties for the non-compliance, including without limitation, amounts necessary to compensate the City for costs incurred investigating, administering and/or enforcing this Regulation or rules promulgated hereto.

Section 3 – Administrative Compliance Orders.
If the DPW determines that a violation of this Regulation, a rule promulgated or a permit issued pursuant to this Regulation has occurred or exists, the DPW may issue an administrative compliance order ("Administrative Order") pursuant to this Section 3.

Except as provided in Section 4, the DPW may issue an Administrative Order in the following circumstances:

(a) the DPW determines that a person has violated a consent agreement entered into with the DPW; or

(b) (i) the DPW determines that a person has violated or continues to violate this Regulation, a rule promulgated or permit issued pursuant to this Regulation, and (ii) the DPW has attempted to resolve the violation pursuant to Sections 1 and 2 but no voluntary consent agreement has been entered into.

The Administrative Order shall contain a statement of facts upon which the Administrative Order is based, a description of the actions that must be taken to correct the non-compliance, a compliance schedule, and other requirements as might be reasonably necessary to address the non-compliance. Administrative Orders also may contain administrative fines and penalties, and such other monetary relief for the non-compliance, including without limitation amounts necessary to compensate the City for costs incurred investigating, administering, and enforcing this Regulation or rules promulgated hereto.

Section 4 – Emergency Orders.
The DPW may issue an order without attempting to resolve a violation by using the enforcement procedures described in Section 1 and 2 if the City finds that a violation of this Regulation, a rule promulgated or permit issued pursuant to this Regulation, constitutes or causes, or will constitute or cause, a substantial injury to the public health, safety, welfare, or the environment, and it is prejudicial to the interests of the people of the City to delay action ("Emergency Order").

Emergency Orders issued pursuant to this Section 4 shall contain a statement of facts upon which the order is based, and notification to the person that it must immediately take action to discontinue, abate, correct, or otherwise address the imminent and substantial injury caused or likely to be caused by the non-compliance.

Within seven (7) days, the City shall provide the person an opportunity to be heard and to present any

proof that the non compliance does not or will not constitute imminent and substantial injury to the public health, safety, welfare or the environment.

Section 5 – Civil Penalties.

A person who violates any provision of this Regulation or rules promulgated hereunder, including without limitation any notice, order, stormwater construction approval, agreement, decision, or determination promulgated, issued, made, or entered by the DPW under this Regulation or rules promulgated hereunder, is responsible for a municipal civil infraction, subject to payment of a civil fine of not less than $100 per day and not more than $5,000 per day for each infraction, plus costs and other sanctions.

Section 6 – Separate Offenses.
Each act of violation, and each day or portion of a day that a violation of this Regulation, rules or regulations promulgated pursuant to this Regulation, stormwater construction approval, order, notice, or determination issued, made or entered into under this Regulation is permitted to exist or occur, constitutes a separate offense and shall be punishable as provided by this Regulation.

Section 7 - Cost Recovery.

(a) The DPW may recover all reasonable costs incurred by the City which are attributable to or associated with violations of these Regulations, including but not limited to the costs of administration, investigation, sampling and monitoring, legal and enforcement activities, damage to the City's sanitary or combined system or to the City's stormwater drainage systems, contracts and health studies, and any fines and penalties assessed to the City which result from a discharge not in compliance with these Regulations or rules adopted thereunder.

(b) All such costs shall be documented by the City and shall be served upon the discharger by certified or registered mail, return receipt requested. Such documentation shall itemize the costs the DPW has determined are attributable to the violations.

(c) Such costs are due and payable to the City upon the receipt of the letter documenting such costs. All such costs shall be paid to the City Treasurer. Nonpayment or dispute regarding the amount shall be referred for appropriate action to the City Solicitor. The City Solicitor may initiate appropriate action against the discharger to recover costs under this Article.

(d) The DPW may terminate a discharge for nonpayment of costs after 30 days notice to the discharger.

Adopted:

Effective Date: March 31, 2008

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Lisa Peterson
Commissioner

APPENDIX H
Stormwater Pollution Prevention Plans

Stormwater Pollution Prevention Plans are under development and will be completed prior to the end of Permit Year 2.