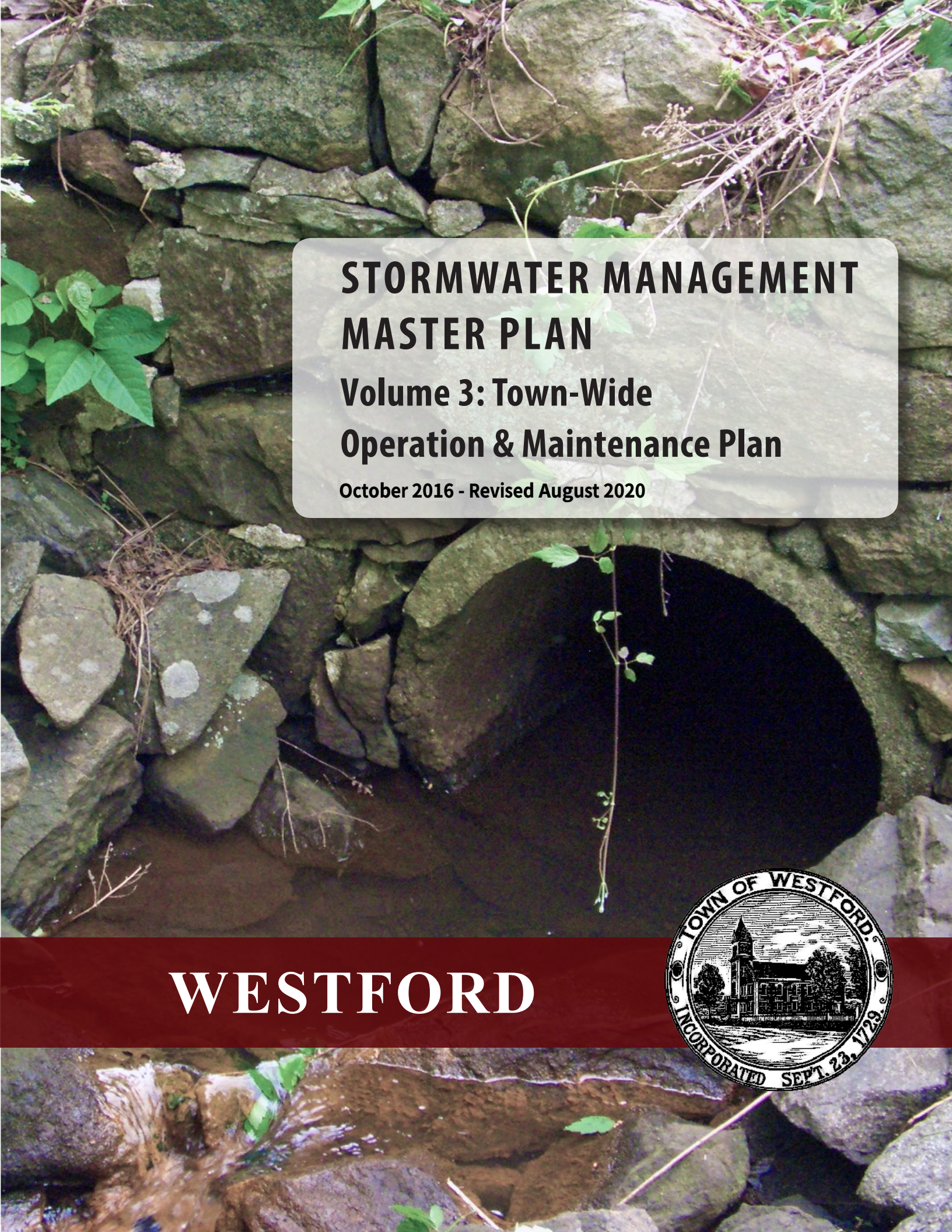


STORMWATER MANAGEMENT MASTER PLAN

Volume 3: Town-Wide Operation & Maintenance Plan

October 2016 - Revised August 2020

WESTFORD

TOWN OF WESTFORD. INCORPORATED SEP'T. 23, 1729.

Westford
Stormwater Management
Master Plan

Volume 3: Operation & Maintenance Plan

October 2016
Revised August 2020

Project advisors:

Tighe & Bond

Raftelis Financial Consultants, Inc.

Regina Villa Associates

The Asset Management portions of the Town of Westford Stormwater Management Master Plan were supported in part by a 2015 Massachusetts Department of Environmental Protection ***Water Infrastructure Planning and Technical Assistance Grant****.*

Report Photography: Sources of all report photos are cited unless taken by Tighe & Bond staff.

For providing data, other plans and studies, editorial assistance, and guidance to the consulting team, special thanks go to the following Westford town department heads and staff: Paul Starratt, Town Engineer; Jeremy Downs, Assistant Town Engineer; Richard "Chip" Barrett, Highway Superintendent; Chris Coutu, GIS Coordinator; and other staff, members of Town boards, commissions, and committees, residents, and business owners who assisted with this plan.

Acknowledgements

We gratefully acknowledge the hard work and commitment of the Stormwater Advisory Group, who reviewed draft report documents and met regularly throughout this planning process to provide invaluable input and guidance.

Eric Heideman, Assistant Town Manager

John Mangiaratti, Former Assistant Town Manager

Richard "Chip" Barrett, Highway Superintendent

Stephen Cronin, Water Superintendent

John Cunningham, Conservation Commission & Capital Planning Committee

Jeremy Downs, P.E., Assistant Town Engineer

Mark Kost, Finance Committee

Paul Starratt, P.E., Town Engineer

Jeff Morrissette, Town Planner

Titus Palmer, Westford Real Estate, Inc.

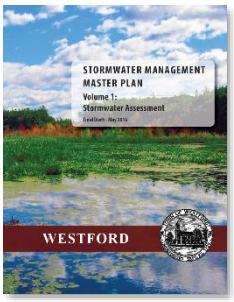
Beverly Woods, Executive Director, Northern Middlesex Council of Governments

Stormwater Management Master Plan Contents

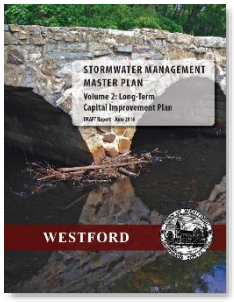
The Stormwater Management Master Plan is organized into the following four volumes:

- Volume 1: Stormwater Assessment
- Volume 2: Long-term Capital Improvement Plan (CIP)
- Volume 3: Operation & Maintenance (O&M) Plan
- Volume 4: NPDES Stormwater Program Compliance Plan

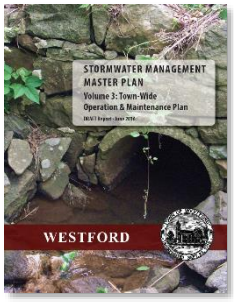
The Town has also explored funding and financial alternatives, which are available under a separate cover from the Stormwater Management Master Plan.



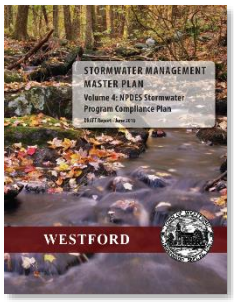
Volume 1, the **Stormwater Assessment**, includes a summary of existing and future conditions (e.g., demographics, land use, water resources), a summary of the current and anticipated future municipal separate storm sewer system (MS4) programs, infrastructure needs, and operations and maintenance. This volume also clarifies drivers for an enhanced stormwater program.



Volume 2, the **Long-Term CIP** includes prioritization of capital projects to address identified drainage and/or water quality needs, recommendations for additional investigation of stormwater infrastructure, and recommendations for the purchase of equipment and hiring of additional staff to meet needs. This plan also incorporates upcoming projects and priorities in Westford that may lend themselves to strategic and cost-effective add-on drainage improvements. For each sub-basin, a menu of appropriate stormwater BMPs that are best to meet that basin's water quality challenges are presented, which can inform future Town projects and also be used to advise local developers during design and permitting for private projects. The Long-term CIP includes an implementation schedule and an opinion of probable costs.



Volume 3, the **Town-wide O&M Plan** includes an inventory of municipal facilities and operations. For the types of activities that the Town routinely conducts, this plan includes town-wide and site specific standard operating procedures (SOPs) for Town staff to follow with the goal of reducing pollutants in stormwater runoff. SOPs are presented in "fact sheets" that can be easily accessed or carried by staff responsible for operations, in some cases at various facilities. The SOPs are consistent with MassDEP's and EPA's most current guidelines.



Volume 4, the **NPDES Stormwater Program Compliance Plan** is equivalent to the written Stormwater Management Program required to satisfy EPA's 2016 Massachusetts Small MS4 General Permit. This Plan documents the best management practices the town will implement to comply with the six minimum control measures (MCMs) within the timeline specified in the reissued General Permit.

Commonly Used Abbreviations	Definitions
AST	Aboveground Storage Tank
BMP	Best Management Practice
CB	Catch Basin
CCTV	Closed-Circuit Television
CIP	Capital Improvement Plan
CMR	Code of Massachusetts Regulations
CMRSWC	Central Massachusetts Regional Stormwater Coalition
CPA	Community Preservation Act
CWA	Clean Water Act
DCIA	Directly Connected Impervious Area
DCR	Department of Conservation and Recreation
DO	Dissolved Oxygen
EOEEA, EEA	Executive Office of Energy and Environmental Affairs
EPA	Environmental Protection Agency
ESS	ESS Group, Inc.
FEMA	Federal Emergency Management Agency
FY	Fiscal Year
GIS	Geographic Information System
GPS	Global Positioning System
HAB	Harmful Algal Bloom
ICM	Impervious Cover Model
ID	Identification
IDDE	Illicit Discharge Detection and Elimination
MACP	Manhole Assessment Certification Program
MassDEP	Massachusetts Department of Environmental Protection
MassDOT	Massachusetts Department of Transportation
MCM	Minimum Control Measure
MESA	Massachusetts Endangered Species Act
MH	Manhole
MS4	Municipal Separate Storm Sewer System
NHESP	National Heritage and Endangered Species Program
NMCOG	Northern Middlesex Council of Governments
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollution Discharge System
NRCC	Northeast Regional Climate Center
NRCS	Natural Resources Conservation Service
O&M	Operation and Maintenance
OSRP	Open Space and Recreation Plan

Commonly Used Abbreviations	Definitions
PACP	Pipeline Assessment Certification Program
RVA	Regina Villa Associates
SOP	Standard Operating Procedure
SSO	Sanitary Sewer Overflow
SwAG	Stormwater Advisory Group
SWAP	Source Water Assessment Report
SWMI	Sustainable Water Management Initiative
SWMMP	Stormwater Management Master Plan
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan
TIP	Transportation Improvement Program
TMDL	Total Maximum Daily Load
TP	Technical Paper
TSS	Total Suspended Solids
WCT	Westford Conservation Trust
WMA	Water Management Act
WPA	Wetland Protection Act
WRPOD	Water Resource Protection Overlay District

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Section 1

Section 1
Introduction

The Town of Westford has an exceptional Operation & Maintenance (O&M) program to prevent or reduce pollution in stormwater runoff from municipal operations. From completing ongoing preventative maintenance of the drainage system (such as catch basin cleaning and structure repairs) to managing trash and pet waste in open space and recreational areas, numerous municipal staff in Westford departments, boards, and commissions participate in and have a responsibility for municipal good housekeeping and pollution prevention.

This O&M Plan was prepared to formalize practices and present a consistent framework for use Town-wide among staff in various departments, boards, and commissions. This plan applies to all Town-owned and/or operated buildings and facilities, parks and open space, vehicles and equipment, drainage infrastructure, and wastewater assets. The plan identifies municipal activities with a range of pollution potential, provides Standard Operating Procedures to address activities and pollutants of concern, and establishes responsibilities and schedules for implementation.

The goal of this Operation & Maintenance Plan is to prevent and/or reduce pollutants in stormwater runoff from municipal operations, to protect public and environmental health, and to preserve Westford's overall town character.

1.1 Regulatory Overview

The U.S. Environmental Protection Agency (EPA) nationally regulates the discharge of stormwater runoff that is transported into local water bodies through Municipal Separate Storm Sewer Systems (MS4) that are located in Urbanized Areas (also known as "regulated areas"). The Town of Westford meets EPA's regulatory threshold, and therefore is required to be covered under a National Pollutant Discharge Elimination System (NPDES) permit for its stormwater discharges from the MS4 in its Urbanized Area. Figure 1-1 includes a map prepared by EPA Region 1 showing Westford's Urbanized Area based on the 2000 census and the 2010 census, where the red hatching denotes the urbanized area in Town.

In Massachusetts, the EPA Region 1 and the Massachusetts Department of Environmental Protection (MassDEP) jointly administer the municipal stormwater program. EPA and MassDEP originally authorized Westford to discharge stormwater in 2003 under a *NPDES General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems*, known as the "Small MS4 General Permit." Under this permit, the Town has developed and implemented a Stormwater Management Program (SWMP) to reduce the contamination of stormwater runoff. The Small MS4 Program contains six (6) elements called *minimum control measures* (MCMs) that, when implemented, should result in a significant reduction in pollutants discharged into receiving waters. The MCMs are:

1. Public Education and Outreach;
2. Public Involvement and Participation;
3. Illicit Discharge Detection and Elimination (IDDE);
4. Construction Site Stormwater Runoff Control;
5. Post-Construction Stormwater Management; and
6. Good Housekeeping and Pollution Prevention.

The 2003 Small MS4 Permit expired in May 2008, but remained in full force and effect until a replacement permit was issued on April 13, 2016. The reissued NPDES *General Permit for Stormwater Discharges from Small MS4 in Massachusetts* substantially increases stormwater management requirements and mandates specific timelines for compliance. This O&M Plan was developed to be consistent with the requirements of the sixth MCM, Good Housekeeping and Pollution Prevention in Town-Owned Operations, specified in the 2016 MS4 General Permit for Massachusetts.

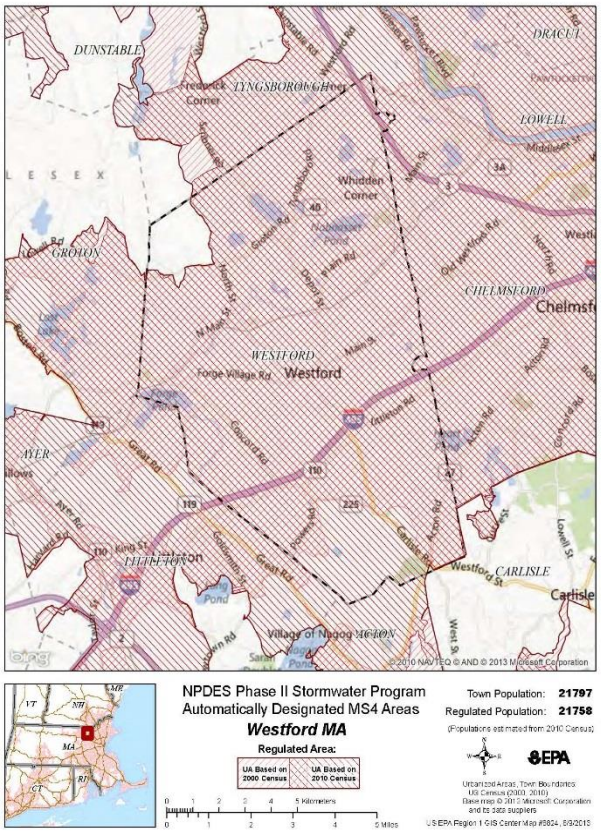


Figure 1-1: Westford's Urbanized Area

Once implemented, the Operation and Maintenance Program described herein will satisfy the requirements of EPA's 2016 permit and is one part of Westford's overall SWMP for compliance under the Small MS4 General Permit.

1.2 Local Conditions Driving Pollution Prevention and Good Housekeeping in Municipal Operations

Preservation of water resources within the Town of Westford is critical to maintaining the community's overall character and economy. Preventing pollution and practicing good housekeeping procedures in municipal operations and at municipal facilities will support this goal by:

- Preserving the **water quality** of lakes and streams for **public health**, **recreation**, and **wildlife habitat**.
- Providing a sustainable, high-quality **drinking water** source for residents and industry.
- **Operating and maintaining Westford's drainage system** to protect public health and property; and
- **Complying with Federal and State environmental regulations** such as the National Pollutant Discharge Elimination System permits, Massachusetts

Stormwater Management Standards, Massachusetts Wetlands Protection Act, Total Maximum Daily Load (TMDL) provisions of the Clean Water Act, and the Safe Drinking Water Act.

Priority areas for operations and maintenance of Town-owned and operated facilities and municipal activities include drinking water resources, outstanding resource waters, recreational areas, and waterbodies that have impaired water quality. Figure 1-2 shows the location and extent of these priority areas in relation to municipally-owned parcels.

High Environmental Value - Drinking Water Sources

- Town of Westford Water Resource Protection Overlay District II (WRPODII) – According to the Town's Zoning bylaw, this overlay district was developed to ensure adequate drinking water quality and quantity, preserve and protect drinking water supplies, conserve natural resources, and prevent contamination of the environment. This district is bounded by
- Approved Wellhead Protection Areas (Zone IIs), Interim Wellhead Protection Areas (IWPAs), and high and medium yield aquifers.
- Public water supply wells – Wells that provide water to the public.
- Zone I - The protective radius required around a public water supply well or well field, as defined by 310 CMR 22.02

Areas of High Environmental Value – Outstanding Resource Waters

- Natural Heritage and Endangered Species Program (NHESP) Certified and Potential Vernal Pools
- Reed Brook, a Cold Water Fishery

Areas of High Recreational Value - Public Beaches

- Edward's Beach, Williams Avenue (Nabnasset Lake)
- Forge Beach, Forge Beach Road (Forge Pond)

Impaired Waterbodies

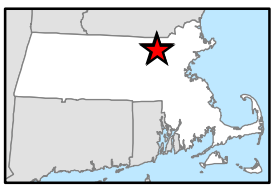
- Nabnasset Lake
- Stony Brook
- Forge Pond
- Heart Pond
- Beaver Brook
- Nashoba Brook
- Tadmuck Brook

Watersheds with a Total Maximum Daily Load

- Assabet River Watershed

DUNSTABLE
DRACUT
LOWELL
TYNGSBOROUGH
GROTON
CHELMSFORD
AYER
LITTLETON
CARLISLE
ACTON
BOXBOROUGH

Deep Brook
Flint Pond
Nabnasset Lake
Nabnasset Lake
Edward's Beach
Unnamed
Snake Meadow/Keyes Brook
Stony Brook
Reed Brook
Stony Brook
Tadmuck Brook
Tadmuck Brook
Forge Pond
Forge Village Pond Beach
Forge Pond
Boutwell Brook
Beaver Brook
Beaver Brook
Mill Pond (Beaver Brook)
Heart Pond
Heart Pond
Vine Brook
Nashoba Brook
Nonset Brook
Butter Brook
Nashoba Brook
Nashoba Brook



Legend

- Public Water Supplies

Aquifers

- Potentially Productive Medium Yield Aquifer
- Potentially Productive High Yield Aquifer
- DEP Approved Zone I
- DEP Approved Zone II
- DEP Interim Wellhead Protection Area (IWPA)
- NHESP Priority and Estimated Habitats of Rare Species
- Major Basin Boundary
- Sub-basin Boundary

Watershed with TMDL

- Assabet River Watershed

2014 Impairments - Ponds

Category

- Category 4A - TMDL Complete
- Category 5 ("303(d)")

2014 Impairments - Rivers and Streams

Category

- Category 2
- Category 5 ("303(d)")

- Impervious Surface
- Parcel
- Town Boundary
- Ponds
- Rivers and Streams
- Coldwater Fishery

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Feet

Note: Impairments shown are from Proposed 2014 Massachusetts Integrated List of Waters are not yet finalized as of the date of this map, but are expected to be accepted by the EPA.

FIGURE 1-2
PRIORITY AREAS

Westford, Massachusetts

March 2016

Tighe&Bond
Consulting Engineers
Environmental Specialists

1.3 Operation and Maintenance Plan Development

To prepare this O&M Plan, Tighe & Bond worked closely with Town of Westford staff to develop an inventory of Town facilities, infrastructure, vehicles and equipment, and operations and to complete site visits.

1.3.1 Buildings, Facilities, Parks, and Open Space Inventory

To create the initial inventory, a list of Town-owned parcels was obtained using the Westford Assessor's database. A category was assigned to each parcel (e.g., buildings, schools, public safety, water, cemetery, etc.) based on what actives may occur on the site that have the potential to contribute pollution to stormwater runoff.

Tighe & Bond gathered publicly available data about each site including the area of buildings, parking, and wastewater disposal type (septic or sewer). An electronic data collection system was developed to identify key features to be inventoried during site visits, including the presence and location of:

- Managed turf fields;
- Outfalls/drainage features;
- Heating type;
- Above ground storage tank (AST) and generator;
- Waste management (trash);
- Vehicle maintenance;
- Vehicle washing;
- Chemical storage;
- Floor drains;
- Equipment storage;
- Equipment maintenance; and/or
- Irrigation.

Figure 1-3: Examples of Key Features Inventoried during Site Visits: AST (left) and Waste Management (right)

Based on these categories, Tighe & Bond staff, accompanied by the Town Engineer and Assistant Town Engineer, visited the municipal buildings, schools, fire and police stations, water treatment plant, cemeteries with buildings on them, and a few of the parks and open space areas with active use (e.g., ballfields, tennis courts, etc.) on November 13, 2014. Figure 1-4 shows the locations of sites visited.

Map No.	Municipal Facility
BF1	Cameron Senior Center
BF2	IT Department (Forge Village Fire Station)
BF3	J.V. Fletcher Library
BF4	New Highway Garage Site
BF5	Parkerville Schoolhouse Parcel
BF6	Rec Dept Storage (Graniteville Fire Station)
BF7	Recreational Department
BF8	Roudenbush Community Center
BF9	Roudenbush Community Center at Nabnasset
BF10	Town Hall
BF11	Westford Museum
BF12	Abbot School & Millenium School
BF13	Blanchard Middle School
BF14	Nabnasset School
BF15	Norman Day School

DUNSTABLE

TYNGSBOROUGH

GROTON

CHELMSFORD

AYER

LITTLETON

ACTON

CARLISLE

Deep Brook

Flint Pond

Nabnasset Lake

Unnamed

Snake Meadow/Keyes Brook

Stony Brook

Forge Pond

Boutwell Brook

Tadmuck Brook

Beaver Brook

Merrimack Basin

SuAsCo Basin

Mill Pond (Beaver Brook)

Heart Pond

Vine Brook

Nashoba Brook

Nonset Brook

Butter Brook

Nashoba Brook

BF16 BF19 BF14 BF4 BF18 PO9 BF6 PO12 BF13 BF15 BF25 BF7 BF27 BF28 PO5 PO19 BF2 BF1 BF22 BF17 BF12 PO1 BF8 BF3 BF11 BF24 BF23 BF9/PO8 BF5 PO17

Map No.	Municipal Facility
BF16	Rita Miller School
BF17	Robinson and Crisafulli Elementary Schools
BF18	School Maintenance Garage (Old Highway Garage)
BF19	Veterans Memorial Complex/Stony Brook School 1
BF22	Westford Academy
BF23	Nabnasset Fire Station
BF24	Police and Fire Station
BF25	Rogers Fire Station
BF27	Forge Village Rd. Water Dept. Land - North Garage
BF28	Forge Village Rd. Water Dept. Land - South Treatment Plant
PO1	Fairview Cemetery
PO5	Pine Grove Cemetery
PO8	Captain Stephen Hamilton Ballfield
PO9	East Boston Camps at Stony Brook Conservation Land
PO12	Graniteville Ballfield/American Legion Field
PO17	Jack Walsh Recreation Area
PO19	VFW Softball Field

Legend

Municipal Facilities Visited (31)

Municipal Facilities

Buildings and Facilities

- Municipal Buildings
- Municipal Buildings/ Active Recreation
- Fire and Safety
- School Buildings
- Water

Municipal Facilities

Parks and Open Space

- Garden and Active Recreation
- Municipal Buildings/ Active Recreation
- Cemetery
- Commons
- Municipal Parks and Open Space Parcels

- Major Basin Boundary
- Sub-basin Boundary
- Town Boundary
- Parcels
- Westford Town Boundary
- Inland Wetlands
- Lakes, Ponds and Rivers
- Rivers and Streams

1:48,000

0 2,000 4,000

Feet

N

Based on MassGIS Data and Town of Westford Data

FIGURE 1-4
MUNICIPAL FACILITIES VISITED

Westford, Massachusetts

May 2016

Tighe&Bond
Engineers | Environmental Specialists

1.3.2 Infrastructure

The Town of Westford's stormwater infrastructure includes the municipal separate storm sewer system (e.g. drain pipes, structures, outfalls, channels, roadways and curb, and stormwater management and/or treatment structures), and in-stream infrastructure (e.g. culverts, dams, and bridges).

The Town maintains an inventory of drainage infrastructure assets through a robust Geographic Information System (GIS). Westford employs a dedicated GIS Coordinator that oversees and maintains the GIS inventory.

To develop an inventory of stormwater infrastructure, we began with the existing GIS mapping available as of the data of this report, and added data by digitizing record drawings.

In addition, field work to evaluate the condition and performance of stormwater infrastructure within Westford was completed. Field work included further evaluation of locations with known deficiencies to understand the drainage or flooding deficiency, connectivity and outfalls (if applicable), evaluate the condition, and discuss potential solutions to deficiency. Field work also included a rapid condition assessment for various drainage pipes, manholes, and catch basins using an Envirosight QuickView zoom inspection camera. Utilizing this camera allowed high-resolution video logs of pipes and structures without confined space entry equipment or prior drainage pipe cleaning. This rapid condition assessment led to an understanding that the majority of the drainage system in Westford is in good condition, however, there are some locations that need operation & maintenance and/or improvements. Section 2.4 further discussion areas that need Operation & Maintenance improvements to address findings from the field work.

1.3.3 Vehicles and Equipment

The Town maintains a list of Town-owned vehicles. The inventory of vehicles provided in this report was developed using the September 2013 Town Green Vehicle Inventory. The most recent list is available from the Town Accountant or Town Manager's office.

1.3.4 Wastewater

As part of the Stormwater Management Master Plan (SWMMP) development, Tighe & Bond also prepared an Operations and Maintenance Plan for the sub-surface municipal wastewater assets (e.g., septic systems, cesspools, etc.) in Town. The Town of Westford's Public Works Initiative Committee worked with the Board of Health to develop a preliminary inventory and identify types and locations of its municipally-owned wastewater assets. Tighe & Bond worked closely with Town staff to confirm that the inventory contained all municipally-owned parcels with a wastewater asset and to expand the initial inventory to include system location, system type, and other details about each property's wastewater assets. Comprehensive operation and maintenance procedures were then developed, which meet local, state and federal requirements and best practices. To expand the inventory, Tighe & Bond also reviewed Board of Health records to obtain the following information (where available):

- Type of system;
- Date of installation or most recent upgrade;
- Capacity;

- Pumping information;
- Variances; and
- System failure history.

Westford's municipal wastewater assets were evaluated for their potential to contribute nonpoint source pollution to receiving waters, particularly pollutants of concern in impaired watersheds, and their potential to cause illicit discharges to the drainage system. Based on this screening, some of these facilities and adjacent drainage infrastructure were prioritized for the Town's Illicit Discharge Detection and Elimination Program and other relevant components of the NPDES Stormwater Program Compliance Plan, Volume 4 of the SWMMP.

Appendix G includes the inventory of wastewater assets. Refer to Appendix G for more detail information of each of these assets and the methodology involved in the completion of the wastewater asset O&M plan.

Section 2

Section 2
Inventory of Municipal Facilities and Assets

Preparing an overall plan for Westford's operation and maintenance must include the development of a comprehensive inventory of the Town's facilities where activities may have the potential to cause pollution in stormwater runoff. This inventory includes:

1. Parks and open space;
2. Buildings and facilities;
3. Vehicles and equipment;
4. Drainage infrastructure; and
5. Wastewater assets.

The first step in reducing pollutants in stormwater runoff and protecting water quality is to identify Town facilities and operations where the Town has the ability to affect change.

2.1 Parks and Open Space

There are numerous parks and extensive open space lands within the Town of Westford. These lands are owned by various entities (including Westford Conservation Trust (WCT), New England Forestry Foundation, Massachusetts Audubon Society, Middlesex County 4-H Fairgrounds, Stony Brook Fish and Game Club, Westford Sportsman's Club, the M.I.T. Haystack Observatory Site, etc.), and are under differing levels of protection (e.g., permanently protected, unprotected, conservation restriction, etc.). The Town of Westford, through the Cemetery Commission, Board of Selectmen, Conservation Commission, and the Recreation Commission, owns a number of parks and open space lands that are actively used or actively managed. A map showing the municipally-owned and managed parks and open space is included in Appendix A. Appendix B provides a complete inventory listing of these lands. Appendix C includes maps of the individual facilities.

Table 2-1 lists parks and other open space (PO) that are utilized by the public and therefore have the potential for pollution from pet waste or trash, and also lists areas that are actively managed by the Town (e.g., mowing, lawn maintenance, landscaping, and/or pesticide/herbicide/fertilizer application).

Table 2-1
Inventory of Parks and Open Space

Map ID	Name	Address	Responsible Board/ Commission/ Department	Size (acres)
		Cemetery		
PO1	Fairview Cemetery	Main Street	Cemetery Commission	10.450
PO2	Hillside Cemetery	Nutting Road	Cemetery Commission	0.939
PO3	Keyes Cemetery	Jonas Road	Cemetery Commission	0.048
PO4	Picking-Wright Cemetery Annex	Groton Road	Cemetery Commission	4.490
PO5	Pine Grove Cemetery	Forge Village Road	Cemetery Commission	11.700
PO6	Westlawn Cemetery	Concord Road	Cemetery Commission	1.700

Table 2-1
Inventory of Parks and Open Space

Map ID	Name	Address	Responsible Board/ Commission/ Department	Size (acres)
PO7	Wright Cemetery	Groton Road	Cemetery Commission	0.416
	Garden and Active Recreation			
PO8	Captain Stephen Hamilton Ballfield	Plain Road	Selectmen	3.750
PO9	East Boston Camps at Stony Brook Conservation Land	Depot Street	Conservation Commission	237.230
PO10	Edwards Beach	Williams Avenue	Conservation Commission	10.000
PO11	Forge Pond Town Beach	Pleasant Street	Selectmen	5.670
PO12	Graniteville Ballfield/American Legion Field	15 River Street	Recreation Commission	31.000
PO13	Greystone Playing Fields (Lot Q)	Russell's Way	Selectmen	3.280
PO14	Hill Orchard Farm Stand	Hunt Road	Conservation Commission	3.480
PO15/ PO16	Hill Orchard West 1, 2	Chamberlin Road	Conservation Commission	2.000/ 18.00
PO17	Jack Walsh Recreation Area	Carlisle Road	Recreation Commission	32.800
PO18	Stony Brook Conservation Land - Recreation Commission Parcel 1	Nutting Road	Selectmen	29.800
PO19	VFW Softball Field	52 W Prescott Street	Recreation Commission	10.000
	Commons			
PO20	Civil War Soldiers Monument	Boston Road	Selectmen	< 1.000
PO21	Graniteville Memorial Triangle	North Main Street	Selectmen	< 0.100
PO22	Odell W. Prescott St. Land Donation	W Prescott Street	Selectmen	0.092
PO23	Old Pioneer Burial Ground	Carlisle Road	Selectmen	< 0.10
PO24	Town Common	Main Street	Selectmen	1.130
PO25/ PO26	Veterans Memorial Complex	Farmer Way	Selectmen	4.410/ 7.790

The inventory included in Table 2-1 will change over time. Pease consult with the Assessor's Office, GIS Department, and Land Use Management Department for the most up-to-date list of Town-owned parks and open space.

2.2 Buildings and Facilities

There are 31 buildings and facilities (BF) owned and/or operated by the Town of Westford through various responsible parties. Table 2-2 lists schools, Town offices, public safety facilities, water and wastewater facilities, municipal parking areas, and other Town facilities. A map showing the locations of buildings and facilities is included Appendix A. A complete inventory of the buildings and facilities is provided in Appendix B. Appendix C includes maps of individual facilities.

Table 2-2
Inventory of Buildings and Facilities

Map ID	Name	Address	Responsible Board/ Commission/ Department	Size (acres)
		Municipal Buildings		
BF1	Cameron Senior Center	20 Pleasant Street	Council on Aging	3.422
BF2	IT Department (Forge Village Fire Station)	1 E Prescott Street	Selectmen	0.103
BF3	J.V. Fletcher Library	50 Main Street	Library Trustees	1.590
BF4	New Highway Garage Site	28 North Street	Selectmen	44.000
BF5	Parkerville Schoolhouse	110 Carlisle Road	Parkerville School Reuse Committee	0.342
BF6	Rec Dept. Storage (Graniteville Fire Station)	54 Broadway Street	Selectmen	0.250
BF7	Recreational Department	35 Town Farm Road	Selectmen	0.680
BF8	Roudenbush Community Center	73 Main Street	Selectmen	5.200
BF9	Roudenbush Child Care at Nabnasset (Frost Day Care)	170 Plain Road	Selectmen	3.750
BF10	Town Hall	55 Main Street	Selectmen	0.500
BF11	Westford Museum	2 Boston Road	Historical Commission	0.359
BF33	Stony Brook Housing #1 and #2	3 – 7 Farmer Way	Westford Housing Authority	1.750
		School Buildings		
BF12	Abbot School & Millennium School	25 Depot Street	School Department	32.070
BF13	Blanchard Middle School	20 West Street	School Department	85.620
BF14	Nabnasset School	99 Plain Road	School Department	21.980
BF15	Norman Day School	75 E Prescott Street	School Department	40.100
BF16	Rita E. Miller School	Vineyard Road Ext.	School Committee	8.560
BF17	Robinson and Crisafulli Elementary Schools	33 Robinson Road	School Department	68.800
BF18	School Maintenance Garage (Old Highway Garage)	30 Beacon Street	Selectmen	5.000
BF19/ BF20	Stony Brook School	Farmer Way	School Department	22.300/ 20.900
BF21	Vineyard Rd Ext School Land - North	Vineyard Road Ext.	School Department	3.760
BF22	Westford Academy	30 Patten Road	School Department	37.900

Table 2-2
Inventory of Buildings and Facilities

Map ID	Name	Address	Responsible Board/ Commission/ Department	Size (acres)
		Fire and Safety		
BF23	Nabnasset Fire Station	14 Oak Hill Road	Fire Department	0.207
BF24	Police and Fire Central Station	51/53 Main Street	Selectmen	30.000
BF25	Rogers Fire Station	39 Town Farm Road	Selectmen	5.900
		Water		
BF26	Town Farm Storage Tank	E Prescott Street	Water Department	0.500
BF27	Forge Village Road Water Dept. Land and Garage Building	65 Forge Village Road	Water Department/ Selectmen	88.260
BF28	Forge Village Road Water Dept. Land and Water Treatment Plant	60 Forge Village Road	Water Department	26.100
BF29	Hildreth Hills Storage Tank	Hildreth Street	Water Department	1.670
BF30	Francis Hill Storage Tank	Hunt Road	Water Department	1.070
BF31	Prospect Hill Storage Tank	Main Street	Water Department	0.735
BF32	Nutting Road Wells and Water Treatment Plant	19 Nutting Road	Water Department	7.750

A site-specific stormwater pollution prevention plan (SWPPP) must be developed for any Town-owned or operated maintenance garages, public works yards, transfer stations, and/or other waste handling facilities where pollutants are exposed to stormwater. The Town of Westford operates two (2) facilities that require an individual SWPPP:

- The Highway Garage, located at 28 North Street; and
- The School Maintenance Garage (former Highway Garage) currently used by the School Department, located at 30 Beacon Street.

Figure 2-1: Highway Garage (left) and School Maintenance Garage (right)

A site-specific SWPPP must be developed to include the following control measures:

- Minimize or prevent exposure;
- Good housekeeping;
- Preventative maintenance;
- Spill prevention and response;
- Erosion and sediment control;
- Management of runoff;
- Enclose or cover salt storage;
- Employee training; and
- Maintenance of control measures.

2.3 Vehicles and Equipment

Vehicles and equipment are owned and operated by numerous departments in Town and include passenger cars and vans, dump trucks, ambulances, fire trucks, tractors, loaders, street sweepers, backhoes, and mowers. They are utilized for a variety of purposes, including student and senior citizen transportation, emergencies and public safety, public works operations, and inspections. Table 2-3 summarizes the number of vehicles and equipment in Town by department and function. Appendix D includes a complete inventory of Town of Westford vehicles. Equipment is not specifically listed in this inventory, but may include generators (stationary or portable), snow blowers, tools, etc.

Table 2-3
Inventory of Vehicles

Department	Number of Vehicles	Vehicle Function
Animal Control	2	Emergency Vehicle Public Safety
Building	2	Inspector Vehicle
Cemetery	2	Public Works
Council on Aging	2 (leased)	Senior Transport
Fire	16	Emergency Vehicle - Ambulances, Staff Vehicles, Fire Trucks
Health	2	Inspector Vehicle
Highway	47	Public Works - Dump Trucks, Tractors, Loaders, Staff Vehicles, Sweepers, Excavator
Library	1	Bookmobile
Parks	8	Public Works
Police	23	Emergency Vehicle
School	29 (18 leased)	Student Transport
Water	14	Public Works - Staff Vehicles, Dump Truck, Backhoe, Tractor
Total	**148**	

An up-to-date inventory of Town-owned vehicles is available from the Town Accountant, who maintains an updated list of assets in Town.

2.4 Infrastructure

Infrastructure includes all components of the MS4 (e.g., catch basins, drainage manholes, stormwater outfalls, drainage pipes, open channel conveyances, etc.), interconnections with other MS4s (e.g., abutting communities or MassDOT), culverts, dams, and Town-owned or operated structural Best Management Practices (BMPs) such as detention basis, retention basis, swales, etc.

Much like the Town's water system, drainage infrastructure should be considered an important asset that has a service life, a probability and consequence of failure, and a monetary value. Westford's current drainage system is worth more than $150 million. The infrastructure is a necessary Town utility, and adequate operation and maintenance is critical to protect public health and the safety of residents, as well as to ensure operation of local businesses.

Stormwater infrastructure serves several important functions which can be broadly organized into two groups: drainage and water quality. The original goal of stormwater infrastructure was to remove water from roadways and other impervious surfaces to prevent icing and flooding. The systems were originally designed to collect runoff and quickly discharge it to the nearest water course. Now that the role of stormwater as a transport mechanism for non-point source pollution is better understood, the scope of stormwater infrastructure design has expanded to include water quality as well as quantity.

The majority of the Town's drainage infrastructure is mapped using Geographical Information System (GIS) software. The GIS mapping has been conducted by multiple parties, including consultants and Town staff, in several discrete field efforts over the course of the last decade or more. Maps of some portions of Town are only available on paper or in AutoCAD. Paper and/or AutoCAD maps were provided to the Town by contractors or developers following the completion of projects.

As part of developing the SWMMP, Tighe & Bond completed a desktop review of GIS mapping and data management (see Section 3.2.2 in Volume 1 of the SWMMP). This evaluation showed there is a need to improve drainage system mapping by adding mapping of currently unmapped developed areas in Town, improving connectivity, remedying conflicts between field located structures and as-built plans, identifying public and private structural stormwater best management practices, and increasing the quantity of attributes (e.g., material, diameter, age, date installed, type, condition, etc.).

This GIS desktop assessment also showed that information available in the Town's GIS did not include enough detail on pipe material, condition, age, and previous problems and therefore was insufficient to determine condition and criticality of drainage system assets. To help the Town improve the inventory and management of drainage system assets, the following tasks were completed:

- Additional as-built and definitive subdivision plans were digitized into ArcGIS with the goal of improving drainage system mapping and meeting the EPA's NPDES MS4 General Permit mapping requirements; and

- A field effort consisting of a rapid condition assessment of drainage infrastructure was completed in late 2015 to visually confirm the condition and attributes of mapped drain pipes and structures.

Sections 3 through 5 in Volume 2, the Long-Term Capital Improvement Plan, of the SWMMP provide additional information on the additions to the Town's GIS mapping and the rapid condition assessment.

The Town of Westford owns, operates, and maintains the following stormwater infrastructure assets:

- 60 miles of drain pipes;
- 5,630 drainage structures (catch basins and manholes);
- 675 outfalls[1];
- 285 culvert pipes totaling 3.2 miles in length;
- 3.5 miles of natural drainage conveyances;
- 3 dams (while there are more than 10 dams in Westford, only 3 are owned and operated by the Town);
- 9 bridges (while there are numerous bridges in Westford, only 9 are owned and operated by the Town);
- 150 miles of publicly maintained roadways;
- 110 miles of roadway curb;

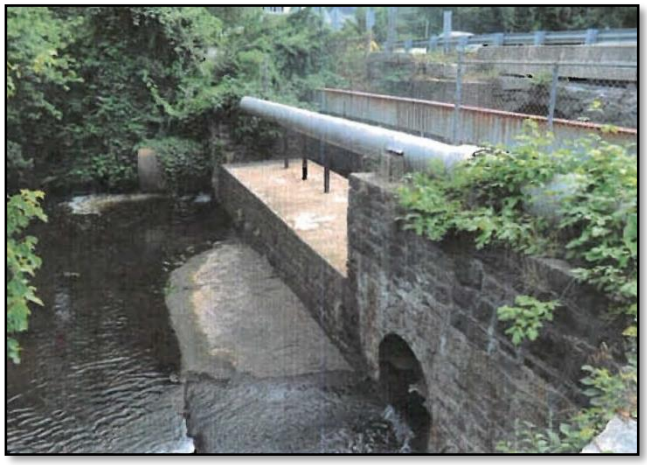


Figure 2-2: Depot Street Dam and Bridge

- Numerous vehicles and equipment necessary for operating and maintaining the drainage infrastructure; and
- An unknown number of stormwater Best Management Practices, which may include structural pretreatment BMPs, treatment BMPs, conveyance BMPs, and/or infiltration BMPs.

[1] There are instances where the Town's GIS drainage system map categorizes culverts and pipes entering detention ponds as outfalls. The actual number of MS4 outfalls is likely fewer and will be further verified under additional mapping completed by the Town.

Table 2-4 presents a summary of many of the drainage assets in the Town of Westford.

Table 2-4
Summary of Drainage Infrastructure

Asset Type and Category	Description
Drain Pipes (60 miles)	
Pipe Diameter	• Ranges from 2" to 42" • 62% 12" • 13% 15" • 10% 18" • 3% unknown
Pipe Material	• 74% reinforced concrete • 9% corrugated metal • 3% unknown • Other materials include PVC and HDPE, among others
Drain Structures (5,630)	
Structure Type	• 55% catch basins • 19% drain manholes • 17% unknown
Outfalls (675)	
Outfall Diameter	• Ranges from 4" to 60" • 49% 12" • 13% 15" • 15% unknown
Outfall Material	• 62% reinforced concrete • 12% corrugated metal • 8% unknown • Other materials include plastic and clay, among others
Discharge Locations	• Swales, woods, ponds, streams, and wetlands
Culverts (285 pipes totaling 3.2 miles)	
Culvert Diameter	• Ranges from 4" to 72" • 20% 12", 24", and unknown (each) • 7 to 12% 18", 36", and 48" (each)
Culvert Material	• 40% stone • 25% concrete boxes and pipes (combined)

Generally, Westford's drainage system is in good condition, and no substantial issues were found during the field inspections conducted as part of Volume 2 of the SWMMP. While some drain pipes that were inspected do need maintenance, none were in danger of failure. Figure 2-3 includes two photos taken during the rapid condition assessment field work. The photo on the left is of a reinforced concrete pipe (RCP) in excellent condition. The photo on the right shows a corrugated metal pipe (CMP) in fair condition, with rusting walls and a buildup of sediment and debris.

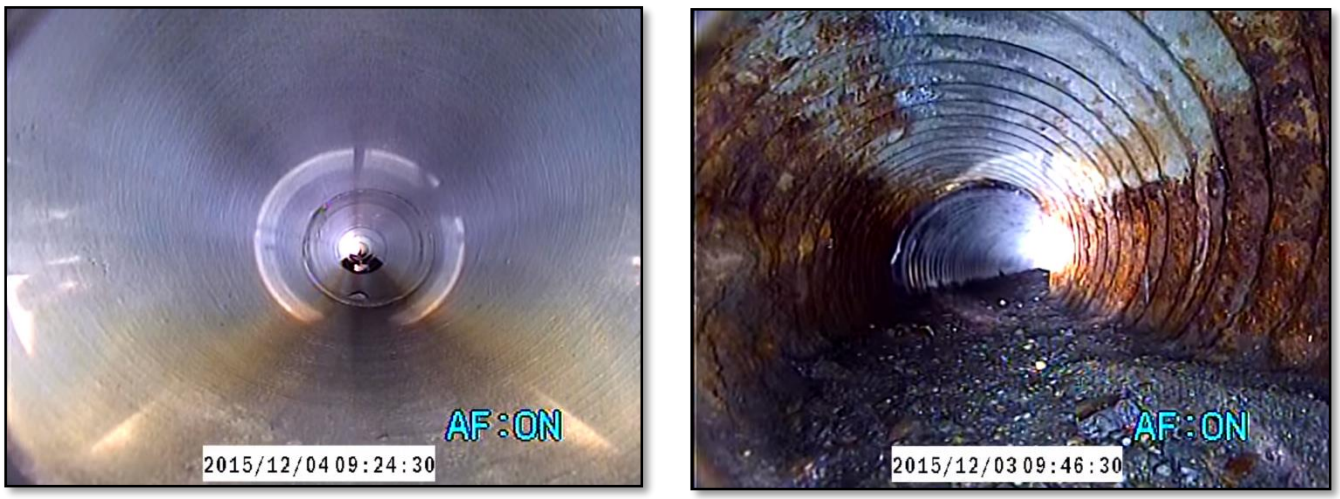


Figure 2-3: Example of Inspected RCP in Good Condition (left) and CMP in Fair Condition (right)

To identify and better understand drainage system deficiencies (e.g., capacity limitations and flooding, failing drainage infrastructure, chronic maintenance problems, etc.) not already addressed in the Town's Capital Plan, information on known problem areas was collected from Police, School, Fire, and Highway Departments. Highway and Engineering Department staff were also interviewed to obtain more detail on these known deficiencies. Tighe & Bond and Town staff completed site visits to a number of locations, as well. Some of the drainage areas of concern will require future capital improvements, as further discussed in Volume 2 of the SWMMP, however, others were categorized as ongoing operation and maintenance needs.

The following table lists areas identified through this effort that are considered ongoing operation and maintenance deficiencies. The ID for each location is consistent with the tables and figure of drainage system deficiencies located in Volumes 1 and 2 of the SWMMP.

Table 2-5
Inventory of Known Operation and Maintenance Deficiencies

Location ID	Location	Description of Conditions
3	North Hill Road	This subdivision was installed with country drainage (e.g., swales next to roadways) and ditches. Lack of maintenance and illegal dumping have limited capacity of the system and resulted in road flooding every Spring. Need to evaluate drainage in the subdivision and conduct maintenance.
4	Hidden Valley Road	Open drainage ditches need maintenance, and some segments of drainage need structure replacement.
8	Wing Road at Keyes Road	Beavers cause flooding. There has been at least one significant flood event in the past five years. The existing corrugated metal culvert is rusted and needs to be replaced.

Table 2-5
Inventory of Known Operation and Maintenance Deficiencies

Location ID	Location	Description of Conditions
10	Dunstable Road at Pond Road	This road has an open ditch drainage system When debris accumulates, it impedes flow and causes icing on the road. The system should be evaluated and maintained. A subdivision is planned for the area between Project #9, #10, and #11, which may help solve drainage concerns.
15	Groton Road and Snake Meadow	Beavers at the existing culvert cause flooding of one house. The culvert requires routine clearing and maintenance.
16	Groton Road at Commerce Way	A nearby asphalt plant causes water quality and drainage issues. The area is low lying with country drainage, and wetlands are only 6 inches below drainage outlets. There is a large amount of silt and sediment. A solution to the country drainage is needed, and long-term maintenance will be an issue.
21	Polley Road	The existing open ditches behind houses flow into Stony Brook, and maintenance is a challenge due to existing conditions and conflicts with private property. The existing ditches should be evaluated for stream restoration or alternative engineered solutions.
27	Hartford Road at Westford Academy	Wetlands are too full of water and sediment/organic debris, beaver issues, flat low lying area, maybe need to remove sediment organic debris and restore channel.
28	Forge Village Road	The wetlands are too full of water and sediment/organic debris. There are beaver issues in this area, and it is a flat low lying area. There may be a need to remove sediment organic debris and restore the channel. The road is built through the wetlands, and raising the road grade may be a solution.
31	Vose Road	The existing culvert has been replaced, but beavers are a problem and have caused flooding.
32	Steeple Chase Circle	There is a failing subsurface infiltration/detention/retention system in this location that was installed in the mid-1990s. There is an inlet to the system, but no outlet to allow water out. The system may be undersized and may not infiltrate. When the system is full, it causes surcharges out of drainage system. For these reasons, the street floods almost every rain event.
46	Blanchard Middle School	A catch basin near the Café is clogged with sand from hill erosion. The front entrance sinks in winter, most likely due to poor soils that move with the freeze/thaw cycle. There is a sunken area by the basketball court.
47	Westford Academy	The area near the ticket booth does not drain.
48	Nabnasset School	The drainage system that was installed as part of the addition was poorly constructed. Stone was not used around the leaching basins that were installed and several of those structures have failed over the years. The catch basin in the back of the school is too high.

Table 2-5
Inventory of Known Operation and Maintenance Deficiencies

Location ID	Location	Description of Conditions
50	John Crisafulli School	Catch basins do not drain.

Table 2-6 includes the drain pipes that were found to be in fair or poor condition during the rapid condition assessment inspection. Often, pipelines were classified as fair or poor condition when mineral deposits, rusting, or roots were observed during the inspection. This table is broken down by street, pipe diameter and material, and condition.

Table 2-6
Inspected Drain Pipes in Fair or Poor Condition or Needing Maintenance

Street[1]	Diameter	Material	Condition	Condition Notes
Blackthorn Drive	12”	RCP	Fair	Mineral deposits in joints
Blackthorn Drive	12”	RCP	Fair	Mineral deposits in joints
Boston Road	12”	Corrugated Metal	Fair	Has point repair
Bradford Street	12”	RCP	Needs Maintenance	Evidence of past surcharging, some sediment
Bradford Street	12”	RCP	Needs Maintenance	Evidence of past surcharging, some sediment
Bradford Street	12”	RCP	Needs Maintenance	Evidence of past surcharging, some sediment
Broadway Street	12”	Corrugated Metal	Poor	Sediment and pieces of broken pipe in segment
Broadway Street	12”	RCP	Poor	Sediment and pieces of broken pipe in segment
Broadway Street	15”	Corrugated Metal	Poor	Sediment and pieces of pipe in segment
Colonial Drive Ext.	24”	Corrugated Metal	Fair	Elliptical CMP with asphalt coating in invert; small buckling deformity
First Street	12”	HDPE	Needs Maintenance	Unknown connectivity
Fletcher Road	15”	RCP	Fair	Mineral deposits in joints
Fletcher Road	Unknown	RCP	Fair	Mineral deposits in joints
Groton Road	12”	Corrugated Metal	Fair	Pipe rusted with deposits
Groton Road	12”	Corrugated Metal	Fair	Pipe rusted with deposits
Mark Vincent Drive	24”	Corrugated Metal	Fair	Some rusting of corrugations
Moore Avenue	12”	RCP	Fair	Roots in joint, good condition otherwise
Moore Road	15”	Corrugated Metal	Fair	Protruding object in segment
North Street	12”	Corrugated Metal	Poor	Deposits encrusted on wall, rusting
Oak Hill Road	12”	Corrugated Metal	Fair	CMP rusted
Oak Hill Road	12”	HDPE	Needs Maintenance	Shows evidence of past surcharge
Oak Hill Road	Unknown	Corrugated Metal	Fair	CMP rusted
Pleasant Street	12”	Corrugated Metal	Needs Maintenance	Minor fine roots at some points
Pleasant Street	12”	Corrugated Metal	Needs Maintenance	Minor fine roots at some points
Pleasant Street	12”	Corrugated Metal	Needs Maintenance	Minor fine roots at some points
Rome Drive	18”	RCP	Poor	Gasket visible in DMH2479 segment (believed to be in structure); RCP in good condition

Street(1)	Diameter	Material	Condition	Condition Notes
Vine Brook Road	18”	RCP	Needs Maintenance	Potential pipe defect, ground depression noted above pipe alignment
West Prescott Street	12”	Corrugated Metal	Fair	Some roots coming through pipe
West Prescott Street	12”	Corrugated Metal	Fair	Some roots coming through pipes
Williams Avenue	12”	Corrugated Metal	Fair	Some roots
Windsor Way	12”	RCP	Needs Maintenance	Outlet partially grown over with grass

(1) The 24" CMP on Colonial Drive and Mark Vincent Road were installed in the 1970s, based on definitive subdivision plan dates. The installation decade of the other drain pipes is unknown.

2.5 Wastewater Assets

The Town of Westford does not have a centralized wastewater collection and treatment system, and therefore buildings are served by decentralized collection, treatment, and disposal systems or by on-site treatment and/or wastewater disposal systems. Thirty-four (34) municipal parcels have some form of wastewater collection, treatment, and/or disposal as follows:

- Twelve (12) parcels discharge to one of the four (4) Town-owned wastewater treatment facilities (Abbot WWTF, Blanchard WWTF, Academy WWTF, and Stony Brook WWTF). These facilities vary in treatment type and handle larger volumes of wastewater. Of these parcels, six (6) properties connect to the Abbot WWTF (Fletcher Library, Town Hall, Roudenbush Community Center, Roudenbush Child Care, Main Street Fire and Police Station, and Abbot School & Millennium School), two (2) properties connect to the Blanchard WWTF (Blanchard School and Norman Day School), two (2) properties connect to the Academy WWTF (Crisafulli and Robinson School and Westford Academy), and two (2) properties connects to the Stony Brook WWTF (Stony Brook Middle School and Stony Brook Housing). As part of the wastewater pre-treatment, each facility has a large capacity tank that settles large solids and is routinely pumped.
- Nineteen (19) of the parcels are served by an onsite wastewater treatment system, more commonly referred to as a septic system. A conventional septic system is an onsite system designed to treat and dispose of domestic sewage that is made up of a septic tank, distribution box, and a soil absorption system (SAS) (also known as a leach field, drain field, or absorption field). Figure 2-4 includes a schematic of a typical septic system process.
- Nine (9) parcels have grease traps installed. Grease traps are watertight structures installed at restaurants, nursing homes, schools, hospitals and any other facility that discharges grease. The function of a grease trap is to separate out grease and oil from the other solid or liquid sewage.
- One (1) parcel is served by a cesspool, which is a non-conforming onsite wastewater system. A cesspool is a pit with open-jointed linings or holes in the bottom and/or sidewalls into which raw sewage is discharged, where the liquid sewage seeps into the surrounding soils and the solids settle and remain in the pit.
- Twelve (12) parcels have tight tanks. Tight tanks are similar to a septic tank except they do not have an outlet and must be pumped regularly to remain in proper working order.
- Twelve (12) parcels have floor drains that discharge to an on-site tight tank.

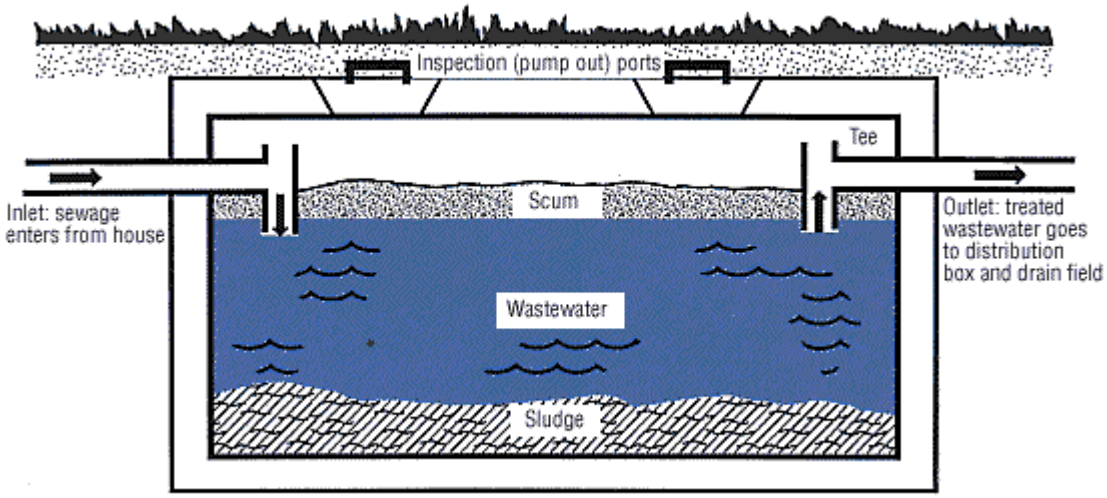


Figure 2-4: Sketch of a Typical Septic System[2]

Appendix G includes the complete Wastewater Asset Operation & Maintenance Plan, which lists locations of municipal properties with wastewater assets and the types of wastewater systems.

[2] Schematic source: http://www.mass.gov/eea/images/dep/water/ysscut.gif

Section 3

Section 3
Municipal Activities and Associated Potential Pollutants

Understanding that municipal activities or operations have the potential to pollute the Town's waterbodies, wetlands, drinking water, and recreational areas is critical to success of this Plan.

Numerous activities on municipally-owned parcels and various municipal operations have potential to contribute pollutants to stormwater runoff. For example, in parks and open space, there is the potential for pet waste, littering, mowing, landscaping, and chemical application, which may contribute pollutants such as bacteria, trash, nutrients, pesticides, and other toxins to stormwater runoff. Management of municipal facilities, such building repairs and maintenance; parking lot repairs; and loading, unloading, and storage of chemicals, materials, and oil/fuel have the potential to contribute sediment, metals, hydrocarbons, toxins, and numerous other pollutants to stormwater runoff. Even winter operations such as deicing and snow removal can contribute sodium chloride to the environment. Construction, if not properly managed, can also cause significant sediment and nutrient loading to the environment.

Table 3-1 provides an overview of the potential pollutants likely associated with activities at municipal facilities.

Table 3-1
Potential Pollutants Likely Associated with Specific Municipal Facilities

Municipal Facility Activity	Potential Pollutants									
	Sediment	Nutrients	Trash	Metals	Bacteria & Pathogens	Oil & Grease	Organics	Pesticides	Oxygen Demanding Substances	Toxins
Building Maintenance (e.g., painting or window washing)	●			●			●		●	
Building Repair	●		●	●		●				
Chemical Handling - Loading, Unloading, Storage						●		●		●
Construction	●	●	●	●		●				
Grounds Maintenance and Repair	●	●	●	●	●	●	●	●	●	●
Outdoor Container Storage of Liquids		●		●		●	●	●	●	
Outdoor Loading and Unloading of Materials	●	●	●	●		●	●	●	●	
Outdoor Process Equipment	●		●	●		●	●			
Outdoor Storage of Raw Materials	●	●	●			●	●	●	●	●
Parking Lot Maintenance	●	●	●	●	●	●	●		●	
Salt Storage										●

Municipal Facility Activity	Potential Pollutants									
	Sediment	Nutrients	Trash	Metals	Bacteria & Pathogens	Oil & Grease	Organics	Pesticides	Oxygen Demanding Substances	Toxins
Septic System		●		●	●	●	●			●
Snow Dumping	●	●		●		●				●
Solid Waste Management (including scrap metal)	●	●		●	●	●				
Vehicle and Equipment Fueling			●	●		●	●			●
Vehicle and Equipment Maintenance and Repair				●		●	●			●
Vehicle and Equipment Storage										
Vehicle and Equipment Washing	●	●	●	●		●	●			●
Waste Handling and Disposal	●	●	●	●	●	●	●	●	●	
Waste Oil Storage, Handling, and Disposal						●				●

Table 3-2 lists potential pollutants likely associated with municipal activities. These tables were adapted from the California Stormwater Quality Association Municipal BMP Handbook[3] and the Center for Watershed Protection.

Table 3-2
Potential Pollutants Likely Associated with Specific Municipal Activities

Municipal Program	Activities	Potential Pollutants									
		Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides	Oxygen Demanding Substances	Toxins
Roads, Streets, and Highways Operation and Maintenance	Sweeping and Cleaning	●		●	●		●			●	
	Street Repair, Maintenance, and Striping/Painting	●		●	●		●	●			
	Bridge and Structure Maintenance	●		●	●		●	●			
Plaza, Sidewalk, and Parking Lot Maintenance and Cleaning	Surface Cleaning	●	●			●	●			●	
	Graffiti Cleaning	●	●		●			●			●
	Sidewalk Repair	●		●							
	Controlling Litter	●		●		●	●			●	

[3] California Stormwater Quality Association Municipal BMP Handbook source: https://www.casqa.org/resources/bmp-handbooks/municipal-bmp-handbook

Municipal Program	Activities	Potential Pollutants									
		Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides	Oxygen Demanding Substances	Toxins
Landscape Maintenance	Mowing/Trimming/Planting	●	●	●		●			●	●	
	Fertilizer & Pesticide Management	●	●						●		
	Managing Landscape Wastes			●					●	●	
	Erosion Control	●	●								
Drainage System Operation and Maintenance	Inspection and Cleaning of Stormwater Conveyance Structures	●	●	●		●		●		●	
	Controlling Illicit Connections and Discharges	●	●	●	●	●	●	●	●	●	
	Controlling Illegal Dumping	●	●	●	●	●	●	●	●	●	
	Maintenance of Catch Basins and Outfall Structures	●		●	●		●			●	
Waste Handling and Disposal	Solid Waste Collection		●	●	●	●	●	●		●	●
	Waste Reduction and Recycling			●	●					●	●
	Household Hazardous Waste Collection			●	●		●	●	●		●
	Leaf and Landscape Waste Collection										
	Controlling Litter			●	●	●		●		●	
	Controlling Illegal Dumping	●		●		●	●		●	●	
Water and Sewer Utility Operation and Maintenance	Water Line Maintenance	●				●	●				
	Sanitary Sewer Maintenance	●				●	●			●	
	Septic System Maintenance		●		●	●	●	●			●
	Spill/Leak/Overflow Control, Response, and Containment	●	●			●		●		●	●
Winter Operations	Snow Removal & Storage	●	●	●			●				●
	Deicing	●									●

The impacts of various pollutants in stormwater runoff in water quality are described in Table 3-3. Text included in this table is from the California Stormwater Quality Association Stormwater BMP Handbook for New Development and Redevelopment.[4]

Table 3-3
Pollutant Impacts on Water Quality

Sediment 	Sediment is a common component of stormwater, and can be a pollutant. Sediment can be detrimental to aquatic life (primary producers, benthic invertebrates, and fish) by interfering with photosynthesis, respiration, growth, reproduction, and oxygen exchange in water bodies. Sediment can transport other pollutants that are attached to it including nutrients, trace metals, and hydrocarbons. Sediment is the primary component of total suspended solids (TSS), a common water quality analytical parameter.
Nutrients 	Nutrients including nitrogen and phosphorous are the major plant nutrients used for fertilizing landscapes, and are often found in stormwater. These nutrients can result in excessive or accelerated growth of vegetation, such as algae, resulting in impaired use of water in lakes and other sources of water supply. For example, nutrients have led to a loss of water clarity in Lake Tahoe. In addition, un-ionized ammonia (one of the nitrogen forms) can be toxic to fish.
Bacteria and Viruses 	Bacteria and viruses are common contaminates of stormwater. For separate storm drain systems, sources of these contaminants include animal excrement and sanitary sewer overflow. High levels of indicator bacteria in stormwater have led to the closure of beaches, lakes, and rivers to contact recreation such as swimming.
Oil and Grease 	Oil and grease includes a wide array of hydrocarbon compounds, some of which are toxic to aquatic organisms at low concentrations. Sources of oil and grease include leakage, spills, cleaning and sloughing associated with vehicle and equipment engines and suspensions, leaking and breaks in hydraulic systems, restaurants, and waste oil disposal.

[4] California Stormwater Quality Association Stormwater BMP Handbook for New Development and Redevelopment source:
https://www.casqa.org/resources/bmp-handbooks/new-development-redevelopment-bmp-handbook

Table 3-3
Pollutant Impacts on Water Quality

Metals 	Metals including lead, zinc, cadmium, copper, chromium, and nickel are commonly found in stormwater. Many of the artificial surfaces of the urban environment (e.g., galvanized metal, paint, automobiles, or preserved wood) contain metals, which enter stormwater as the surfaces corrode, flake, dissolve, decay, or leach. Over half the trace metal load carried in stormwater is associated with sediments. Metals are of concern because they are toxic to aquatic organisms, can bioaccumulate (accumulate to toxic levels in aquatic animals such as fish), and have the potential to contaminate drinking water supplies.
Organics 	Organics may be found in stormwater at low concentrations. Often synthetic organic compounds (adhesives, cleaners, sealants, solvents, etc.) are widely applied and may be improperly stored and disposed. In addition, deliberate dumping of these chemicals into storm drains and inlets causes environmental harm to waterways.
Pesticides 	Pesticides (including herbicides, fungicides, rodenticides, and insecticides) have been repeatedly detected in stormwater at toxic levels, even when pesticides have been applied in accordance with label instructions. As pesticide use has increased, so too have concerns about the adverse effects of pesticides on the environment and human health. Accumulation of these compounds in simple aquatic organisms, such as plankton, provides an avenue for biomagnification through the food web, potentially resulting in elevated levels of toxins in organisms that feed on them, such as fish and birds.
Gross Pollutants 	Gross Pollutants (trash, debris and floatables) may include heavy metals, pesticides, and bacteria in stormwater. Typically resulting from an urban environment, industrial sites and construction sites, trash and floatables may create an aesthetic "eye sore" in waterways. Gross pollutants also include plant debris (such as leaves and lawn-clippings from landscape maintenance), animal excrement, street litter, and other organic matter. Such substances may harbor bacteria, viruses, vectors, and depress the dissolved oxygen levels in streams, lakes and estuaries sometimes causing fish kills.
Vector Production 	Vector production (e.g., mosquitoes, flies, and rodents) is frequently associated with sheltered habitats and standing water. Unless designed and maintained properly, standing water may occur in treatment control BMP's for 72 hours or more, thus providing a source for vector habitat and reproduction (Metzger, 2002).

Section 4

Section 4
Standard Operating Procedures and Schedules

This section of the O&M Plan presents the Standard Operating Procedures (SOPs) and schedules for implementation for the municipal facilities and associated activities at each facility to address the pollutants of concern and reduce or eliminate potential pollution in stormwater runoff. SOPs for the Town of Westford include:

1. Building Maintenance;
2. Catch Basin Inspection, Cleaning, and Maintenance;
3. Fuel and Oil Handling Procedures;
4. Lawn, Grounds, & Landscaping Maintenance;
5. Oil/Water Separator Maintenance;
6. Pesticides, Herbicides, and Fertilizer - Use, Storage, and Disposal;
7. Petroleum and Hazardous Materials - Use, Storage, and Disposal;
8. Pet Waste;
9. Spill Prevention, Response, and Cleanup Procedures;
10. Sweeping Streets and Town Owned Parking Lots;
11. Trash/Solid Waste Management;
12. Vehicle and Equipment Storage and Maintenance;
13. Vehicle and Equipment Washing; and
14. Winter Deicing and Snow Removal.

The inventory of municipal facilities included in Appendix B lists each facility, responsible party, and applicable SOPs. The municipal facilities SOPs are located in Appendix E. Each SOP describes the pollutants of concern addressed by the SOP. Schedules for implementation are also presented in the individual SOPs.

4.1 Municipal Activity SOPs

The following sections provide additional detail on the sources of pollutants for specific activities, relevant SOPs, and additional pollution prevention measures applicable to the activity.

4.1.1 Parks and Open Space

Town staff must undertake efforts to manage potential sources of pollution from the activities conducted at parks and open spaces. Table 4-1 lists activities typical to parks and open spaces previously inventoried in Section 2.1, as well as potential sources of pollution, relevant SOPs, and pollution prevention measures.

Table 4-1
Activities with Pollution Potential and Relevant SOPs for Parks and Open Space

Activity	Source of Pollution	Relevant SOPs	Pollution Prevention Measures
Landscaping equipment	Use of small engines such as lawn mowers and weed whackers requires the transport and use of gasoline and oil.	Spill Prevention, Response, and Cleanup Procedures Fuel and Oil Handling Procedures	Municipal personnel involved in fuel or oil handling are familiar with the spill response kit and spill response procedures. Vehicles transporting landscaping equipment are equipped with a spill response kit.
Fertilizer and pesticide application	If fertilizers and pesticides are not used in accordance with relevant regulations and instructions, or if they are not applied by properly trained personnel, these chemical treatments can enter stormwater in large quantities.	Pesticides, Herbicides, and Fertilizers – Use, Storage, and Disposal	Minimize the use of fertilizer and pesticide and use in strict accordance with the manufacturer's instructions and with local regulations. Never over-apply. Pesticides are handled and applied by individuals licensed with the Massachusetts Department of Agricultural Resources.
Field painting	Marking lines on athletic fields can contribute to pollution of stormwater if the incorrect type of paint is used, or if the paint is not applied in an appropriate manner.	Lawn, Grounds, & Landscaping Maintenance	Only purpose-made athletic field paint shall be sprayed on athletic fields. To prevent paint from contaminating runoff, paint shall not be applied directly before a rainstorm.
Landscaping and Mowing Procedures	Maintaining turf and landscaping includes mowing, applying fertilizer or pesticides and irrigation. Improper techniques can generate runoff of nutrients, bacteria, pesticides, and organic carbon.	Lawn, Grounds, & Landscaping Maintenance	Evaluate lawn maintenance and landscaping to reduce mowing frequency, proper disposal of lawn clippings and use of alternative (drought resistant) plantings.
Management of Pet Waste	Pet waste is a source of bacteria when droppings left on impervious surfaces are washed into storm drains during rain events.	Pet Waste	Establish pet waste handling, collection and disposal locations including signage concerning location to dispose of collected waste.

Table 4-1
Activities with Pollution Potential and Relevant SOPs for Parks and Open Space

Activity	Source of Pollution	Relevant SOPs	Pollution Prevention Measures
Management of Refuse	Visitors to parks and open spaces generate waste that is stored on-site pending disposal.	Trash/Solid Waste Management	Procedures are in place for the management of trash containers at parks and open space. Cleaning around the trash cans, providing anti-littering signs, and preventing exposure to stormwater by keeping cans lidded can reduce pollutants.

4.1.2 Buildings and Facilities

Town staff must undertake efforts to manage potential sources of pollution from the activities conducted at municipal buildings and facilities. Table 4-2 lists activities typical to buildings and facilities previously inventoried in Section 2.2, as well as possible sources of pollution, relevant SOPs, and pollution prevention measures.

Table 4-2
Activities with Pollution Potential and Relevant SOPs for Buildings and Facilities

Activity	Source of Pollution	Relevant SOPs	Pollution Prevention Measures
Landscaping Equipment	Use of small engines such as lawn mowers and weed whackers requires the transport and use of gasoline and oil.	Spill Prevention, Response, and Cleanup Procedures	Personnel involved in fuel or oil handling are familiar with Oil Handling Procedures, the spill response kit and spill response procedures.
Fuel Transfer Procedures	Emergency generators must be periodically fueled.	Fuel and Oil Handling Procedures	Fueling activities shall occur on impervious surfaces with proper containment and a spill response kit in close proximity.
Vehicle and Equipment Washing	Vehicle maintenance can potentially release pollutants as well as detergents into surrounding storm drain systems.	Vehicle and Equipment Washing	Vehicle washing activities shall follow the guidance described in SOP Vehicle Washing and shall not be completed in areas served by an oil/water separator.

Table 4-2
Activities with Pollution Potential and Relevant SOPs for Buildings and Facilities

Activity	Source of Pollution	Relevant SOPs	Pollution Prevention Measures
Building Maintenance and Painting	Routine cleaning and maintenance practices can cause runoff of sediment, nutrients, paints and solvents from the site. Sanding, painting, power-washing, resealing or resurfacing roofs or parking lots should be carefully managed, especially when performed near storm drain	Building Maintenance	Temporary cover/tarps on worksite, employee training, contractor training, proper cleanup and disposal procedures, dry cleaning methods, storm drain covers
Management of Refuse	Municipal buildings generate waste as part of daily operations that is stored on-site pending disposal. Cleaning around the dumpster and preventing exposure to stormwater by keeping dumpsters lidded and locked can reduce pollutants.	Trash/Solid Waste Management	Keep dumpsters closed and locked. Pickups should be scheduled on a regular basis.
Use, Storage, and Disposal of Petroleum Products and Hazardous Materials	Using, storing, and disposing of hazardous materials and petroleum products has the potential to contaminate groundwater and surface waters with oils and grease and toxins.	Petroleum Products and Hazardous Materials – Use, Storage, and Disposal	Keep petroleum products and hazardous wastes stored under cover and in proper containers with correct labeling.
Oil/Water Separator Maintenance	Improperly maintained O/W separators have the potential for oil and other grease products to overflow into stormwater system.	Oil/Water Separator Maintenance	Proper inspection, maintenance, and repairs of oil/water separators.
Parking Lot Maintenance	Pollutants accumulate on paved parking areas, and can enter the stormwater system and waterbodies with stormwater runoff.	Winter Deicing and Snow Removal Sweeping Streets and Town Owned Parking Lots Catch Basin Inspection, Cleaning, and Maintenance	Prevent solids and other pollutants from entering the drainage system and local waterbodies by proper winter deicing and snow removal procedures and frequent street sweeping. Remove pollutants from the drainage system through catch basin inspection, cleaning, and maintenance.

4.1.3 Vehicles and Equipment

Operation and maintenance of Town-owned vehicles and equipment inventoried in Section 2.3 must be completed in a manner to prevent pollution. Table 4-3 lists typical vehicle and equipment maintenance efforts and associated SOPs.

Table 4-3
Activities with Pollution Potential and Relevant SOPs for Vehicles and Equipment

Activity	Source of Pollution	Relevant SOPs	Pollution Prevention Measures
Landscaping Equipment	Use of small engines such as lawn mowers and weed whackers requires the transport and use of gasoline and oil.	Spill Prevention, Response, and Cleanup Procedures	Personnel involved in fuel or oil handling are familiar with Oil Handling Procedures, the spill response kit and spill response procedures.
Fuel Transfer Procedures	Emergency generators must be periodically fueled.	Fuel and Oil Handling Procedures	Fueling activities shall occur on impervious surfaces with proper containment and a spill response kit in close proximity.
Vehicle and Equipment washing	Vehicle maintenance can potentially release pollutants as well as detergents into surrounding storm drain systems.	Vehicle and Equipment Washing	Vehicle washing activities shall follow the guidance described in SOP Vehicle Washing and shall not be completed in areas served by an oil/water separator.
Vehicle and Equipment Storage	Poorly maintained equipment may leak contaminants. Sediments, oil, grease, and metals accumulate on vehicle and equipment during daily activities and may redeposit on impervious surfaces when stored or maintained.	Spill Prevention, Response, and Cleanup Procedures Vehicle and Equipment Storage and Maintenance Oil/Water Separator Maintenance	All vehicles and equipment used for municipal O&M shall receive regular maintenance and be inspected for leaks or defective parts. Municipal equipment stored on municipal properties is stored inside when not in use. Outdoor storage of vehicles and equipment shall not occur in areas that drain to the engineered storm drain system unless adequate devices are employed to remove oil and sediments.
Vehicle and Equipment Maintenance	Vehicle maintenance can potentially release pollutants including oil and grease and solvents into surrounding storm drain systems.	Vehicle and Equipment Storage and Maintenance	Perform all routine vehicle equipment maintenance indoors, utilize drip pans, disposal of used fluids properly, have spill materials available including storm drain covers and booms, train employees.

4.2 Drainage Infrastructure SOPs

4.2.1 Pipe and Manhole Inspection, Cleaning, and Maintenance

While regular pipe and manhole inspection, cleaning, and maintenance is not required by the MS4 General Permit, the Town should optimize these activities to maintain the current condition of the drainage infrastructure. The Town should have an ongoing inspection program to investigate the drainage system in representative areas of Town. Investigations and inspections can be completed using CCTV or a zoom camera, as described in Volume 2 of the SWMMP. Expenditures for developing an ongoing inspection program are included in Volume 2 of the SWMMP.

4.2.2 Catch Basin Inspection, Cleaning, and Maintenance

The Westford Highway Department must optimize routine inspections, cleaning and maintenance of catch basins such that the following conditions are met:

- Prioritize inspection and maintenance for catch basins located near construction activities (roadway construction, residential, commercial, or industrial development or redevelopment). Clean catch basins in such areas more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings.
- Establish a schedule with a goal that the frequency of routine cleaning will ensure that no catch basin at any time will be more than 50 percent full.
- If a catch basin sump[5] is more than 50 percent full during two (2) consecutive routine inspections/cleaning events, the Town must document that finding, investigate the contributing drainage area for sources of excessive sediment loading, and to the extent practicable, abate contributing sources. Westford is required by EPA to describe any actions taken in its annual report.
- Westford currently meets EPA's requirement by keeping a log of catch basins cleaned or inspected.
- Westford must document its plan for optimizing catch basin cleaning, inspection plans, or its schedule for gathering information to develop the optimization plan in the SWMP and the first annual report. Documentation is required to include metrics and other information used to reach the determination that the established plan for cleaning and maintenance is optimal for the MS4.
- Westford must report in each annual report the total number of catch basins, number inspected, number cleaned, and the total volume or mass of material removed from all catch basins.

Appendix E contains the procedures for cleaning catch basins. Tracking methods to use during catch basin cleaning will be developed as part of a recommendation from the SWMMP Volume 2: Long-Term Capital Improvement Plan and as part of the SWMMP Volume 4: NPDES Compliance Plan.

[5] A catch basin sump is more than 50 percent full if the contents within the sump exceed one half (½) the distance between the bottom interior of the catch basin to the invert of the deepest outlet of the catch basin.

4.2.3 Sweeping Streets and Town Owned Parking Lots

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

For rural uncurbed roadways with no catch basins or limited access highways, Westford must either meet the minimum once per year sweeping, or develop and implement an inspection, documentation, and targeted sweeping plan within two (2) years of the effective date of the MS4 General Permit, and submit such plan with its annual report.

Appendix E contains the procedures for the reuse and disposal of streets and parking lot sweepings. Tracking methods will be developed as part of a recommendation from the SWMMP Volume 2: Long-Term Capital Improvement Plan and as part of the SWMMP Volume 4: NPDES Compliance Plan.

4.2.4 Storage and Disposal of Catch Basin Cleanings and Sweepings

To meet EPA's Small MS4 General Permit requirements, the Westford Highway Department must ensure proper storage of catch basin cleanings and street sweepings prior to disposal or reuse such that they do not discharge to receiving waters. Catch basin cleaning, including soil material such as leaves, sand and twigs removed during cleaning operations, are typically classified as solid waste by the MassDEP, and must be disposed of in accordance with applicable regulations, policies and guidelines. The general rule is that catch basins cleanings can be disposed of at a MassDEP permitted sanitary landfill unless there is evidence that the catch basin has been contaminated by a spill, sanitary waste or other means.

Appendix E contains detailed information from MassDEP including Policy #BWP-94-092, Reuse and Disposal Policy of Street Sweepings and landfill restrictions regarding acceptance of catch basin cleanings.

4.2.5 Winter Deicing and Snow Removal

To meet EPA's Small MS4 General Permit, the Westford Highway Department must establish and implement procedures for winter road maintenance including the use and storage of salt and sand, minimizing the use of sodium chloride and other salts, and evaluating opportunities for use of alternative materials, and ensuring that snow disposal activities do not result in disposal of snow into surface waters. These procedures also apply to Town-owned and maintained parking lots, sidewalks, and other walkways around buildings and facilities.

The Town currently has a snow dump site at the Forge Village Ballfield on West Prescott Street. In the spring, the Town inspects the area and removes trash and debris. See

Appendix E for guidance on maintenance of snow disposal areas, including Massachusetts EEA Snow Disposal Guidance #BRPG01-01.

4.2.6 Stormwater Best Management Practice (BMP) Inspection and Maintenance

Stormwater best management practices (BMPs) are structures designed to manage post-construction stormwater runoff through conveyance, treatment, infiltration, retaining, attenuation, and storage of stormwater runoff.[6] These BMPs simultaneously manage water quantity and, in most cases, improve water quality.

Structural stormwater BMPs under the ownership or operation by the Town of Westford should be routinely inspected and maintained. The frequency of inspections and maintenance depend on the type and design of the BMP, but all treatment structures (excluding catch basins) must be inspected annually at a minimum.

As part of EPA's NPDES Phase II Small MS4 Stormwater Program, the Town will need to know where public BMPs are located and if/when they are being maintained. The Town has located and mapped known Town-owned structural BMPs and treatment structures in accordance with Phase I mapping requirements. Procedures and schedules for inspecting and maintaining common types of constructed stormwater BMPs, as well as a map of Westford's BMPs as of June 2020, can be found in Appendix E.

4.2.7 Beaver Maintenance at Culverts and Roadways

There are numerous beavers in Town, and the subsequent construction of beaver dams has caused backups in local streams, leading to flooding and water quality issues. The dams cause a reduction in capacity of stream channels and drainage culverts, thereby impeding streamflow and increasing the water level in wetland areas. To alleviate this problem, Westford routinely hires a contractor to install Beaver Deceivers, an example of which is shown in Figure 4-1[7], in various beaver dams. As needed, beavers may be managed by trapping after obtaining required permits. It is illegal to trap or harm beavers without proper permits and approvals.

Figure 4-1: Beaver Deceiver

4.2.8 Storm Preparation

Various operation and maintenance procedures are completed by the Town in preparation for a storm. Prior to anticipated large warm weather rainstorms, Highway staff clean leaves and any debris out of catch basins and drainage channels in areas of Town prone

[6] MassDEP Stormwater Handbook, Volume 2, Chapter 2: Structural BMP Specifications for the Massachusetts Stormwater Handbook

[7] Source: http://www.beaverdeceivers.com/gallery1.html

to flooding. Prior to an anticipated winter storm, Town staff repair potholes as feasible, and prepare deicing materials and trucks for plowing and deicer application.

4.2.9 Dam Inspections and Maintenance

There are more than ten (10) dams in Westford, however, the Town owns and operates only the following three (3) that are regulated by the Office of Dam Safety[8] and MGL Chapter 253 Sections 44-50 and the Commonwealth's Dam Safety Regulations:

- Nabnasset Lake Dam (Byrne Avenue at Nabnasset Lake);
- Westford Depot Dam (Depot Street at Stony Brook); and
- Stony Brook Dam at Graniteville (Broadway Street at Stony Brook).

Figure 4-2: Stony Brook Dam Upstream (left) and Downstream (right)

Dams are classified by hazard potential (high, significant, and low). Emergency planning and inspection frequencies are specified based on the hazard potential. The three (3) dams owned by the Town of Westford are all considered Significant Hazard Potential dams and therefore are required to be inspected every five (5) years by a qualified engineer per 302 CMR 10.07. The qualified engineer must prepare report of the inspection.[9] As required by state and federal regulations, Westford completes annual maintenance on the dams as needed, and hires a qualified engineer to complete inspections every five (5) years. These efforts are funded by the Highway Department's operating budget.

Other inspections that should be performed by the Town include:

- Regular visual observations (at least monthly) which include a general site walk-over, including:
    - A walk along the toe of the dam and in the downstream area to check for seepage, boils, and other unusual occurrences;

[8] In Massachusetts, the Office of Dam Safety maintains records of dams located throughout the Commonwealth and ensures compliance with acceptable practices pertaining to dam inspection, maintenance, operation and repair of dams. http://www.mass.gov/eea/agencies/dcr/conservation/dam-safety/

[9] Source: http://www.mass.gov/eea/agencies/dcr/conservation/dam-safety/dam-safety-inspection-information-for-dam-owners.html

  - A walk along the crest of the dam to look for cracking, settlement and animal burrows;
  - Examination of structural components of the dam to look for any new leaning, cracking, or degradation; and
  - Inspection of spillways and intakes for accumulating debris.
- Inspections following major storm events (exceeding approximately three (3) inches of rainfall).
- More frequent site inspections during storms, floods, periods of extended rain, and periods of high-pool level (within two (2) feet of the dam crest) with the frequency of inspections increased as appropriate, such as daily or more frequently.

An inspection should be performed by a registered professional engineer:

- Following a seismic event (e.g., earthquake), other disturbance, or unusual movement; and
- Following noted increases in the quantity of seepage through the dam.

The Town should consider preparing an Operation and Maintenance Plan specific to each dam.

4.3 Impaired Water SOPs

For facilities and activities in watersheds with impaired waterbodies or final TMDLs, additional good housekeeping and pollution prevention activities are required by EPA.

For facilities and activities within the Assabet River Watershed, the following activities must be completed to address the Assabet River TMDL and reduce the discharge of phosphorus:

- Develop and implement a program to properly manage grass cuttings and leaf litter on property, including prohibiting blowing organic waste materials onto adjacent impervious areas; and
- Increase sweeping frequency of municipal streets and parking lots to a minimum of twice a year, once in the spring and once in the fall.

For facilities and activities within watersheds impaired by solids (e.g., TSS), such as Beaver Brook and Stony Brook, and metals (for Westford, mercury), such as Forge Pond and Nabnasset Lake, the following activities must be completed to reduce the discharge of these pollutants in stormwater runoff:

- Increase street sweeping frequency of all municipally-owned streets and parking lots to a schedule determined by the Town to target areas with potential for high pollutant loads. This may include, but is not limited to, increased street sweeping frequency in commercial areas and high density residential areas, or drainage areas with a large amount of impervious area; and

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

Good housekeeping and pollution prevention SOPs for facilities and activities within watersheds impaired by bacteria (fecal coliform and E. coli), such as Heart Pond, Beaver Brook (Littleton to Forge Pond), Stony Brook, and Tadmuck Brook, are not specifically identified in EPA requirements. However, as part of ongoing operations and maintenance efforts throughout Town, staff should note sources of bacteria, such as pet waste, and illegal dumping/illicit discharges and report the occurrence to the appropriate authority.

4.4 Town-Owned Wastewater System Inspection and Maintenance

Sub-surface wastewater systems on Town-owned properties should be routinely inspected and maintained. The frequency of which is dependent on the type of wastewater system(s) on the property. Appendix G includes recommendations, including SOPs, for the types of wastewater systems that exist in Town: septic systems, cesspools, grease traps, floor drains, and tight tanks.

Section 5

Section 5
O&M Plan Implementation

Implementation of the Operation & Maintenance Plan will require commitment from staff in various departments, boards, and commissions. This section presents the major steps necessary to implement Westford's comprehensive operation and maintenance program to prevent or reduce pollution in stormwater runoff from municipal facilities and operations. Implementation applies to all Town-owned and/or operated buildings and facilities, parks and open space, vehicles and equipment, drainage infrastructure, and wastewater assets.

5.1 Capital Expenditures to Support Implementation

There are a number of capital expenditures necessary to support implementation of the O&M program. Expenditures include but are not limited to:

- Additional mapping of the drainage system;
- Development of a culvert inspection program including procedures, reporting, forms, and safety plans;
- Development of a stormwater asset management program, including routine visual inspections of the drainage system and tablet tracking;
- Identification of publicly-owned structural stormwater BMPs, including type, location, and maintenance requirements;
- Purchasing and installation of GPS units and a tracking system in Highway Department vehicles to track and optimize street sweeping and snow removal/deicing practices; and
- Purchasing vehicles and/or equipment to support drainage system maintenance.

The SWMMP Volume 2, Capital Improvement Plan, includes further details on these capital items, the recommended schedule, and opinions of probable costs.

5.2 Ongoing Implementation Activities

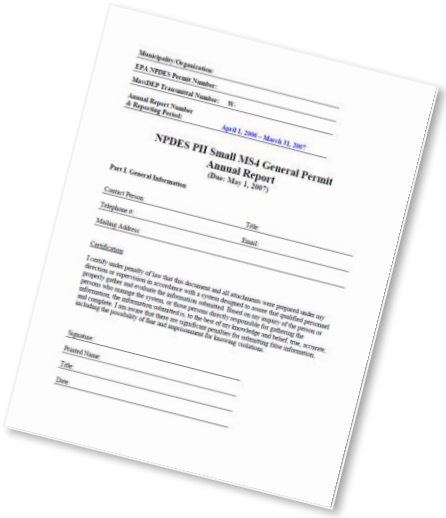
There are numerous ongoing activities necessary to support implementation of Westford's O&M Program. The following sections provide additional detail on these activities and the general schedule.

5.2.1 Record Keeping

Records of good housekeeping and pollution prevention operations should be maintained to document efforts to present or reduce pollutants in stormwater runoff and protect water quality. EPA's MS4 General Permit requires Westford to keep written records of all inspection, maintenance, and trainings for a period of at least five (5) years. The Town currently has a work order system in use by the Highway Department. Volume 2, the CIP, includes recommendations to improve record keeping through development of online forms, software purchases, and improvements to ArcGIS to collect information on tablets. Appendix F includes forms for employee training and O&M Plan amendments record keeping.

5.2.2 Annual Reporting

EPA's Small MS4 General Permit requires that Westford report on the status of the following in each annual report:


NPDES PII Small MS4 General Permit
Annual Report

- Status of inventory of Town-owned facilities and any subsequent updates;
- Status of O&M programs for the municipal facilities and municipal operations listed in Section 4 and Appendix E;
- The maintenance activities associated with each; and
- Good housekeeping/pollution prevention trainings completed.

Annual Reports are due by September 30 annually under the new MS4 General Permit and must cover the previous reporting period (July 1 through June 30).

5.2.3 Annual Update of Municipal Facilities Inventory

As part of preparing the Annual Report required by EPA's Small MS4 General Permit, the Town should review the inventory of parks and open space, buildings and facilities, vehicles and equipment, drainage infrastructure, and wastewater assets and update as needed. Appendix F includes a form to document changes to this O&M plan, including updated inventory components.

5.2.4 Annual Employee Training

Employees involved in good housekeeping and pollution prevention operations should be trained annually on the O&M Plan contents, proper procedures to reduce pollutants in stormwater runoff and protect water quality, and tracking and reporting. EPA's MS4 General Permit specifically requires the following trainings:

- Employees that are responsible for handling petroleum products must be trained as necessary.
- For the site-specific SWPPPs at the Highway Garage and School Maintenance Garage, employees who work in areas where materials or activities are exposed to stormwater or who are responsible for implementing the SWPPP, including the Pollution Prevention Team, should be trained annually. Training should cover specific components and the scope of the SWPPP and the control measures to reduce pollution at the site, including spill prevention and response, good housekeeping, and materials management.

Written records of any trainings conducted must be kept for a period of at least five (5) years. Appendix F includes a log to document trainings completed.

5.2.5 Executing Standard Operating Procedures

Town staff must undertake ongoing efforts to manage potential sources of pollution from the activities conducted at parks and open spaces and buildings and facilities, from vehicles and equipment, and from drainage infrastructure operation and maintenance.

The SOPs discussed in Section 4 and included in Appendix E should be followed in accordance with Tables 5-1 and 5-2.

To reduce the potential for sub-surface wastewater treatment and/or disposal systems to malfunction or fail, thereby potentially causing pollution of the environment, wastewater systems on Town-owned properties should be routinely inspected and maintained. Appendix G includes the SOPs for the types of wastewater systems that exist in Town.

5.2.6 Address Known Drainage System Deficiencies

The locations identified in Section 2.4 through the rapid condition assessment of the drainage system must be investigated and maintained to prevent occurrences of flooding or other drainage issues.

While some drain pipes that were inspected do need maintenance, none were in danger of failure. Figure 2-3 includes two photos taken during the rapid condition assessment field work. The photo on the left is of a reinforced concrete pipe (RCP) in excellent condition. The photo on the right shows a corrugated metal pipe (CMP) in fair condition, with rusting walls and a buildup of sediment and debris.

5.3 Summary of O&M Plan Implementation and Schedule

Table 5-1 identifies general O&M activities organized by responsible party and the associated schedule for each activity.

Table 5-1
General O&M Activities

Responsible Party	Activity	Schedule
Engineering Department (with input by other Boards, Departments, and Commissions)	Record Keeping	Ongoing, quarterly check-ins with other Boards, Departments, and Commissions.
	Annual Reporting	Submit to EPA and MassDEP annually by September 30. Reporting period covers July 1 through June 30 of previous year.
	Annual Employee Training	Formal annual training to be held at Highway Garage. Ongoing, quarterly check-ins with other Boards, Departments, and Commissions.
Engineering Department with assistance from Highway Department	Stormwater Best Management Practice (BMP) Inspection and Maintenance	Ongoing in accordance with program developed as recommended in the SWMMP Volume 2: Long-Term Capital Improvement Plan
GIS Coordinator (with input by other Boards, Departments, and Commissions)	Municipal Facilities Inventory Update	Annually prior to June 30.

Table 5-1
General O&M Activities

Responsible Party	Activity	Schedule
Highway Department	Pipe and Manhole Inspection, Cleaning, and Maintenance	Ongoing in accordance with program developed as recommended in the SWMMP Volume 2: Long-Term Capital Improvement Plan.
	Catch Basin Inspection, Cleaning, and Maintenance	Routine cleaning such that no catch basin sump at any time will be more than 50 percent full. Prioritize inspection and maintenance for catch basins in Beaver Brook, Stony Brook, Forge Pond, and Nabnasset Lake subwatersheds.
	Sweeping Streets and Town Owned Parking Lots	Minimum of once per year in the spring, at least twice per year in targeted areas including within the Assabet River Watershed and targeted areas identified by the Highway Department that are within the Beaver Brook, Stony Brook, Forge Pond, and Nabnasset Lake subwatersheds.
	Storage and Disposal of Catch Basin Cleanings and Sweepings	Ongoing.
	Winter Deicing and Snow Removal	Ongoing road, parking lot, and sidewalk/walkway maintenance. Inspect the snow dump site at the Forge Village ballfield on West Prescott Street in the spring and remove trash and debris.
	Beaver Maintenance at Culverts and Roadways	Ongoing.
	Storm Preparation	Prior to anticipated large warm weather rainstorms, clean leaves and any debris out of catch basins and drainage channels in areas of Town prone to flooding. Prior to an anticipated winter storm, repair potholes as feasible, and prepare deicing materials and trucks for plowing and deicer application.
	Dam Inspection and Maintenance	Hire qualified engineer to inspect each dam every five (5) years and prepare report of the inspection. Facilitate annual maintenance on the dams as needed.
Various Departments, Boards, Commissions, etc.	Standard Operating Procedures in Appendix E	Follow applicable SOPs for facilities and/or operations on an ongoing basis.

Table 5-1
General O&M Activities

Responsible Party	Activity	Schedule
Various Departments, Boards, Commissions, etc.	Town-owned Wastewater System Operation and Maintenance	Sub-surface wastewater systems on Town-owned properties should be routinely inspected and maintained. The frequency of which is dependent on the type of wastewater system(s) on the property. Appendix G includes recommendations, including SOPs, for the types of wastewater systems that exist in Town: septic systems, cesspools, grease traps, floor drains, and tight tanks.

Appendix A

Map of Facilities

BF29	Hildreth Hills Storage Tank	Hildreth Street
BF30	Francis Hill Storage Tank	Hunt Road
BF31	Prospect Hill Storage Tank	Main Street
BF32	Nutting Road Wells and Water Treatment Plant	19 Nutting Road
	Parks and Open Space	
	Cemetery	
PO1	Fairview Cemetery	Main Street
PO2	Hillside Cemetery	Nutting Road
PO3	Keyes Cemetery	Jonas Road
PO4	Picking-Wright Cemetery Annex	Groton Road
PO5	Pine Grove Cemetery	Forge Village Road
PO6	Westlawn Cemetery	Concord Road
PO7	Wright Cemetery	Groton Road
	Garden and Active Recreation	
PO8	Captain Stephen Hamilton Ballfield	Plain Road
PO9	East Boston Camps at Stony Brook Conservation Land	Depot Street
PO10	Edwards Beach	Williams Avenue
PO11	Forge Pond Town Beach	Pleasant Street
PO12	Graniteville Ballfield/American Legion Field	15 River Street
PO13	Greystone Playing Fields (Lot Q)	Russell's Way
PO14	Hill Orchard Farm Stand	Hunt Road
PO15	Hill Orchard West 1	Chamberlin Road
PO16	Hill Orchard West 2	Chamberlin Road
PO17	Jack Walsh Recreation Area	Carlisle Road
PO18	Stony Brook Conservation Land - Recreation Commission Parcel 1	Nutting Road
PO19	VFW Softball Field	52 W Prescott Street
	Commons	
PO20	Civil War Soldiers Monument	Boston Road
PO21	Graniteville Memorial Triangle	North Main Street
PO22	Odell W. Prescott St. Land Donation	W Prescott Street
PO23	Old Pioneer Burial Ground	Carlisle Road
PO24	Town Common	Main Street
PO25	Veterans Memorial Complex 1	Farmer Way
PO26	Veterans Memorial Complex 2	Farmer Way

	Buildings and Facilities	
	Municipal Buildings	
BF1	Cameron Senior Center	20 Pleasant Street
BF2	IT Department (Forge Village Fire Station)	E Prescott Street
BF3	J.V. Fletcher Library	50 Main Street
BF4	New Highway Garage Site	North Main Street
BF5	Parkerville Schoolhouse	Carlisle Road
BF6	Rec Dept. Storage (Graniteville Fire Station)	54 Broadway Street
BF7	Recreational Department	35 Town Farm Road
BF8	Roudenbush Community Center	73 Main Street
BF9	Roudenbush Community Center at Nabnasset (Frost Day Care)	Plain Road
BF10	Town Hall	55 Main Street
BF11	Westford Museum	2 Boston Road
BF33	Stony Brook Housing #1 and #2	3 - 7 Farmer Way
	School Buildings	
BF12	Abbot School & Millennium School	25 Depot Street
BF13	Blanchard Middle School	20 West Street
BF14	Nabnasset School	99 Plain Road
BF15	Norman Day School	75 E Prescott Street
BF16	Rita E. Miller School	Vineyard Road Ext.
BF17	Robinson and Crisafulli Elementary Schools	33 Robinson Road
BF18	School Maintenance Garage (Old Highway Garage)	30 Beacon Street
BF19	Stony Brook School	Farmer Way
BF20	Stony Brook School	Farmer Way
BF21	Vineyard Rd Ext School Land - North	Vineyard Road Ext.
BF22	Westford Academy	30 Patten Road
	Fire and Safety	
BF23	Nabnasset Fire Station	Oak Hill Road
BF24	Police and Fire Central Station	51/53 Main Street
BF25	Rogers Fire Station	39 Town Farm Road
	Water	
BF26	Town Farm Storage Tank	E Prescott Street
BF27	Forge Village Road Water Dept. Land and Garage Building	65 Forge Village Road
BF28	Forge Village Road Water Dept. Land and Water Treatment Plant	60 Forge Village Road

Legend

- Municipal Buildings and Facilities (56)

Municipal Facilities

Buildings and Facilities

- Municipal Buildings
- Municipal Buildings/ Active Recreation
- Fire and Safety
- School Buildings
- Water

Municipal Facilities

Parks and Open Space

- Garden and Active Recreation
- Municipal Buildings/ Active Recreation
- Cemetery
- Commons
- Municipal Parks and Open Space Parcels

- Major Basin Boundary
- Sub-basin Boundary
- Town Boundary
- Parcels
- Westford Town Boundary
- Inland Wetlands
- Lakes, Ponds and Rivers
- Rivers and Streams

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Based on MassGIS Data and Town of Westford Data

MAP OF MUNICIPAL FACILITIES

Westford, Massachusetts

November 2016

Tighe&Bond

Engineers | Environmental Specialists

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Appendix B

Inventory of Municipal Facilities

Appendix B
Inventory of Municipal Facilities

Map No.	Name	Address	Parcel	Responsible Board/ Commission/Department	Size (acres)	Building (Y/N)
			Buildings and Facilities			
			Municipal Buildings			
BF1	Cameron Senior Center	20 Pleasant Street	330/053.0-0091-0000.0	Council on Aging	3.422	Y
BF2	IT Department (Forge Village Fire Station)	E Prescott Street	330/057.0-0028-0000.0	Selectmen	0.103	Y
BF3	J.V. Fletcher Library	50 Main Street	330/059.0-0018-0000.0	Library Trustees	1.590	Y
BF4	New Highway Garage Site	North Main Street	330/030.0-0030-0000.0	Selectmen	44.000	Y
BF5	Parkerville Schoolhouse	Carlisle Road	330/012.0-0101-0000.0	Parkerville School Reuse Committee	0.342	Y
BF6	Rec Dept. Storage (Graniteville Fire Station)	54 Broadway Street	330/062.0-0030-0000.0	Selectmen	0.250	Y
BF7	Recreational Department	35 Town Farm Road	330/024.0-0023-0000.0	Selectmen	0.680	Y
BF8	Roudenbush Community Center	73 Main Street	330/059.0-0042-0000.0	Selectmen	5.200	Y
BF9	Roudenbush Community Center at Nabnasset (Frost Day Care)	Plain Road	330/074.0-0108-0000.0	Selectmen	3.750	Y
BF10	Town Hall	55 Main Street	330/059.0-0046-0000.0	Selectmen	0.500	Y
BF11	Westford Museum	2 Boston Road	330/055.0-0013-0000.0	Historical Commission	0.359	Y
BF33	Stony Brook Housing #1 and #2	3 - 7 Farmer Way	330/035.0-0107-0000.0	Westford Housing Authority	1.750	Y
			School Buildings			
BF12	Abbot School & Millennium School	25 Depot Street	330/026.0-0086-0000.0	School Department	32.070	Y
BF13	Blanchard Middle School	20 West Street	330/029.0-0002-0000.0	School Department	85.620	Y
BF14	Nabnasset School	99 Plain Road	330/069.0-0253-0000.0	School Department	21.980	Y
BF15	Norman Day School	75 E Prescott Street	330/024.0-0005-0000.0	School Department	40.100	Y
BF16	Rita E. Miller School	Vineyard Road Ext.	330/048.0-0011-0232.0	School Committee	8.560	Y
BF17	Robinson and Crisafulli Elementary Schools	33 Robinson Road	330/020.0-0102-0000.0	School Department	68.800	Y
BF18	School Maintenance Garage (Old Highway Garage)	30 Beacon Street	330/030.0-0045-0000.0	Selectmen	5.000	Y
BF19	Stony Brook School	Farmer Way	330/035.0-0108-0000.0	School Department	22.300	Y
BF20	Stony Brook School	Farmer Way	330/035.0-0112-0000.0	School Department	20.900	N
BF21	Vineyard Rd Ext School Land - North	Vineyard Road Ext.	330/048.0-0005-0001.0	School Committee	3.760	Partial
BF22	Westford Academy	30 Patten Road	330/020.0-0082-0000.0	School Department	37.900	Y
			Fire and Safety			
BF23	Nabnasset Fire Station	Oak Hill Road	330/074.0-0278-0000.0	Fire Department	0.207	Y
BF24	Police and Fire Central Station	51/53 Main Street	330/059.0-0047-0000.0	Selectmen	30.000	Y
BF25	Rogers Fire Station	39 Town Farm Road	330/024.0-0022-0000.0	Selectmen	5.900	Y
			Water			
BF26	Town Farm Storage Tank	E Prescott Street	330/024.0-0006-0000.0	Water Department	0.500	N
BF27	Forge Village Road Water Dept. Land and Garage Building	65 Forge Village Road	330/025.0-0010-0000.0	Water Department/ Selectmen	88.260	Y
BF28	Forge Village Road Water Dept. Land and Water Treatment Plant	60 Forge Village Road	330/020.0-0043-0000.0	Water Department	26.100	Y
BF29	Hildreth Hills Storage Tank	Hildreth Street	330/016.0-0024-0000.0	Water Department	1.670	N
BF30	Francis Hill Storage Tank	Hunt Road	330/033.0-0017-0000.0	Water Department	1.070	N
BF31	Prospect Hill Storage Tank	Main Street	330/055.0-0002-0000.0	Water Department	0.735	N
BF32	Nutting Road Wells and Water Treatment Plant	19 Nutting Road	330/068.0-0001-0000.0	Water Department	7.750	Y

Appendix B
Inventory of Municipal Facilities

Map No.	Name	Address	Parcel	Responsible Board/ Commission/Department	Size (acres)	Building (Y/N)
			Parks and Open Space			
			Cemetery			
PO1	Fairview Cemetery	Main Street	330/027.0-0170-0000.0	Cemetery Commission	10.450	Y
PO2	Hillside Cemetery	Nutting Road	330/036.0-0035-0000.0	Cemetery Commission	0.939	N
PO3	Keyes Cemetery	Jonas Road	330/043.0-0022-0000.0	Cemetery Commission	0.048	N
PO4	Picking-Wright Cemetery Annex	Groton Road	330/035.0-0004-0004.0	Cemetery Commission	4.490	N
PO5	Pine Grove Cemetery	Forge Village Road	330/020.0-0043-0001.0	Cemetery Commission	11.700	Y
PO6	Westlawn Cemetery	Concord Road	330/020.0-0028-0000.0	Cemetery Commission	1.700	N
PO7	Wright Cemetery	Groton Road	330/035.0-0005-0000.0	Cemetery Commission	0.416	N
			Garden and Active Recreation			
PO8	Captain Stephen Hamilton Ballfield	Plain Road	330/074.0-0108-0000.0	Selectmen	3.750	N
PO9	East Boston Camps at Stony Brook Conservation Land	Depot Street	330/031.0-0037-0000.0	Conservation Commission	237.230	Y
PO10	Edwards Beach	Williams Avenue	330/074.0-0002-0000.0	Conservation Commission.	10.000	Y
PO11	Forge Pond Town Beach	Pleasant Street	330/053.0-0012-0000.0	Selectmen	5.670	Y
PO12	Graniteville Ballfield/American Legion Field	15 River Street	330/062.0-0102-0000.0	Recreation Commission	31.000	Y
PO13	Greystone Playing Fields (Lot Q)	Russell's Way	330/046.0-0011-0244.0	Selectmen	3.280	N
PO14	Hill Orchard Farm Stand	Hunt Road	330/033.0-0012-0000.0	Conservation Commission	3.480	Y
PO15	Hill Orchard West 1	Chamberlin Road	330/033.0-0006-0000.0	Conservation Commission	2.000	N
PO16	Hill Orchard West 2	Chamberlin Road	330/033.0-0007-0003.0	Conservation Commission	18.000	N
PO17	Jack Walsh Recreation Area	Carlisle Road	330/007.0-0009-0000.0	Recreation Commission	32.800	Y
PO18	Stony Brook Conservation Land - Recreation Commission Parcel 1	Nutting Road	330/036.0-0008-0000.0	Selectmen	29.800	
PO19	VFW Softball Field	52 W Prescott Street	330/056.0-0055-0000.0	Recreation Commission	10.000	Y
			Commons			
PO20	Civil War Soldiers Monument	Boston Road	330/055.0-0041-0001.0	Selectmen	< 1.000	N
PO21	Graniteville Memorial Triangle	North Main Street	330/030.0-0068-0001.0	Selectmen	< 0.100	N
PO22	Odell W. Prescott St. Land Donation	W Prescott Street	330/053.0-0013-0000.0	Selectmen	0.092	N
PO23	Old Pioneer Burial Ground	Carlisle Road	330/012.0-0099.0001.0	Selectmen	< .10	N
PO24	Town Common	Main Street	330/059.0-0001-0000.0	Selectmen	1.130	N
PO25	Veterans Memorial Complex 1	Farmer Way	330/035.0-0113-0000.0	Selectmen	4.410	N
PO26	Veterans Memorial Complex 2	Farmer Way	330/035.0-0110-0000.0	Selectmen	7.790	N
			Undeveloped Land			
	Minot's Corner Parcel	Littleton Road	330/017.0-0027-0001	Selectmen	0.027	N
	Old Landfill/New Meadow	Cold Spring Road	330/025.0-0015-0000.0	Selectmen	17.020	N
			Other Open Space			
	Acton Road Tax Title Parcel 1	Acton Road	330/013.0-0047-0000.0	Tax Possession Sale Committee	9.400	
	Acton Road Tax Title Parcel 2	Acton Road	330/007.0-0055-0000.0	Tax Possession Sale Committee	0.930	
	Acton Road Tax Title Parcel 3 (Vose Parcel)	Acton Road	330/007.0-0086-0000.0	Conservation Commission	0.263	
	Acton Road Tax Title Parcel 4	Acton Road	330/013.0-0038-0000.0	Tax Possession Sale Committee	0.810	
	Allie Lane Parcel	Allie Lane	330/035.0-0101-0000.0	Selectmen	15.000	
	Anderson Conservation Land 1	Baldwin Road	330/033.0-0023-0019.0	Conservation Commission	1.010	

Appendix B
Inventory of Municipal Facilities

Map No.	Name	Address	Parcel	Responsible Board/ Commission/Department	Size (acres)	Building (Y/N)
	Anderson Conservation Land 2	Hunt Road	330/033.0-0023-0014.0	Conservation Commission	0.420	
	Arch Bridge 1	Milot Roat	330/025.0-0085-0000.0	Conservation Commission	1.070	
	Arch Bridge 2	Milot Road	330/025.0-0090-0000.0	Conservation Commission	2.700	
	B&M Stony Brook Conservation Parcel	Milot Road	330/025.0-0083-0000.0	Conservation Commission	4.458	
	Balas Conservation Land	Carolina Lane	330/069.0-0001-0000.0	Conservation Commission	11.950	
	Banbury Drive Conservation Parcel	Banbury Drive	330/011.0-0061-0000.0	Conservation Commission	1.480	
	Beacon St. Water Department Land	Beacon Street	330/030.0-0032-0001.0	Water Department	26.000	
	Beaver Brook Conservation Land	Southwick Circle	330/015.0-0002-0025.0	Conservation Commission	46.350	
	Beaver Brook Village Conservation Land	Conservation Way	330/051.0-0006-0000.0	Conservation Commission	2.900	
	Beaver Brook/Concord Rd Conservation Land	33 Beaver Brook Road	330/020.0-0016-0000.0	Conservation Commission	26.130	
	Beers Conservation Land 1	Oakdale Street	330/050.0-0014-0000.0	Conservation Commission	0.096	
	Beers Conservation Land 2	Sand Beach Road	330/050.0-0016-0000.0	Conservation Commission	0.195	
	Blue Brook Conservation Land	Flushing Pond Road	330/041.0-0155-0002.0	Conservation Commission	19.100	
	Boston Rd Drew Orchard	Boston Road	330/022.0-0003-0004.0	Selectmen	4.810	N
	Briarwood Drive Tax Title Parcel	Briarwood Drive	330/045.0-0083-0020.0	Tax Possession Sale Committee	0.017	
	Brookside Mill Conservation Parcel 1	Brookside Road	330/067.0-0005-0000.0	Conservation Commission	1.720	
	Brookside Mill Conservation Parcel 2	Brookside Road	330/067.0-0050-0000.0	Conservation Commission	12.470	
	Brookside Mill Conservation Parcel 3	Brookside Road	330/038.0-0021-0000.0	Conservation Commission	3.360	
	Brookside Mill Conservation Parcel 4	Brookside Road	330/038.0-0020-0000.0	Conservation Commission	5.420	
	Brookside Mill Tax Title Parcel 1	Depot Street	330/031.0-0051-0000.0	Tax Possession Sale Committee	0.240	
	Byrne Ave Gibbons Land Donation	31 Byrne Avenue	330/078.0-0076-0000.0	Selectmen	0.128	
	Catalog Realty Trust Conservation Land	Old Lowell Road	330/013.0-0018-0005.0	Conservation Commission	12.830	
	Cider Mill Pond Conservation Land 1 (Taylor Parcel)	Stony Brook Road	330/032.0-0075-0000.0	Conservation Commission	14.640	
	Cider Mill Pond Conservation Land 2 (MacDougall Parcel)	Lowell Road	330/032.0-0080-0000.0	Conservation Commission	3.040	
	Cider Mill Pond Conservation Land 3 (Agnew Parcel)	Lowell Road	330/032.0-0081-0000.0	Conservation Commission	21.130	
	Cline Conservation Land	Littleton Road	330/012.0-0010-0000.0	Conservation Commission	4.000	
	Cold Spring Rd Municipal Land - West	Cold Spring Road	330/025.0-0202-0002.0	Selectmen	0.450	
	Cold Spring Road Municipal Land - East	Cold Spring Road	330/025.0-0202-0003.0	Selectmen	0.840	
	Coolidge Street Land	Coolidge Street	330/056.0-0075-0000.0	Selectmen	0.138	
	Cote Well Land	North Street	330/030.0-0047-0000.0	Water Department	16.800	
	Country Rd Well Land	Country Road	330/020.0-0090-0000.0	Water Department	8.140	
	Country Rd West Future Well Site 1	Country Road	330/020.0-0018-0002.0	Water Department	3.880	
	Country Rd West Future Well Site 2	Country Road	330/020.0-0034-0000.0	Water Department	5.500	
	Crescent St. Tax Title Parcel - East	Crescent Street	330/054.0-0010-0000.0	Tax Possession Sale Committee	0.100	
	Crescent St. Tax Title Parcel - West	Crescent Street	330/053.0-0069-0000.0	Tax Possession Sale Committee	0.146	
	Crest Haven Parcel	Acton Road	330/013.0-0071-0000.0	Selectmen	0.750	
	Dana Drive Conservation Land 1	Dana Drive	330/027.0-0206-0000.0	Conservation Commission	0.420	
	Dana Drive Conservation Land 2	Dana Drive	330/027.0-0206-0002.0	Conservation Commission	2.540	
	Dana Drive Conservation Land 3	Dana Drive	330/027.0-0228-0010.0	Conservation Commission	22.000	
	Day Agricultural and Conservation Land (a.k.a. "The Pumpkin Field")	Graniteville Road	330/026.0-0037-0000.0	Conservation Commission	17.610	
	Depot St Well Parcel 2	Depot Street	330/065.0-0003-0000.0	Water Department	5.300	

Appendix B
Inventory of Municipal Facilities

Map No.	Name	Address	Parcel	Responsible Board/ Commission/Department	Size (acres)	Building (Y/N)
	Depot St. Well - Parcel 1	Depot Street	330/065.0-0002-0000.0	Water Department	8.330	
	Drew Boston Road Land	Boston Road	330/022.0-0117-0002.0	Selectmen	2.480	
	Drew Boston Road Land Access ROW	Boston Road	330/022.0-0117-0016.0	Selectmen	0.620	
	Drew Court Road Parcel 1	Crown Road	330/022.0-0084-0000.0	Conservation Commission	5.600	
	Drew Court Road Parcel 2	Court Road	330/022.0-0083-0000.0	Conservation Commission	20.680	
	Drew Crossing Conservation Land	Drew Crossing	330/022.0-0117-0004.0	Conservation Commission	9.250	
	Drew Ramp Parcel	Boston Road	330/022.0-0003-0003.0	Conservation Commission	12.210	
	Duffy and Doucette Conservation Land	Keyes Road	330/040.0-0058-0001.0	Conservation Commission	2.300	
	Edward and Louise Dean Conservation land	Dean Drive	330/066.0-0101-0003.0	Conservation Commission	0.440	
	Edwards Parcel	Tyngsboro Road	330/045.0-0099-0000.0	Conservation Commission	40.000	
	Emmet Conservation Land - Durkee Rd. Eminent Domain Taking	Durkee Road	330/002.0-0011-0000.0	Conservation Commission	8.950	
	Emmet Conservation Land - Gage Parcel (Hapgood and Tuttle Lots 2)	Texas Road	330/002.0-0023-0000.0	Conservation Commission	10.000	
	Emmet Conservation Land - Gage Parcel (Hapgood and Tuttle Lots)	Durkee Road	330/002.0-0007-0000.0	Conservation Commission	28.250	
	Emmet Conservation Land - Gage Parcel (Sheperd Lot Part 1)	Texas Road	330/002.0-0005-0000.0	Conservation Commission	41.400	
	Emmet Conservation Land - Gage Parcel (Sheperd Lot Part 2)	Texas Road	330/002.0-0006-0000.0	Conservation Commission	41.110	
	Emmet Conservation Land - Gage Parcel (White Lot 1)	Durkee Road	330/002.0-0003-0000.0	Conservation Commission	16.500	
	Emmet Conservation Land - Gage Parcel (White Lot 2)	Texas Road	330/002.0-0024-0000.0	Conservation Commission	5.000	
	Emmet Conservation Land - Gage/Kennedy Parcels 1	Powers Road	330/006.0-0002-0000.0	Conservation Commission	23.830	
	Emmet Conservation Land - Gage/Kennedy Parcels 2	Powers Road	330/006.0-0003-0000.0	Conservation Commission	2.500	
	Emmet Conservation Land - Gage/Kennedy Parcels 3	Concord Road	330/006.0-0005-0000.0	Conservation Commission	11.140	
	Emmet Conservation Land - Guidoboni/Masse Parcel	Powers Road	330/006.0-0008-0000.0	Conservation Commission	5.540	
	Emmet Conservation Land - Harriet Hill Tax Title Parcel 1	Durkee Road	330/002.0-0002-0000.0	Conservation Commission	16.000	
	Emmet Conservation Land - Harriet Hill Tax Title Parcel 2	Durkee Road	330/002.0-0008-0000.0	Conservation Commission	7.000	
	Emmet Conservation Land - J. F. White Parcel 1	Texas Road	330/002.0-0025-0000.0	Conservation Commission	36.050	
	Emmet Conservation Land - J.F. White Parcel 2	Texas Road	330/002.0-0027-0000.0	Conservation Commission	12.000	
	Emmet Conservation Land - J.F. White Parcel 3	Texas Road	330/002.0-0028-0000.0	Conservation Commission	12.520	
	Emmet Conservation Land - Kennedy Parcel 1	Texas Road	330/002.0-0026-0000.0	Conservation Commission	15.620	
	Emmet Conservation Land - Kennedy Parcel 2	Texas Road	330/006.0-0047-0000.0	Conservation Commission	5.000	
	Emmet Conservation Land - Mahoney and Jansky Parcel 1	Powers Road	330/005.0-0020-0000.0	Conservation Commission	1.200	

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Map No.	Name	Address	Parcel	Responsible Board/ Commission/Department	Size (acres)	Building (Y/N)
	Emmet Conservation Land - Mahoney and Jansky Parcel 2	Powers Road	330/005.0-0020-0001.0	Conservation Commission	5.760	
	Emmet Conservation Land - Martin and Mitchell Parcel	Powers Road	330/002.0-0004-0000.0	Conservation Commission	6.000	
	Emmet Conservation Land - R.S. Realty Trust Parcel	Powers Road	330/006.0-0007-0000.0	Conservation Commission	26.490	
	Endmoor Road Tax Title Land	Endmoor Road	330/073.0-0013-0000.0	Tax Possession Sale Committee	0.096	
	Ennion Tyngsboro Rd. Tax Title Parcel	Tyngsboro Road	330/047.0-0029-0000.0	Tax Possession Sale Committee	2.868	
	Fieldstone Drive Conservation Land 1	Fieldstone Drive	330/017.0-0025-0000.0	Conservation Commission	8.470	
	Fieldstone Drive Conservation Land 2	Fieldstone Drive	330/017.0-0038-0000.0	Conservation Commission	14.520	
	Flagg Road Conservation Land	Flagg Road	330/021.0-0014-0000.0	Conservation Commission	1.380	
	Fletcher Well Land 1	Concord Road	330/020.0-0007-0000.0	Water Department	1.010	
	Fletcher Well Land 2	Concord Road	330/020.0-0009-0000.0	Water Department	2.080	
	Fletcher Well Land 3	Concord Road	330/020.0-0012-0000.0	Water Department	9.990	
	Forge Village Rd. Conservation Area	Forge Village Road	330/025.0-0224-0000.0	Conservation Commission	14.620	
	Forrest Road Land	Forrest Road	330/046.0-0001-0006.0	Status unclear	0.080	
	Genova Conservation Land	Stony Brook Road	330/067.0-0049-0000.0	Conservation Commission	10.800	
	Georges Tadmuck Ln Conservation Land 1	5 Tadmuck Lane	330/027.0-0187-0000.0	Status Unclear	0.459	
	Georges Tadmuck Ln Conservation Land 2	Tadmuck Lane	330/027.0-0196-0000.0	Conservation Commission	14.800	
	Gifford Drive Tax Title Parcel	Gifford Drive	330/037.0-0003-0006.0	Tax Possession Sale Committee	0.420	
	Granite Hill Est. Conservation Parcel 1	Cowdry Hill Road	330/029.0-0070-0000.0	Conservation Commission	26.922	
	Granite Hill Est. Conservation Parcel 2	Cowdry Hill Road	330/029.0-0084-0000.0	Conservation Commission	44.844	
	Grassy Pond Conservation Area	Depot Street	330/065.0-0054-0000.0	Conservation Commission	62.140	
	Great Elm Parcel	Carlisle Road	330/007.0-0019-0001.0	Conservation Commission	10.850	
	Grey Fox Lane Conservation Land	Grey Fox Lane	330/032.0-0027-0000	Conservation Commission	12.900	
	Greystone Groton Rd Land (Lot A)	Groton Road	330/046.0-0011-0227.0	Selectmen	0.920	
	Greystone Lot B Conservation Land	Russell's Way	330/046.0-0011-0228.0	Conservation Commission	52.810	
	Greystone Lot C Conservation Land	Russell's Way	330/046.0-0011-0229.0	Conservation Commission	4.850	
	Greystone Lot D Municipal Land (Drainage Basin)	Curren Drive	330/048.0-0011-0230.0	Selectmen	0.460	
	Greystone Lot E Municipal Land (Water Tower Road Entrance)	Russell's Way	330/048.0-0011-0231.0	Selectmen	0.960	
	Greystone Lot G Conservation Land	Caldwell Drive	330/048.0-0011-0233.0	Conservation Commission	13.380	
	Greystone Lot H Conservation Land	Russell's Way	330/048.0-0011-0247.0	Conservation Commission	130.130	
	Greystone Lot J Municipal Land	Russell's Way	330/048.0-0011-0235.0	Selectmen	4.240	
	Greystone Lot K Conservation Land	Russell's Way	330/048.0-0011-0236.0	Conservation Commission	0.380	
	Greystone Lot L Conservation Land	Chandler Road	330/049.0-0011-0237.0	Conservation Commission	31.470	
	Greystone Lot M Conservation Land	Morrison Lane	330/048.0-0011-0238.0	Conservation Commission	0.080	
	Greystone Lot P Conservation Land	Morrison Lane	330/048.0-0011-0240.0	Conservation Commission	0.370	
	Groton Rd Gage Land	Groton Road	330/076.0-0054-0001.0	Town Forest Committee	8.370	
	Hassan Conservation Land	Littleton Road	330/023.0-0041-0000.0	Conservation Commission	4.500	
	Hildreth St. Tax Title Parcel	Hildreth Street	330/021.0-0103-0000.0	Tax Possession Sale Committee	2.950	
	Horsehead Conservation Land 1	Beaver Brook Road	330/014.0-0034-0016.0	Conservation Commission	26.330	
	Horsehead Conservation Land 2	Southwick Circle	330/015.0-0002-0026.0	Conservation Commission	18.000	
	Horsehead Conservation Land 3	True Bean Way	330/014.0-0023-0003.0	Conservation Commission	4.580	
	Howard Rd. Well Site 1	Howard Road	330/015.0-0003-0000.0	Water Department	17.920	

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Map No.	Name	Address	Parcel	Responsible Board/ Commission/Department	Size (acres)	Building (Y/N)
	Howard Rd. Well Site 2	Howard Road	330/015.0-0004-0000.0	Water Department	5.650	
	Howard Rd. Well Site 3	Howard Road	330/015.0-0098-0000.0	Water Department	2.810	
	Indian Meeting Ground	Bradford Street	330/052.0-0002-0000.0	Conservation Commission	0.562	
	Irwin Conservation Land	Howard Road	330/015.0-0097-0000.0	Conservation Commission	2.550	
	J.P. McKenna Conservation Land	Hyacinth Drive	330/031.0-0034-0000.0	Conservation Commission	0.739	
	Kate Rose Way Conservation Land	Kate Rose Way	330/016.0-0020-0002.0	Conservation Commission	1.160	
	Keyes Pond Conservation Land	Keyes Road	330/040.0-0044-0000.0	Conservation Commission	0.256	
	Keyes Road Tax Title Parcel 1	Keyes Road	330/040.0-0060-0000.0	Tax Possession Sale Committee	0.100	
	Keyes Road Tax Title Parcel 2	Keyes Road	330/040.0-0059-0000.0	Tax Possession Sale Committee	0.100	
	Kiberd Conservation Land	Monadnock Drive	330/016.0-0042-0000.0	Conservation Commission	2.910	
	Kloppenburg Conservation Land	Hartford Road	330/020.0-0074-0010.0	Conservation Commission	12.860	
	Knoll Rd Tax Title Parcel	1 Knoll Road	330/074.0-0153-0000.0	Tax Possession Sale Committee	0.098	
	Lakeview St. Tax Title Parcel 1	Lakeview Street	330/050.0-0017-0000.0	Tax Possession Sale Committee	0.123	
	Lakeview St. Tax Title Parcel 2	Lakeview Street	330/050.0-0018-0000.0	Tax Possession Sale Committee	0.108	
	Lakeview St. Tax Title Parcel 3	Lakeview Street	330/050.0-0019-0000.0	Tax Possession Sale Committee	0.108	
	Lakeview St. Tax Title Parcel 4	Lakeview Street	330/050.0-0020-0000.0	Tax Possession Sale Committee	0.095	
	Lakeview St. Tax Title Parcel 5	Lakeview Street	330/050.0-0021-0000.0	Tax Possession Sale Committee	0.071	
	LaSallette Rd. Land	Lasalleette Road	330/018.0-0103-0000.0	Selectmen	3.900	
	LaSallette Rd. Land	Lasalleette Road	330/018.0-0110-0000.0	Selectmen	1.050	
	LaSallette Rd. land	Lasalleette Road	330/018.0-0111-0000.0	Selectmen	1.230	
	LaSallette Rd. Land	Lasalleette Road	330/018.0-0112-0000.0	Selectmen	2.090	
	Lawton Ave. Conservation Land 1	Lawton Avenue	330/027.0-0063-0004.0	Conservation Commission	0.960	
	Lawton Ave. Conservation Land 2	Lawton Avenue	330/027.0-0063-0002.0	Conservation Commission	1.020	
	Leighton Way Conservation Parcel 1	Leighton Way	330/032.0-0022-0002.0	Conservation Commission	1.880	
	Leighton Way Conservation Parcel 2	Leighton Way	330/032.0-0022-0005.0	Conservation Commission	0.150	
	LePage Conservation Land	Forge Village Road	330/025.0-0037-0000.0	Conservation Commission	0.060	
	Littleton Road Conservation Parcel	Littleton Road	330/012.0-0009-0000.0	Conservation Commission	4.440	
	Lorain Realty Trust Conservation Land	Rome Drive Ext.	330/016.0-0076-0000	Conservation Commission	22.500	
	MacDonald Sawmill Rd Tax Title Parcel	Sawmill Road	330/045.0-0040-0000.0	Conservation Commission	11.360	
	MacDonald Tyngsboro Rd. Tax Title Parcel	Tyngsboro Road	330/045.0-0002-0000.0	Tax Possession Sale Committee	2.250	
	Mark Vincent Drive Tax Title Land	Mark Vincent Drive	330/013.0-0082-0000.0	Tax Possession Sale Committee	0.920	
	Martina Gage Town Forest	Gage Road	330/018.0-0066-0000.0	Town Forest Committee	74.880	
	Mass. Electric Conservation Land	Rome Drive	330/016.0-0078-0000.0	Conservation Commission	11.000	
	Michael Joseph "Joe" and Yvonne Rose Sullivan Land	Blakes Hill Road	330/021.0-0094-0000.0	Selectmen	1.450	
	Mill Pond/Charles G. Sargent Playground	North Main Street	330/061.0-0041-0000.0	Selectmen	8.000	N
	Milot Conservation Land	Milot Road	330/025.0-0084-0000.0	Conservation Commission	3.640	
	Minot's Corner Parcel	Littleton Road	330/017.0-0027-0001	Selectmen	0.027	
	Moulton Conservation Land 1	Cold Spring Road	330/025.0-0129-0000.0	Conservation Commission	0.961	
	Moulton Conservation Land 2	Old Homestead Road	330/025.0-0149-0000.0	Conservation Commission	0.690	

Appendix B
Inventory of Municipal Facilities

Map No.	Name	Address	Parcel	Responsible Board/ Commission/Department	Size (acres)	Building (Y/N)
	Moulton Conservation Land 3	Longmeadow Road	330/025.0-0148-0000.0	Conservation Commission	0.920	
	Mystery Spring Woods Conservation Land	Tadmuck Road	330/022.0-0030-0017.0	Conservation Commission	4.620	
	Nabnasset St. Water Dept. Land 1	Nabnasset Street	330/043.0-0011-0000.0	Water Department	6.680	
	Nabnasset St. Water Dept. Land 2	25 Nabnasset Street	330/043.0-0041-0000.0	Water Department	1.320	
	Nabnasset St. Water Dept. Land 3	Nabnasset Street	330/043.0-0013-0000.0	Water Department	1.280	
	Nutting Rd Well Parcel 1	Nutting Road	330/068.0-0001-0000.0	Water Department	7.750	
	Nutting Rd Well Parcel 2	Nutting Road	330/068.0-0002-0000.0	Water Department	9.200	
	Odell W. Prescott St. Land Donation	W Prescott Street	330/053.0-0013-0000.0	Selectmen	0.092	
	Original Academy Site-Boston Rd	Boston Road	330/059.0-0002-0000.0	Selectmen	0.155	
	O'Soro Conservation Land	Moore Avenue	330/074.0-0183-0000.0	Conservation Commission	0.178	
	Parcel Z, Lakeside Meadows	Muriel Drive	330/041.0-0002-0017.0	Selectmen	0.390	
	Patten Road Tax Title Parcel	Patten Road	330/054.0-0030-0002.0	Tax Possession Sale Committee	0.195	
	Picking Conservation Land - East	Gould Road	330/035.0-0004-0001.0	Conservation Commission	27.380	
	Picking Conservation Land - West	Gould Road	330/035.0-0002-0007.0	Conservation Commission	21.850	
	Picking Selectmen Land - East	Groton Road	330/035.0-0004-0002.0	Selectmen	4.730	
	Picking Selectmen Land - West	Gould Road	330/035.0-0002-0006.0	Selectmen	6.090	
	Pine Tree Trail Tax Title Parcel 1	20 Pine Tree Trail	330/078.0-0075-0000.0	Tax Possession Sale Committee	< 0.100	
	Pine Tree Trail Tax Title Parcel 2	1 Pine Tree Trail	330/074.0-0055-0000.0	Tax Possession Sale Committee	0.103	
	Pond St. Conservation Land - Freedom Park	8 Pond Street	330/053.0-0095-0000.0	Conservation Commission	0.941	
	Randolph Circle Tax Title Parcel	Randolph Circle	330/059.0-0007-0004.0	Tax Possession Sale Committee	1.410	
	Red Line North Parcel	West Street	330/029.0-0001-0000.0	School Department	5.360	
	Red Line South Parcel	Forge Village Road	330/025.0-0011-0000.0	Selectmen	6.100	
	River St. Canoe Ramp	River Street	330/030.0-0065-0000.0	Conservation Commission	6.260	
	Rolling Meadows Conservation Land	Rolling Meadow Lane	330/046.0-0031-0009.0	Conservation Commission	10.080	
	Rome Drive Tax Title Parcel 1	Rome Drive	330/021.0-0003-0026.0	Tax Possession Sale Committee	0.690	
	Rome Drive Tax Title Parcel 2	Rome Drive	330/022.0-0003-0011.0	Tax Possession Sale Committee	0.415	
	Russell Bird Sanctuary	65 Forge Village Road	330/025.0-0010-0001.0	Conservation Commission	20.740	
	Sargent's Town Forest Gift	Groton Road	330/034.0-0026-0000.0	Town Forest Committee	25.000	
	Schlusemeyer Lake Shore Dr S Land	Lake Shore Drive S	330/074.0-0246-0000.0	Selectmen	0.953	
	Schlusemeyer Sycamore Rd Parcel 1	Sycamore Road	330/069.0-0049-0000.0	Conservation Commission	0.254	
	Schlusemeyer Sycamore Rd Parcel 2	Sycamore Road	330/069.0-0050-0000.0	Conservation Commission	0.050	
	Schwab Conservation Parcel 1	Rome Drive Ext.	330/016.0-0074-0000	Conservation Commission	22.500	
	Schwab Conservation Parcel 2	Rome Drive Ext.	330/016.0-0075-0000	Conservation Commission	20.000	
	Scott Conservation Land	Cold Spring Road	330/025.0-0202-0001.0	Conservation Commission	14.600	
	Shelly Lane Conservation Land	Shelly Lane	330/007.0-0033-0000.0	Conservation Commission	1.710	
	Shipley Swamp Conservation Area	Nutting Road	330/068.0-0003-0000.0	Conservation Commission	25.500	
	Skating Pond Conservation Land	Hearthstone Road	330/028.0-0020-0000.0	Conservation Commission	4.570	
	Slifer Conservation Land	Keyes Road	330/040.0-0063-0002.0	Conservation Commission	20.530	
	Snake Meadow Hill Conservation Parcel 1	Groton Road	330/030.0-0014-0000.0	Conservation Commission	7.000	
	Snake Meadow Hill Conservation Parcel 2	Groton Road	330/030.0-0015-0000.0	Conservation Commission	0.400	
	So. Chelmsford Rd 1	S Chelmsford Road	330/023.0-0079-0000.0	Town Forest Committee	20.320	
	So. Chelmsford Rd 2	S Chelmsford Road	330/023.0-0078-0000.0	Town Forest Committee	9.150	
	Socha Shore	Pleasant Street	330/052.0-0001-0000.0	Conservation Commission	1.200	

Appendix B
Inventory of Municipal Facilities

Map No.	Name	Address	Parcel	Responsible Board/ Commission/Department	Size (acres)	Building (Y/N)
	Spalding Town Forest 1	Cold Spring Road	330/025.0-0012-0000.0	Town Forest Committee	5.030	
	Spalding Town Forest 2	Forge Village Road	330/025.0-0013-0000.0	Town Forest Committee	7.530	
	Stony Brook Conservation Land - Conservation Commission Parcel 2	Depot Road	330/035.0-0032-0004.0	Conservation Commission	19.750	
	Stony Brook Conservation Land - Conservation Commission Parcel 3	River Street	330/031.0-0035-0000.0	Conservation Commission	65.100	
	Stony Brook Conservation Land - Recreation Commission Parcel 2	River Street	330/031.0-0035-0101.0	Recreation Commission	15.000	
	Stony Brook Conservation Land - Water Dept. Parcel	River Street	330/031.0-0035-0102.0	Water Department	30.700	
	Stony Brook Road Conservation Land	Stony Brook Road	330/066.0-0018-0000.0	Conservation Commission	7.170	
	Sullivan Conservation Land	Rome Drive	330/016.0-0077-0000.0	Conservation Commission	65.690	
	Swanson Conservation Land	14 Hunt Road	330/033.0-0015-0000.0	Conservation Commission	0.919	
	Switzer Conservation Land	Lowell Road	330/032.0-0079-0001.0	Conservation Commission	1.320	
	Tadmuck Swamp North 1	Tadmuck Road	330/027.0-0229-0000.0	Selectmen	100.800	
	Tadmuck Swamp North 2	Chippewa Road	330/028.0-0005-0000.0	Selectmen	4.740	
	Tadmuck Swamp South	Littleton Road	330/023.0-0046-0000.0	Selectmen	24.000	
	TBG Conservation Land 1	43 Almeria Circle	330/063.0-0032-0000.0	Conservation Commission	0.420	
	TBG Conservation Land 2	Almeria Circle	330/064.0-0027-0000.0	Conservation Commission	0.150	
	TBG Conservation Land 3	Almeria Circle	330/064.0-0028-0000.0	Conservation Commission	5.210	
	Tenney Road Conservation Land (Avalon Real Estate Land)	Tenney Road	330/044.0-0028-0006.0	Conservation Commission	15.305	
	Tenney Road Conservation Parcel 1	Tenney Road	330/044.0-0046-0000.0	Conservation Commission	1.520	
	Tenney Road Conservation Parcel 2	Tenney Road	330/044.0-0047-0000.0	Conservation Commission	1.350	
	Texas Rd Conservation Land	Texas Road	330/006.0-0031-0000.0	Conservation Commission	6.960	
	Town Farm Rd. Water Dept. Land	Town Farm Road	330/024.0-0024-0000.0	Water Department	7.380	
	Trailside Way Parcel A Conservation Land	Trailside Way	330/005.0-0074-0020.0	Conservation Commission	0.160	
	Trailside Way Parcel B Conservation Land	Trailside Way	330/005.0-0074-0017.0	Conservation Commission	7.900	
	Trailside Way Parcel C Conservation Land	Trailside Way	330/005.0-0074-0019.0	Conservation Commission	1.400	
	Trailside Way Parcel D Conservation Land	Trailside Way	330/005.0-0074-0021.0	Conservation Commission	0.770	
	Trailside Way Parcel E Conservation Land	Trailside Way	330/005.0-0074-0018.0	Conservation Commission	0.050	
	Twin Peaks	Tyngsboro Road	330/047.0-0043-0000.0	Town Forest Committee	23.290	
	Twin Peaks Water Tower Land	Russell's Way	330/047.0-0043-0001.0	Water Department	2.430	
	Tyngsboro Town Line Gage Parcel-East	Sawmill Road	330/047.0-0001-0000.0	Town Forest Committee	22.900	
	Tyngsboro Town Line Gage Parcel-West	Tenney Road	330/044.0-0002-0000.0	Town Forest Committee	22.700	
	Uncompleted Tax Taking - Cold Spring Road	Cols Spring Lane	330/025.0-0202-0000.0	Status Unclear	2.520	
	Varnum Conservation Land	Forge Village Road	330/025.0-0036-0000.0	Conservation Commission	1.050	
	Verna Williamson Parcel	Acton Road	330/013.0-0035-0000.0	Selectmen	0.480	
	Veterans Memorial Complex Conservation Land 1	Farmer Way	330/035.0-0111-0000.0	Conservation Commission	2.670	
	Veterans Memorial Complex Conservation Land 2	Nutting Road	330/035.0-0109-0000.0	Conservation Commission	8.900	
	Veterans Memorial Complex Conservation Land 3	Farmer Way	330/030.0-0032-0000.0	Conservation Commission	7.940	
	Veterans Memorial Complex Water Department Land	Beacon Street	330/030.0-0032-0002.0	Water Department	45.250	N
	Village View Parcel A-2	Village View Road	330/056.0-0054-0000.0	Selectmen	8.150	
	Vine Brook Road Conservation Parcel	Vine Brook Road	330/006.0-0006-0000.0	Conservation Commission	8.340	
	Vineyard Rd Ext School Land - North	Vineyard Road Ext	330/048.0-0005-0001.0	School Committee	3.760	

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Map No.	Name	Address	Parcel	Responsible Board/ Commission/Department	Size (acres)	Building (Y/N)
	Vineyard Rd Ext School Land - South 1	Vineyard Road Ext	330/048.0-0005-0000.0	School Committee	8.020	
	Vineyard Rd Ext School Land - South 2	Vineyard Road Ext	330/048.0-0011-0245.0	School Committee	1.270	
	Vineyard Road Conservation Land	Vineyard Road	330/047.0-0045-0015.0	Conservation Commission	15.320	
	William C. O'Connell Wildlife Sanctuary	Timberlee Lane	330/036.0-0002-0000.0	Conservation Commission	6.900	
	Williams Ave Conservation Land	Williams Avenue	330/070.0-0046-0001.0	Conservation Commission	2.060	
	Wilson Parcel	Boston Road	330/022.0-0119-0000.0	Conservation Commission	1.000	
	Winnek Water Dept Land 1	17 Main Street	330/021.0-0042-0000.0	Water Department	22.330	
	Winnek Water Dept. Land 2	Main Street	330/055.0-0003-0000.0	Water Department	10.370	

Note:
This inventory is up to date as of December 2014.

Appendix D

Inventory of Municipal Vehicles and Equipment

TOWN OF WESTFORD GREEN VEHICLE INVENTORY 9-20-2013 **VEHICLE COUNT: 148**

Item #	Department	Owned/ Leased	Model Year	Purchased	Manufacturer	Model	Plate #	Drive System 2WD, 4WD or AWD	GVW	Exempt or non-exempt	MPG Rating	Fuel Type	Vehicle Function
1	ANIMAL CONTROL	OWNED	2005		CHEVROLET	EXPVAN	M73076	2 WD		Exempt			EMERGENCY VEHICLE
2	ANIMAL CONTROL	OWNED	2006		CHEVROLET	EXPVAN	M72065	2 WD		Exempt			PUBLIC SAFETY
4	BUILDING	OWNED	2003		FORD	CROWN VICTORIA	M79266	2WD		Non-exempt	16		INSPECTOR
5	BUILDING	OWNED	2008		FORD	ESCAPE	M79853	2WD		Non-exempt	32		INSPECTOR
6	CEMETERY	OWNED	1982	08/25/82	GMC	DUMP TRUCK	M30877	4WD	>8500	Exempt		GAS	PUBLIC WORKS
7	CEMETERY	OWNED	1999		CHEVROLET	DUMP TRUCK	M64036	4WD	>8500	Exempt			PUBLIC WORKS
11	COUNCIL ON AGING	LEASED	2002		DODGE	CARAVAN		2WD		Exempt			SENIOR TRANSPORT
12	COUNCIL ON AGING	LEASED	2002		DODGE	RAM VAN		3 WD		Exempt			SENIOR TRANSPORT
17	FIRE	OWNED	1997		NAVISTAR	AMBULANCE	MF8294	AWD	>8500	Exempt			EMERGENCY VEHICLE
29	FIRE	OWNED	2007		CHEVROLET	AMBULANCE	MF9828	AWD	>8500	Exempt			EMERGENCY VEHICLE
14	FIRE	OWNED	1990		PIERCE	DASH PUMPER	MF5717		>8500	Exempt			EMERGENCY VEHICLE
20	FIRE	OWNED	2000		FORD	EXPEDITION				Exempt			EMERGENCY VEHICLE
33	FIRE	OWNED	2012		FORD	EXPEDITION	MF6487			Exempt			EMERGENCY VEHICLE
28	FIRE	OWNED	2006		FORD	EXPLORER	MF2932			Exempt			EMERGENCY VEHICLE
30	FIRE	OWNED	2008		FORD	EXPLORER	MF9639			Exempt			EMERGENCY VEHICLE
32	FIRE	OWNED	2011		FORD	F350 PICKUP			>8500	Exempt			EMERGENCY VEHICLE
15	FIRE	OWNED	1995		INTERNATIONAL	FIRE TRUCK			>8500	Exempt			EMERGENCY VEHICLE
21	FIRE	OWNED	2000		FORD	FIRE TRUCK	MF2928		>8500	Exempt			EMERGENCY VEHICLE
31	FIRE	OWNED	2010		KME	FIRE TRUCK	MF9165		>8500	Exempt			EMERGENCY VEHICLE
23	FIRE	OWNED	2002		INTERNATIONAL	HOOKLIFT TRUCK	MF9040		>8500	Exempt			EMERGENCY VEHICLE
27	FIRE	OWNED	2004		FORD	NAVISTAR AMBULANCE	MF4798		>8500	Exempt			EMERGENCY VEHICLE
18	FIRE	OWNED	1999		PIERCE	PUMPER	MF6494		>8500	Exempt			EMERGENCY VEHICLE
19	FIRE	OWNED	1999		PIERCE	PUMPER	MF6495		>8500	Exempt			EMERGENCY VEHICLE
24	FIRE	OWNED	2002		PIERCE	PUMPER AERIAL PLATFORM	MF9037		>8500	Exempt			EMERGENCY VEHICLE
35	HEALTH	OWNED	2006		FORD	RANGER	M71782	4WD		Non-exempt	16		INSPECTOR
34	HEALTH	OWNED	2005		CHRYSLER	TOWN & COUNTRY	M79872			Exempt			INSPECTOR
43	HIGHWAY	OWNED	1991	07/18/91	JOHN DEERE	MOBILE EQUIPMENT	M10549	4WD	>8500	Exempt		DIESEL	PUBLIC WORKS
45	HIGHWAY	OWNED	1994	10/25/93	INGERSOLL	RAND CONST	M51725	4WD	>8500	Exempt		DIESEL	PUBLIC WORKS
46	HIGHWAY	OWNED	1995	08/09/94	FORD	DUMP TRUCK	M52256	4WD	>8500	Exempt		DIESEL	PUBLIC WORKS
49	HIGHWAY	OWNED	1996		CHEVROLET	TRUCK	M55085	4WD	>8500	Exempt			PUBLIC WORKS
52	HIGHWAY	OWNED	1997	04/07/97	INTERNATIONAL	DUMP TRUCK	M55089	4WD	>8500	Exempt		DIESEL	PUBLIC WORKS
55	HIGHWAY	OWNED	1999		JOHN DEERE	TRACTOR	M61361	4WD	>8500	Exempt			PUBLIC WORKS
56	HIGHWAY	OWNED	1999		INTERNATIONAL	DUMP TRUCK	M61370	4WD	>8500	Exempt			PUBLIC WORKS
63	HIGHWAY	OWNED	2000		INTERNATIONAL	DUMP TRUCK	M63018	4WD	>8500	Exempt			PUBLIC WORKS
65	HIGHWAY	OWNED	2001		CHEVROLET	TAHOE	M63113	4WD		Non-Exempt	14		PUBLIC WORKS
57	HIGHWAY	OWNED	1999		CHEVROLET	TRUCK	M63143	4WD	>8500	Exempt	15		PUBLIC WORKS
59	HIGHWAY	OWNED	2000		JOHN DEERE	LOADER	M63149	4WD	>8500	Exempt			PUBLIC WORKS
62	HIGHWAY	OWNED	2000		CHEVROLET	SILVERADO	M63398	4WD	>8500	Exempt	14		PUBLIC WORKS
61	HIGHWAY	OWNED	2000		INTERNATIONAL	DUMP TRUCK	M63515	4WD	>8500	Exempt			PUBLIC WORKS
60	HIGHWAY	OWNED	2000		INTERNATIONAL	DUMP TRUCK	M63879	4WD	>8500	Exempt			PUBLIC WORKS
64	HIGHWAY	OWNED	2000		CHEVROLET	SILVERADO	M65111	4WD	>8500	Exempt	14		PUBLIC WORKS
53	HIGHWAY	OWNED	1998		BOBCAT	TRACTOR	M65794	AWD	>8500	Exempt			PUBLIC WORKS
70	HIGHWAY	OWNED	2002		JOHN DEERE	LOADER	M67294	4WD	>8500	Exempt			PUBLIC WORKS
69	HIGHWAY	OWNED	2002		INTERNATIONAL	DUMP TRUCK	M67310	4WD	>8500	Exempt			PUBLIC WORKS
71	HIGHWAY	OWNED	2002		CHEVROLET	SILVERADO	M68368	4WD	>8500	Exempt	15		PUBLIC WORKS
68	HIGHWAY	OWNED	2002		INTERNATIONAL	DUMP TRUCK	M68369	4WD	>8500	Exempt			PUBLIC WORKS
41	HIGHWAY	OWNED	1990		FORD	DUMP TRUCK	M69177	4WD	>8500	Exempt			PUBLIC WORKS
72	HIGHWAY	OWNED	2002		CHEVROLET	SILVERADO	M69196	4WD	>8500	Exempt	15		PUBLIC WORKS
42	HIGHWAY	OWNED	1991		CHEVROLET	KODIAK	M69755	4WD	>8500	Exempt			PUBLIC WORKS
73	HIGHWAY	OWNED	2002		GMC	SWEEPER	M69759	AWD	>8500	Exempt			PUBLIC WORKS
74	HIGHWAY	OWNED	2004		INTERNATIONAL	DUMP TRUCK	M71387	4WD	>8500	Exempt			PUBLIC WORKS
50	HIGHWAY	OWNED	1996		DAEWOO	EXCAVATOR	M72471	4WD	>8500	Exempt			PUBLIC WORKS
76	HIGHWAY	OWNED	2005		INTERNATIONAL	DUMP TRUCK	M73090	4WD	>8500	Exempt			PUBLIC WORKS
79	HIGHWAY	OWNED	2008		INTERNATIONAL	DUMP TRUCK	M76728	4WD	>8500	Exempt			PUBLIC WORKS
78	HIGHWAY	OWNED	2008		INTERNATIONAL	DUMP TRUCK	M76729	4WD	>8500	Exempt			PUBLIC WORKS
81	HIGHWAY	OWNED	2008		CHEVROLET	SILVERADO	M78628	4WD	>8500	Exempt			PUBLIC WORKS
80	HIGHWAY	OWNED	2008		CHEVROLET	SILVERADO	M78629	4WD	>8500	Exempt			PUBLIC WORKS
83	HIGHWAY	OWNED	2008		CHEVEROLET	SILVERADO	M78637	4WD	>8500	Exempt			PUBLIC WORKS

82	HIGHWAY	OWNED	2008		CHEVROLET	SILVERADO	M78638	4WD	>8500		Exempt		PUBLIC WORKS
67	HIGHWAY	OWNED	2002		FORD	EXPLORER	M79869	4WD	>8500		Exempt	15	PUBLIC WORKS
84	HIGHWAY	OWNED	2009		CHEVROLET	TRUCK	M81678	4WD	>8500		Exempt		PUBLIC WORKS
66	HIGHWAY	OWNED	2003		INTERNATIONAL	DUMP TRUCK	M81694	4WD	>8500		Exempt		PUBLIC WORKS
87	HIGHWAY	OWNED	2012		FREIGHTLINER	TRUCK	M84035	4WD	>8500		Exempt		PUBLIC WORKS
54	HIGHWAY	OWNED	1998		INTERNATIONAL	DUMP TRUCK	M84562	4WD	>8500		Exempt		PUBLIC WORKS
86	HIGHWAY	OWNED	2012		JOHN DEERE	TRACTOR	M85614	4WD	>8500		Exempt		PUBLIC WORKS
189	HIGHWAY	OWNED	2012		CHEVROLET	SILVERADO	M86814	4WD	>8500		Exempt		PUBLIC WORKS
190	HIGHWAY	OWNED	2012		CHEVROLET	SILVERADO	M86816	4WD	>8500		Exempt		PUBLIC WORKS
51	HIGHWAY	OWNED	1997		JOHN DEERE	BACKHOE LOADER		4WD	>8500		Exempt		PUBLIC WORKS
48	HIGHWAY	OWNED	1995		CHEVROLET	PICKUP		4WD	>8500				PUBLIC WORKS
39	HIGHWAY	OWNED	1987		FORD	DUMP TRUCK		4WD	>8500		Exempt		PUBLIC WORKS
75	HIGHWAY	OWNED	2004		INTERNATIONAL	DUMP TRUCK		4WD	>8500		Exempt		PUBLIC WORKS
38	HIGHWAY	OWNED	1987		IHC	STAKE			>8500		Exempt		PUBLIC WORKS
36	HIGHWAY	OWNED	1984		FORD	TRUCK		4WD	>8500		Exempt		PUBLIC WORKS
88	LIBRARY	OWNED	2001		WORKHORSE	BOOKMOBILE STEP VAN	M63122	2WD			Exempt		BOOKMOBILE
91	PARKS	OWNED	1994	11/04/94	JOHN DEERE	TRACTOR	M51717		>8500		Exempt	DIESEL	PUBLIC WORKS
95	PARKS	OWNED	1998		CHEVROLET	SILVERADO	M61181				Exempt	13	PUBLIC WORKS
97	PARKS	OWNED	1999		INTERNATIONAL	TRUCK	M61354		>8500		Exempt		PUBLIC WORKS
99	PARKS	OWNED	2000		CHEVROLET	SILVERADO	M63019				Exempt	14	PUBLIC WORKS
98	PARKS	OWNED	1999		CHEVROLET	TRUCK	M63144		>8500		Exempt	15	PUBLIC WORKS
101	PARKS	OWNED	2003		CHEVROLET	SILVERADO	M69190				Exempt		PUBLIC WORKS
100	PARKS	OWNED	2003		CHEVROLET	SILVERADO	M69191				Exempt		PUBLIC WORKS
102	PARKS	OWNED	2003		CHEVROLET	SILVERADO	M69772				Exempt		PUBLIC WORKS
176	POLICE	OWNED	2003		CHEVROLET	BLAZER	M69176				Exempt		EMERGENCY VEHICLE
118	POLICE	OWNED	2008		DODGE	CHARGER		2WD		4160	Exempt	18	EMERGENCY VEHICLE
120	POLICE	OWNED	2008		DODGE	CHARGER	MP9984	2WD		4160	Exempt	18	EMERGENCY VEHICLE
121	POLICE	OWNED	2008		DODGE	CHARGER	MP9837	2WD		4160	Exempt	18	EMERGENCY VEHICLE
122	POLICE	OWNED	2008		DODGE	CHARGER	MP9836	2WD		4160	Exempt	18	EMERGENCY VEHICLE
124	POLICE	OWNED	2009		DODGE	CHARGER	MP703G	2WD		4160	Exempt	19	EMERGENCY VEHICLE
125	POLICE	OWNED	2009		DODGE	CHARGER	MP702G	2WD			Exempt	19	EMERGENCY VEHICLE
126	POLICE	OWNED	2010		DODGE	CHARGER		2WD			Exempt	19	EMERGENCY VEHICLE
127	POLICE	OWNED	2010		DODGE	CHARGER		2WD			Exempt	19	EMERGENCY VEHICLE
128	POLICE	OWNED	2010		DODGE	CHARGER	MP8815	2WD			Exempt	19	EMERGENCY VEHICLE
89	POLICE	OWNED	2011		DODGE	CHARGER	MP861G	AWD			Exempt		EMERGENCY VEHICLE
129	POLICE	OWNED	2011		DODGE	CHARGER	MP204J	AWD			Exempt		EMERGENCY VEHICLE
186	POLICE	OWNED	2012		DODGE	CHARGER		AWD	4,339		Exempt		EMERGENCY VEHICLE
187	POLICE	OWNED	2012		DODGE	CHARGER	MPA671	AWD	4,339		Exempt		EMERGENCY VEHICLE
191	POLICE	OWNED	2012		DODGE	CHARGER	MPA670	AWD	5,500		Exempt		EMERGENCY VEHICLE
105	POLICE	OWNED	2001		FORD	CROWN VICTORIA		2WD			Exempt		EMERGENCY VEHICLE
109	POLICE	OWNED	2003		FORD	CROWN VICTORIA		2WD			Exempt		EMERGENCY VEHICLE
111	POLICE	OWNED	2006		FORD	CROWN VICTORIA	MP858G	2WD			Exempt		EMERGENCY VEHICLE
112	POLICE	OWNED	2006		FORD	CROWN VICTORIA		2WD			Exempt		EMERGENCY VEHICLE
117	POLICE	OWNED	2008		FORD	CROWN VICTORIA	MP6610	2WD			Exempt	18	EMERGENCY VEHICLE
108	POLICE	OWNED	2003		FORD	EXPEDITION					Exempt		EMERGENCY VEHICLE
106	POLICE	OWNED	2002		FORD	EXPLORER					Exempt	15	EMERGENCY VEHICLE
115	POLICE	OWNED	2007		FORD	SEDAN					Exempt		EMERGENCY VEHICLE
161	SCHOOL	LEASED	2012		DODGE	CARAVAN VAN	SPN100473	2WD			Exempt		STUDENT TRANSPORT
162	SCHOOL	LEASED	2012		DODGE	CARAVAN VAN	SPN100475	2WD			Exempt		STUDENT TRANSPORT
163	SCHOOL	LEASED	2012		DODGE	CARAVAN VAN	SPN100474	2WD			Exempt		STUDENT TRANSPORT
164	SCHOOL	LEASED	2012		DODGE	CARAVAN VAN	SPN100472	2WD			Exempt		STUDENT TRANSPORT
139	SCHOOL	OWNED	2004		FORD	E250 VAN	SPN43496				Exempt		STUDENT TRANSPORT
141	SCHOOL	LEASED	2006		FORD	E250 VAN					Exempt		STUDENT TRANSPORT
153	SCHOOL	LEASED	2011		FORD	E250 VAN	SPN43099				Exempt		STUDENT TRANSPORT
154	SCHOOL	LEASED	2011		FORD	E250 VAN	SPN43088				Exempt		STUDENT TRANSPORT
155	SCHOOL	LEASED	2011		FORD	E250 VAN	SPN43092				Exempt		STUDENT TRANSPORT
156	SCHOOL	LEASED	2011		FORD	E250 VAN	SPN43091				Exempt		STUDENT TRANSPORT
157	SCHOOL	LEASED	2011		FORD	E250 VAN	SPN43090				Exempt		STUDENT TRANSPORT
158	SCHOOL	LEASED	2011		FORD	E250 VAN	SPN43093				Exempt		STUDENT TRANSPORT
168	SCHOOL	LEASED	2012		FORD	E250 VAN	SPN100130				Exempt		STUDENT TRANSPORT
159	SCHOOL	LEASED	2011		FORD	E350 VAN	SPN41894				Exempt		STUDENT TRANSPORT
142	SCHOOL	LEASED	2007		CHEVROLET	EXPRESS	M82912				Exempt		STUDENT TRANSPORT
152	SCHOOL	OWNED	2009		CHEVROLET	EXPRESS VAN	SPN27793				Exempt		STUDENT TRANSPORT

165	SCHOOL	LEASED	2012	CHEVROLET	EXPRESS VAN	SPN43643			Exempt		STUDENT TRANSPORT
166	SCHOOL	LEASED	2012	CHEVROLET	EXPRESS VAN	SPN27780			Exempt		STUDENT TRANSPORT
167	SCHOOL	LEASED	2012	CHEVROLET	EXPRESS VAN	SPN27779			Exempt		STUDENT TRANSPORT
136	SCHOOL	OWNED	2002	FORD	F350 DUMP TRUCK	M79268			Exempt		PUBLIC WORKS
132	SCHOOL	OWNED	1999	FORD	F350 PICKUP	M85509			Exempt		PUBLIC WORKS
138	SCHOOL	OWNED	2003	FORD	F350 PICKUP	M76740			Exempt		PUBLIC WORKS
188	SCHOOL	LEASED	2012	FORD	F550 PLATFORM	P74777		19,000	Exempt		PUBLIC WORKS
149	SCHOOL	OWNED	2008	DODGE	GRAND CARAVAN				Exempt		PUBLIC WORKS
140	SCHOOL	OWNED	2005	CHEVROLET	SILVERADO	M71279			Exempt		PUBLIC WORKS
192	SCHOOL	OWNED	2012	CHEVROLET	SILVERADO	M87587		9,500	Exempt		PUBLIC WORKS
137	SCHOOL	OWNED	2003	KUBOTA	TRACTOR				Exempt		PUBLIC WORKS
133	SCHOOL	OWNED	2000	CHEVROLET	TRUCK	M87713			Exempt	14	PUBLIC WORKS
146	SCHOOL	OWNED	2008	FORD	VAN	M57806			Exempt		PUBLIC WORKS
185	WATER	OWNED	2011	JOHN DEERE	BACKHOE	M23676			Exempt		PUBLIC WORKS
170	WATER	OWNED	1995	INTERNATIONAL	DUMP TRUCK	M44379	4WD		Exempt		PUBLIC WORKS
182	WATER	OWNED	2008	FORD	ESCAPE	M76949			Exempt		PUBLIC WORKS
179	WATER	OWNED	2005	CHEVROLET	EXPRESS VAN	M74546			Exempt		PUBLIC WORKS
173	WATER	OWNED	2000	CHEVROLET	PICKUP	M44852			Exempt	14	PUBLIC WORKS
171	WATER	OWNED	1997	CHEVROLET	SILVERADO	M57302			Exempt	14	PUBLIC WORKS
174	WATER	OWNED	2002	CHEVROLET	SILVERADO	M65756			Exempt	15	PUBLIC WORKS
181	WATER	OWNED	2005	CHEVROLET	SILVERADO	M71276			Exempt		PUBLIC WORKS
183	WATER	OWNED	2010	CHEVROLET	SILVERADO	M45305			Exempt		PUBLIC WORKS
184	WATER	OWNED	2011	CHEVROLET	SILVERADO	M47003			Exempt		PUBLIC WORKS
178	WATER	OWNED	2004	KIOTO	TRACTOR	M76429			Exempt		PUBLIC WORKS
175	WATER	OWNED	2003	CHEVROLET	TRAILBLAZER	M69189			Exempt		PUBLIC WORKS
180	WATER	OWNED	2005	CHEVROLET	TRUCK	M68567			Exempt		PUBLIC WORKS
172	WATER	OWNED	2000	INTERNATIONAL	VAN	M61231			Exempt		PUBLIC WORKS

Appendix E

Municipal Facilities Standard Operating Procedures

STANDARD OPERATING PROCEDURE | *Building Maintenance*

TARGETED POLLUTANTS

Sediments
Chemicals

RESPONSIBLE DEPARTMENTS

When conducted outdoors, the preparation of surfaces for painting and the final application of paints and finishes represent potential sources of stormwater pollution. Grit from sanding and overspray from painting and finishing are two common contaminants resulting from painting operations. Painting in areas which are not covered or contained adequately may result in the introduction of grit, overspray, and chemicals to the stormwater system.

Handling and use of paints and finishes by improperly trained personnel increases the potential for spills and incorrect use. Contamination of stormwater can also occur during storage, when the paints are not being directly handled. Leaks and spills from faulty containers can migrate to the engineered storm drain system or receiving waters if not promptly controlled.

Pollution Prevention Approach

To prevent or reduce the potential for stormwater pollution from painting the following preventative maintenance procedures are recommended:

- All preparation and application activities should take place in an area that has been covered and contained to the greatest feasible extent. Simple brush-based painting needs less containment than spray painting and sand blasting, which must adhere to air pollution control and OSHA enclosure requirements.
- Ground cloths or drop cloths should be used at each painting site to collect debris and spills. Runoff control devices can be used around catch basins to prevent spilled paint from entering the storm drain system. In case a spill or leak does occur, storage areas and any vehicles transporting paints should be equipped with a spill response kit.
- During precipitation events, painting materials should be stored either indoors or under cover to avoid contact with stormwater.
- Permanent storage can be in cabinets or in other high, dry locations and in accordance with the manufacturer's instructions. Cabinets and storage area floors should be watertight, impervious, and provide spill containment. Many of the guidelines for the storage of pesticides and fertilizers can be applied to paints and finishes as well.

STANDARD OPERATING PROCEDURE

Catch Basin Inspection, Cleaning, and Maintenance

Catch basins help minimize flooding and protect water quality by removing trash, sediment, decaying debris, and other solids from stormwater runoff. Catch basin cleaning reduces foul odors, prevents clogs in the storm drain system, and reduces the loading of suspended solids, nutrients, and bacteria to receiving waters.

TARGETED POLLUTANTS

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

RESPONSIBLE DEPARTMENTS

Suggested Standard Operating Procedures

Implement applicable suggested Standard Operating Procedures to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

- Target cleaning for early spring.
- Clean manually or with equipment (i.e., clamshell or vactor truck).
- Properly dewatering and dispose of catch basin material or store until contractor picks up cleanings (see "Management of Catch Basin Cleanings").
- Repair damaged catch basins including frames and grates.
- 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 Highway Department should maintain an inventory of cleaning activities. Information should at a minimum 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 date of cleaning activities, staff/ contractor that performs activities, number of basins cleaned, illicit connection/odor issues, repair issues, or heavily filled catch basins.
- Report any illicit (illegal) discharges to the Board of Health. Report oil spills immediately to the Fire Department and Board of Health.

Required Inspection & Cleaning Freqency

- Prioritize inspection and maintenance for catch basins located near construction activities (roadway construction, residential, commercial, or industrial development or redevelopment). Clean catch basins in such areas more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings.
- Establish a schedule with a goal that the frequency of routine cleaning will ensure that no catch basin at any time will be more than 50 percent full.
- Inspections should be incorporated during routine cleaning, as part of reconstruction contracts, and through requests made by residents or other Town departments.
- For facilities and activities within watersheds impaired by solids (e.g., TSS), such as Beaver Brook and Stony Brook, and metals (for Westford, mercury), such as Forge Pond and Nabnasset Lake, prioritize inspection and maintenance for catch basins. Clean catch basins more frequently if inspection and maintenance activities indicate excessive sediment or debris loading

Reporting

- Report any repair or maintenance problems to the Highway Superintendent. Repair problems may include frame and grate replacement.
- Keep a log of catch basins cleaned or inspected.
- Document Town's plan for optimizing catch basin cleaning, inspection plans, or its schedule for gathering information to develop the optimization plan in the SWMP and the first annual report. Documentation is required to include metrics and other information used to reach the determination that the established plan for cleaning and maintenance is optimal for the MS4.
- Report in each annual report the total number of catch basins, number inspected, number cleaned, and the total volume or mass of material removed from all catch basins.
- If a catch basin sump is more than 50 percent full (i.e. a catch basin sump is more than 50 percent full if the contents within the sump exceed one half (½) the distance between the bottom interior of the catch basin to the invert of the deepest outlet of the catch basin) during two (2) consecutive routine inspections/cleaning events, the Town must document that finding, investigate the contributing drainage area for sources of excessive sediment loading, and to the extent practicable, abate contributing sources. Westford is required by EPA to describe any actions taken in its annual report.

Management of Catch Basin Cleanings

Catch basin cleanings - solid materials such as leaves, sand and twigs removed from storm water collection systems during cleaning operations - are typically classified as a solid waste by the Department of Environmental Protection (MassDEP). Catch basin cleanings must be handled and disposed in accordance with the agency's applicable regulations, policies and guidance.

Handling and Disposal

Except as explained below, catch basin cleanings from storm water-only drainage systems may be disposed at any landfill that is permitted by MassDEP to accept solid waste. MassDEP does not routinely require storm water only catch basin cleanings to be tested before disposal, unless there is evidence that they have been contaminated by a spill or some other means. Contaminated catch basin cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000, and handled as Hazardous Waste if appropriate. Systems that collect storm water run-off into sanitary sewers are called "combined sewers." MassDEP may require cleanings from combined sewer catch basins to be tested before disposal.

Landfill Restrictions

The MassDEP 310 CMR 19.000: Solid Waste Management Facility Regulations (specifically see Section 19.130(7)) prohibit Massachusetts landfills from accepting materials that contain free draining liquids. When there is no free water in a truck used to transport catch basin cleanings, the agency will generally be satisfied that the material is sufficiently dry. Otherwise, the material will need to undergo a Paint Filter Liquids Test. One way to remove liquids is to use a hydraulic lift truck during catch basin cleaning operations so that the material can be decanted at the site. After material from several catch basins along the same system is loaded, the truck may be elevated so that any free draining liquid is allowed to flow back into the drainage structure. MassDEP may approve catch basin cleanings for use as grading and shaping material at landfills undergoing closure (see the agency's Revised Guidelines for Determining Closure Activities at Inactive Unlined Landfill Sites for additional information). Catch basin cleanings may be used as daily cover or grading material at active landfills only with specific MassDEP approval of the proposed use.

Consult with the Solid Waste Section Chief in the appropriate MassDEP Regional Office for information about applying for an approval and/or a Beneficial Use Determination (see Section 19.060 of the 310 CMR 19.000: Solid Waste Management Facility Regulations) for other uses, including non-landfill uses.

Source: http://www.mass.gov/eea/agencies/massdep/recycle/regulations/management-of-catch-basin-cleanings.html

Westford Catch Basin Cleaning Optimization Plan

TO: Westford Stormwater Management Program Files

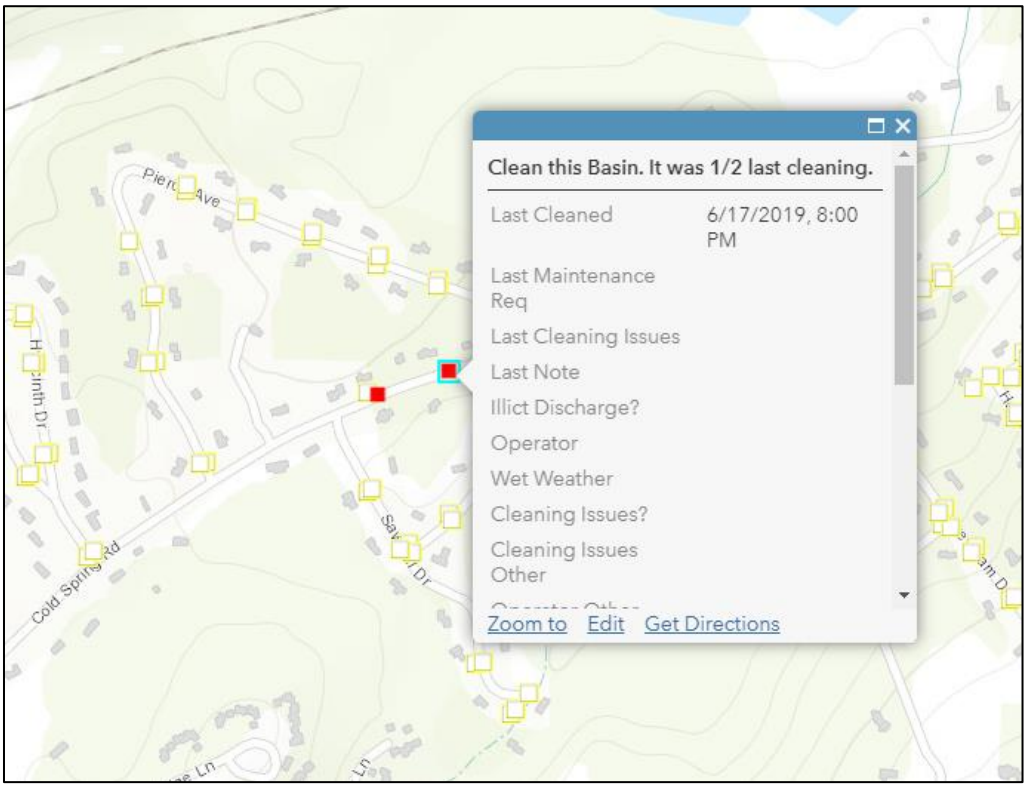
DATE: August 2020

Section 2.3.7.a.iii.2 of the 2016 Small MS4 General Permit requires that Westford optimize routine inspections, cleaning, and maintenance of catch basins to meet the following criteria:

- Prioritize inspection and maintenance for catch basins located near construction activities and clean catch basins more frequently if excessive sediment or debris loadings is found.
- Establish a catch basin cleaning schedule that ensures no catch basin is ever more than 50 percent full.

The Town's current standard operating procedure for catch basin cleaning, inspection, and maintenance are available in Volume 3, Town-Wide Operation & Maintenance Program, of the Stormwater Management Master Plan. This SOP should be referenced for catch basin inspection, cleaning, and maintenance activities.

The Town of Westford uses a GIS-based tablet application (see screen shot below) to efficiently track catch basin cleaning and inspections. The tablet is used to electronically record the cleaning date, percent full, presence of any potential illicit connections, and identify any required maintenance work. The data collected is automatically uploaded into the Town's GIS once a catch basin is cleaned. Over time, the tablet application and data collection will better inform the Town on which catch basins require more frequent cleaning, help prioritize cleaning activities, and identify and address areas in Town that experience excessive sediment loading.



During Permit Years 1 and 2, the Town implemented its routine catch basin program to inspect and clean Town-owned and maintained catch basins. The data obtained during inspections allowed the Town to develop a baseline of whether there are specific catch basins or areas of Town that may experience a heavier sediment loading. In future Permit Years, the Town will attempt to clean all basins in the MS4 annually, but will focus cleaning efforts on catch basins that were more than 50% full in the previous cleaning.

If the Town determines there are catch basins that are more than 50% full during two consecutive inspections, the Town should investigate the contributing drainage area for sources of excessive sediment loading and, to the extent practicable, abate contributing sources. Historically, the Town has resolved instances of excessive loading by working with private property owners to reduce runoff from sites, by stabilizing municipal roadway edges with berm or curb, and by reducing the amount of sand used for deicing activities in the winter. The Town shall document any instances of excessive sediment loading and describe any actions taken in the annual report.

This catch basin cleaning optimization plan may be updated as the catch basin cleaning program is implemented throughout the Permit Term.

J:\W\W5005 Westford MA\017 NPDES PII Small MS4 Year 2 Compliance\04 Municipal BMPs\2020 O&M Plan Updates\4 Catch Basin Cleaning Optimization Plan_final.docx

STANDARD OPERATING PROCEDURE | *Fuel and Oil Handling Procedures*

TARGETED POLLUTANTS

Metals
Oil and Grease
Hydrocarbons

RESPONSIBLE DEPARTMENTS

Spills, leaks, and overfilling can occur during handling of fuels and petroleum-based materials, even in small volumes, representing a potential source of stormwater pollution. This Standard Operating Procedure addresses a variety of ways by which fuels and petroleum-based materials can be delivered, as well as steps to be taken when petroleum products (such as waste oil) are loaded onto vehicles for offsite disposal or recycling. Delivery, unloading, and loading of waste oils are hereafter referred to as "handling".

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

- There is no smoking while fuel handling is in process or underway.
- Sources of flame are kept away while fuel handling is being completed. This includes smoking, lighting matches, carrying any flame, or carrying a lighted cigar, pipe, or cigarette.
- The delivery vehicle's hand brake is set and wheels are chocked while the activity is being completed.
- Catch basins and drain manholes are adequately protected.
- No tools are to be used that could damage fuel or oil containers or the delivery vehicle.
- No flammable liquid shall be unloaded from any motor vehicle while the engine is operating, unless the engine of the motor vehicle is required to be used for the operation of a pump.
- Local traffic does not interfere with fuel transfer operations.
- The attending persons should watch for any leaks or spills. Any small leaks or spills should be immediately stopped, and spilled materials absorbed and disposed of properly. In the event of a large spill or one that discharges to surface waters or an engineered storm drain system, the facility representative shall activate the facility's Stormwater Pollution Prevention Plan (SWPPP) and report the incident as specified within.

Delivery by Bulk Tanker Truck

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

- The truck driver shall check in with the facility upon arrival.
- The facility representative shall ensure that the appropriate spill cleanup and response equipment and personal protective equipment are readily available and easily accessible. Refer to SOP 4, "Spill Response and Cleanup Procedures", for examples of spill cleanup and response materials.
- The facility representative shall check to ensure that the amount of delivery does not exceed the available capacity of the tank.
    - A level gauge can be used to verify the level in the tank.
    - If a level gauge is not functioning or is not present on the tank, the tank should be stick tested prior to filling.
- The truck driver and the facility representative shall both remain with the vehicle during the delivery process.

- The truck driver and the facility representative shall inspect all visible lines, connections, and valves for leaks.
- When delivery is complete and the hoses are removed, buckets should be placed underneath connection points to catch drippings.
- The delivery vehicle shall be inspected prior to departure to ensure that the hose is disconnected from the tank.
- The facility representative shall inspect the fuel tank to verify that no leaks have occurred, or that any leaked or spilled material has been cleaned and disposed of properly.
- The facility representative shall gauge tank levels to ensure that the proper amount of fuel is delivered, and collect a receipt from the truck driver.

Delivery of Drummed Materials

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

- The truck driver shall check in with the facility upon arrival.
- The facility representative shall ensure that the appropriate spill cleanup and response equipment and personal protective equipment are readily available and easily accessible. Refer to SOP 4, “Spill Response and Cleanup Procedures”, for examples of spill cleanup and response materials.
- The facility representative shall closely examine the shipment for damaged drums.
    - If damaged drums are found, they shall be closely inspected for leaks or punctures.
    - Breached drums should be removed to a dry, well-ventilated area and the contents transferred to other suitable containers.
    - Drums shall be disposed of in accordance with all applicable regulations.
- Drummed materials shall not be unloaded outdoors during wet weather events.
- The truck driver and the facility representative shall both remain with the vehicle during the delivery process.
- Drums shall be handled and unloaded carefully to prevent damage.
- Upon completion of unloading, the facility representative shall inspect the unloading point and the drums to verify that no leaks have occurred, that any leaked or spilled material has been cleaned up and disposed of properly, and that the unloaded drums are not leaking.
- The facility representative shall check to ensure that the proper amount of fuel is delivered, and collect a receipt from the truck driver.

Removal of Waste Oil from the Facility

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

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

STANDARD OPERATING PROCEDURE

Lawn, Grounds, and Landscaping Maintenance

TARGETED POLLUTANTS

Sediments
Nutrients
Trash
Metals
Bacteria
Oil and Grease
Organics
Low Dissolved Oxygen

RESPONSIBLE DEPARTMENTS

School Department
Parks and Recreation

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. Grass clippings and leaf litter contribute nutrients to local waters. Dumping lawn and yard waste directly into streams or the drainage system is prohibited.

Landscaping activities, such as mowing, fertilizing, and pesticide application, has the potential to contribute to local stormwater pollution. When lawn mowers, weed whackers, and other landscaping equipment with small engines are used at municipal parks, gasoline and oil are generally also transported to the park to fuel these pieces of equipment. There is an inherent risk of spilling fuel when equipment is being fueled. Poorly maintained equipment may also leak liquids during use.

Grassed areas and parks are often attracive locations for Canada geese and other birds and waterfowl to congregate. Waterfowl droppings are not only a nuisance for park visitors and children playin on athletic fields, but also contribute nutrient and bacteria pollution to surface waters.

Prevent lawn debris from entering surface and groundwater supplies by washing and cleaning 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.

Suggested Standard Operating Procedures

Landscaping Activities

- Use mulch or other erosion control measures on exposed soils.
- Check irrigation schedules and avoid watering during already wet weather.
- 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.
- Reduce mowing frequency and employ mowing techniques to maintain a healthy lawn and minimize chemical use – no more than 1 inch of lawn should be removed from each mowing (grasses kept at 2.5 to 3 inches high are more heat-resistant than close-cropped grass).
- Keep mower blades sharp and leave clippings in place after mowing. If lawn clippings are collected, dispose of them properly.
- Water plants in the early morning or late at night.
- Consider use of alternative landscaping materials (e.g., drought-resistant plantings).
- Use yard waste as mulch and topsoil, or compost.
- Sweep up yard debris instead of hosing down.
- Do not leave yard waste in the street or sweep it into storm drains or streams.
- Sweep paved areas regularly to collect loose particles

Equipment and Gasoline/Oil Management

- To prevent contamination of stormwater by gasoline and oil during maintenance activities at municipal parks, all equipment and containers should be regularly maintained and inspected to ensure that no leaks are present. Handling of gasoline and oil, including filling fuel tanks, should be conducted on impervious surfaces with proper containment of the surrounding area in the event of a spill or a leak. Please refer to the SOP for Fuel and Oil Handling, for more detailed procedures.
- Equip vehicles transporting landscaping equipment, pesticides, fertilizer, or paint with a spill response kit in case a spill or leak of any of the aforementioned materials does occur. More detailed information on spill kits can be found in the SOP for Spill Response and Cleanup.

Waterfowl Management

- Install signs in locations of higher waterfowl density prohibiting feeding the waterfowl and wild animals. Feeding water fowl discourages their natural behavior and may cause dependency on handouts from park visitors. This can lead to overpopulation in parks and other open spaces. When left on their own, waterfowl will find new areas where food sources are more plentiful.
- Regularly maintain areas of waterfowl congregation to prevent pollution due to droppings and feathers.
- Regularly maintain waterways and entrances to the drainage system which may accumulate waterfowl droppings.
- Consider employing physical methods for discouraging waterfowl from residing at parks and open spaces (e.g. reducing watering and fertilizer use, plating foul tasting grasses, eliminate nesting structures, installing detour coyotes, and employing trained dogs to herd and intimidate waterfowl).

Inspection Procedures

- Look for erosion and poor vegetation cover. Address promptly, especially when these areas are within 50 feet of a surface water or storm drain.
- 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 plans.
- Inspect for problems by testing soils.

STANDARD OPERATING PROCEDURE | *Oil/Water Separator Maintenance*

TARGETED POLLUTANTS

Oil and Grease

RESPONSIBLE DEPARTMENTS

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

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

General Oil/Water Separator Maintenance

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

Oil/Water Separator Inspection Procedures

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

Weekly inspections of an OWS should include the following:

- Visually examine the area served by the OWS for evidence of spills or leaks.
- Inspect the point of discharge (i.e., sewer manhole) for evidence of petroleum bypassing the OWS.
- Inspect drains for any signs of unauthorized substances entering the OWS.
- Identify which areas should be or are bermed to contain spills/leaks.
- Examine the OWS for signs of leaks or any malfunction.

Quarterly inspections of an OWS should include the following:

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

Cleaning Procedures

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

- When sludge accumulates to 25% of the wetted height of the separator compartment, or
- When oil accumulates to 5% of the wetted height of the separator compartment, or
- When 75% of the retention capacity of the OWS is filled.

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

Documentation of Cleaning and Service

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

Oil/Water Separator Inspection Checklist

Facility: _____

OWS Location: _____

Inspected By: _____

Date: _____

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

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

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

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

STANDARD OPERATING PROCEDURE

Pesticides,Herbicides,Fertilizer Use Storage and Disposal

TARGETED POLLUTANTS

Sediments
Nutrients
Trash
Metals
Bacteria
Oil and Grease
Organics
Low Dissolved Oxygen

RESPONSIBLE DEPARTMENTS

Unwanted materials may enter the stormwater system during regular applications of fertilizers, herbicides and pesticides to the property. If fertilizers and pesticides are not used in accordance with relevant regulations and instructions, or if they are not applied by properly trained personnel, these chemical treatments can enter stormwater in large quantities. Runoff containing these materials can contribute pollutants that contaminate drinking water supplies and are toxic to both human and aquatic organisms.

Suggested Standard Operating Procedures

Use

- Follow manufacturers' recommendations and label directions.
- Do not apply any chemicals (insecticide, herbicide, or fertilizer) directly to surface waters, unless the application is approved and permitted by the MassDEP under an Integrated Pest Management (IPM) program.
- Check irrigation schedules so pesticides, herbicides, and fertilizers will not be washed away and non-stormwater discharge is minimized.
- 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 products if rain is expected or during high winds.
- Do not mix or prepare pesticides for application near storm drains.
- Calibrate fertilizer distributors to avoid excessive application.
- Work fertilizers into the soil rather than dumping or broadcasting them onto the surface.

Storage

- Storage of pesticides, herbicides, and fertilizers should be indoors to prevent exposure to rainfall. Store off the floor, in dry, closed containers.
- Provide secondary containment for pesticides.
- Clean up spills immediately. Do not hose down the area to a storm drain.
- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Implement other storage requirements for pesticide products with guidance from the Massachusetts Department of Agricultural Resources.

Disposal

- Dispose of empty containers according to the instructions on the container label.
- Use up the products. Rinse containers, and use rinse water as a product.
- Dispose of unused pesticide as hazardous waste.

STANDARD OPERATING PROCEDURE

Petroleum and Hazardous Materials Use Storage and Disposal

TARGETED POLLUTANTS

Sediment
Nutrients
Trash
Metals
Oil & Grease
Organics
Low Dissolved Oxygen

RESPONSIBLE DEPARTMENTS

It is important to properly store petroleum products and 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

Improper storage and handling of these materials can allow toxic compounds, oils and greases, heavy metals, nutrients, suspended solids, and other pollutants to enter stormwater runoff and/or cause concerns to health and safety.

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.

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 Standard Operating Procedures to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

Suggested Standard Operating Procedures

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.

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.

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.
- 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
- 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.

Waste Oil Storage

When not stored properly, waste oil can be a potential source of petroleum in stormwater. Waste oil containers can leak, and spills can occur while during transportation activities. When possible, steps should be taken to recycle waste oil or reduce the amount generated.

- All waste oil containers should be properly labeled and stored with secondary containment. Containers should be regularly inspected for rust, leaks, or other signs of deterioration. Defective containers should be promptly removed and replaced. A spill response kit should be located wherever waste oil is stored. Facility personnel should know where the spill kit is located and be familiar with the procedures outlined in SOP Spill Response and Cleanup Procedures. Used oil filters should also be properly disposed.
- Care should be taken when transferring used oil to and from storage containers. For additional information see SOP Fuel and Oil Handling Procedures.
- Waste oil should be stored indoors or under a covered structure to prevent exposure to precipitation. Floor drain in waste oil storage areas should drain to an oil/water separator rather than the storm drain system. See SOP Oil/Water Separator Maintenance for further information.

Waste Collection, Handling, and Disposal

- 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.
- 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.
- Never dump wastes containing detergents to a storm drain system. All wastes containing detergents shall be directed to a sanitary sewer system for treatment at a wastewater treatment plant.
- Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal.

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.
- Conduct physical on-site verification of sealed floor drains.
- If floor drains are not sealed, verify drains are connected to the municipal sanitary sewer system. In accordance with the Massachusetts Plumbing Code: 248 C.M.R. 10.09 (1)(b), if floor drains are not connected to the municipal sewer system or a holding tank, a facility is required to either:
    - Connect to the municipal sanitary sewer system;
    - Connect to a holding tank; or
    - Seal the floor drains with caps or plugs in accordance with 248 CMR 10.07, provided that, an application for sealing of floor drains that includes a WS-1 form from the Department of Environmental Protection Waste Minimization Program Procedures (MassDEP Form WS-1) is filed and approved by the Plumbing Inspector before commencing any work. A copy of the form indicating the Inspector's approval must be returned to the MassDEP by the applicant, as indicated on the document.
- Regular inspection and cleaning of oil/water separators or other pretreatment holding tanks by qualified contractor or facility personnel.
- Regular inspection of material storage areas (inside and outside) to verify items are not exposed to precipitation and are covered or in enclosed areas.
- Inspect stormwater discharge locations and onsite stormwater drainage infrastructure (e.g., catch basins) regularly for contaminants, soil staining, and plugged discharge lines.

Maintenance Procedures

- Train employees routinely and when new products enter the facility on proper use, storage, disposal, and safety concerns. MSDS should be reviewed and readily accessible in central facility location.
- 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.
- Spill Prevention Control and Countermeasure Plan (SPCC) Plan must be prepared and kept on file at facilities that store over 1,320 aggregate, where a spill could reach water. When determining the total quantity of oil stored onsite, include all aboveground containers with a capacity of 55-gallons. Add up all the tanks and drums, any tanks on portable equipment, hydraulic reserves, and oil-filled electrical transformers. The USEPA enforces the Oil SPCC Plan through the Code of Federal Regulations (C.F.R.) Title 40 C.F.R. Part 112—Oil Pollution Prevention.

STANDARD OPERATING PROCEDURE | *Pet Waste*

TARGETED POLLUTANTS

Nutrients
Organics
Low Dissolved Oxygen
Pathogens/Bacteria

RESPONSIBLE DEPARTMENTS

Pet droppings can be significant contributor of pollution in lakes and pond watersheds where there are high populations of dogs. It has been estimated that for a small 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 it to swimming.

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.
- If pet waste is a problem, post signs in local parks describing the problem and urging cleanup and proper disposal of pet wastes or target residential areas for public education brochures.

Suggested Standard Operating Procedures

- Put waste in 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, gullies, and steep slopes.
- Add pooper scooper stations with free sanitary “pick-up” bags and proper receptacles to Town-owned parks and playgrounds that have pet waste problems.
- Incorporate public outreach elements like signage and informational brochures into and around parks, if necessary.

Inspection Procedures

- Routinely inspect common dog walking areas for pet waste.

Maintenance Procedures

- Remove and properly dispose of pet waste.
- Restock Mutt Mitt stations frequently.
- Pick up trash frequently and maintain adequate trash receptacles.

STANDARD OPERATING PROCEDURE

Spill Prevention, Response and Cleanup Procedures

TARGETED POLLUTANTS

Nutrients
Metals
Oil and Grease
Hydrocarbons
Organics

RESPONSIBLE DEPARTMENTS

Municipalities are responsible for any contaminant spill or release that occurs on property they own or operate. Particular areas of concern include any facilities that use or store chemicals, fuel oil, or hazardous waste, including schools, garages, DPW yards, and landfills.

It is important to have proper spill response and cleanup procedures in place in the event of a spill to mitigate the effects of a contaminant release and prevent contaminants frrom mixing with stormwater runoff. A spill prevention and response plan can be effective at reducing the risk of 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 spill prevention and response plan, and implement in the event of a spill.
- Facilities that store 1,320 gallons or more of oil (used and new oil, heating oil, engine oil, lube oil, hydraulic oil, and/or transmission fluid) total must develop and keep near oil storage areas an Oil Spill Prevention, Control, and Countermeasure (SPCC) Plan, as regulated under the EPA.
- Post a response checklist in any hazardous waste storage area with contact information (including emergency phone numbers) and spill containment procedures.
- Train personnel on spill prevention and response.
- Regularly update plan, checklists, and contact information.
- Regularly inspect spill potential areas.

Spill Prevention and Response Plan

For facilities that do not already have an Oil SPCC Plan, the plan should include a:

- 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.

Standard Operating Procedures

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 Town 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 absorbent materials for general cleanup of liquids.
  - Use brooms or shovels for the general cleanup 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, according to regulations.
  - Clean or dispose of any equipment used to clean up the spill properly.
- Large non-hazardous spills
  - Use absorbent materials for general cleanup of liquids.
  - Use brooms, shovels, or street sweepers for the general cleanup 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.
- For hazardous or very large spills, contact the **Fire Department**. A private cleanup contractor may be needed to be contacted to assess the situation and conduct the cleanup and disposal of the materials. The used cleanup materials, including rags, are also hazardous and must be disposed of as hazardous waste.

Reporting

- Report any spills immediately to the Facility Supervisor.
- 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 Town's Health Department and the Fire Department.
- 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).
- A spill of 10 gallons or more of oil requires you to call MassDEP immediately at 888-304-1133. Uncontrolled oil can threaten coastlines, waterfowl, and contaminate soils and water supplies. There is a specific "reportable quantity" for other hazardous materials. When in doubt, call MassDEP.
- 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 Town's salt storage shed.

Contacts

	Phone Number
Safety Officer: _____	
Facility Supervisor: _____	
Westford Fire Department	**(978) 692-5542 or (978) 399-2083**
MassDEP 24-Hour Spill Reporting	**(888)-304-1133**
MassDEP Northeast Regional Office	**(978) 694-3200**
Hazardous Waste Compliance Assistance Line	**(617) 292-5898**
Household Hazardous Products Hotline	**(800) 343-3420**
Massachusetts Department of Fire Services	**(978) 567-3100 or (413) 587-3181**
Licensed Site Professionals Association (Wakefield, MA)	**(781) 876-8915**
Licensed Site Professionals Board	**(617) 556-1091**

STANDARD OPERATING PROCEDURE | *Sweeping Streets and Town-owned Parking Lots*

TARGETED POLLUTANTS

Sediments
Nutrients
Trash
Metals
Bacteria
Oil and Grease
Organics
Low Dissolved Oxygen

RESPONSIBLE DEPARTMENTS

Highway Department

MASSDEP REUSE & DISPOSAL OF STREET SWEEPINGS SOURCE:

http://www.mass.gov/eea/docs/dep/recycle/laws/stsweep.pdf

Suggested Standard Operating Procedures

- Adhere to the Town's cleaning schedule.
- Town/facility parking lots should be checked regularly by Facility personnel and swept in the spring. If needed, increase sweeping frequency if excessive sediment accumulates.
- 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.
- Adjust broom frequently to maximize efficiency of sweeping operations.
- After sweeping is finished, make sure sweepings are properly stored and disposed of.
- 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.
- For Town-owned sweepers, inspect sweepers to check for any necessary repairs or regular maintenance.

Required Inspection and Frequency of Sweeping

The Town must establish and implement procesures for sweeping and/or cleaning all streets (with the exception of rural uncurbed roads with no catch basins or high speed limited access highways) and Town-owned parking lots at a minimum of once per year in the spring.

More frequent sweeping of targeted areas determined by the Town on the basis of pollutant and load reduction potential, based on inspections, pollutant loads, catch basin cleanings or inspection results, land use, water quality limited or TMDL waters or other relevant factors should be completed:

- For facilities and activities within the Assabet River Watershed, increase sweeping frequency of municipal streets and parking lots to a minimum of twice a year, once in the spring and once in the fall, the to address the Assabet River TMDL and reduce the discharge of phosphorus.
- For facilities and activities within watersheds impaired by solids (e.g., TSS), such as Beaver Brook and Stony Brook, and metals (for Westford, mercury), such as Forge Pond and Nabnasset Lake, increase street sweeping frequency of all municipally-owned streets and parking lots to a schedule determined by the Town to target areas with potential for high pollutant loads. This may include, but is not limited to, increased street sweeping frequency in commercial areas and high density residential areas, or drainage areas with a large amount of impervious area. The goal is to reduce the discharge of these pollutants in stormwater runoff.

For rural uncurbed roadways with no catch basins and limited access highways, either sweep once per year in the spring or in accordance with a more frequent sweeping program, or develop and implement an inspection, documentation, and targeted sweeping plan.

Reporting

- Maintain a log or schedule of sweeping activities conducted. Information should include the date of sweeping activities, staff/contractor that performs activities, sweeping method (mechanical vs vacuum), and any comments such as amount of sweepings removed and heavily sedimented roadways. By recording heavily sedimented areas, prioritizations can be made to sweep these areas or clean catch basins more frequently. Any maps of areas swept should be kept on file.

- Facilities should maintain a log or schedule for their facility parking lots. Information should include the date of sweeping activities, staff/contractor who performs activities, sweeping method (mechanical or vac), and any comments such as amount of sweepings removed and heavily sedimented catch basins. By recording heavily sedimented areas, prioritizations can be made to sweep these areas or clean catch basins more frequently.
- Reporting in the annual MS4 report the number of miles cleaned or the volume or mass of material removed.

Reuse and Disposal of Street Sweepings

This Policy provides guidance on Massachusetts Department of Environmental Protection requirements, standards, and approvals for handling, reuse and disposal of street sweepings.

Approved by: Carl F. Dierker, Assistant Commissioner for the Bureau of Waste Prevention

Policy Statement and Scope

This Policy explains Department of Environmental Protection (MassDEP) requirements for managing street sweepings. Street sweepings are solid waste subject to the Massachusetts solid waste regulations. The options for managing street sweepings are as follows.

- Use the street sweepings in accordance with the preapproved uses described in Section 4 of this policy.
- Use the street sweepings for a beneficial use after obtaining prior approval from MassDEP under the provisions of the solid waste regulations, 310 CMR 19.060, Beneficial Use of Solid Wastes.
- Dispose of street sweepings at a permitted solid waste landfill.

The provisions and requirements for managing street sweepings under these options are the subject of this policy.

Applicability

This policy applies to the reuse or disposal of street sweepings that are generated in the ordinary and customary maintenance of roadways. The policy does not apply to catch basin cleanings or street sweepings mixed with catch basin cleanings or other wastes. The policy does not apply to the material generated as the result of the clean up of an oil or hazardous material spill.

Street sweepings are not exempt from the Hazardous Waste Regulations, 310 CMR 30.000, and must be handled as hazardous waste when they exhibit any of the characteristics of a hazardous waste. If there is no evidence of unusual contamination, MassDEP does not require street sweepings to be routinely tested, but, as is the case with any waste, the generator has the ultimate responsibility for determining whether the waste is a hazardous waste.

Definitions

Department means the Massachusetts Department of Environmental Protection (MassDEP).

Public Way means the strip of land over and under a publicly owned, paved road or highway and includes the publicly owned land adjacent to the road or highway.

Street Sweepings means materials consisting primarily of sand and soil generated during the routine cleaning of roadways but may also contain some leaves and other miscellaneous solid wastes collected during street sweeping. Street sweepings does not mean the material generated during the clean up of a spill or material from other structures associated with a roadway such as catch basins.

Urban center roads means local roads in central commercial and retail business districts and industrial and manufacturing areas.

Pre-Approved Uses, Restrictions & Conditions

This policy allows street sweepings to be used in several applications. No approval from MassDEP is required when the restrictions and conditions identified in this policy are adhered to. However, sweepings shall not be used unless prior approval is obtained from the owner of the location where the sweepings are to be used.

Use at Landfills

Street sweepings may be used for daily cover at lined or unlined permitted solid waste landfills and need no prior MassDEP approval if the sweepings satisfy the requirements for daily cover material specified at 310 CMR 19.130(15).

Use as Fill in Public Ways

Street sweepings shall be used for fill in public ways without prior approval from MassDEP only when the following restrictions and conditions are observed:

- The sweepings have not been collected from Urban Center Roads (see definition);
- The sweepings are used under the road surface or as fill along the side of the road within the public way;
- The sweepings are not used in residential areas;
- The sweepings are kept above the level of the groundwater;
- The sweepings are not used in designated "No Salt Areas";
- The following definitions have been taken verbatim from the solid waste regulations and are repeated here for clarity in understanding this policy.
- The sweepings are not used within the 100 foot buffer zone of a wetland or within wetland resource areas including bordering vegetative wetlands and riverfront areas;
- The sweepings are not used within 500 feet of a ground or surface drinking water supply.

Use As an Additive to Restricted Use Compost

Street sweepings shall be used as an additive to compost without prior approval froM MassDEP only when the following restrictions and conditions are observed:

- The sweepings have not been collected from Urban Center Roads (see definition);
- The compost is used only in public ways;
- The compost is not used in residential areas;
- The compost is kept above the level of the groundwater;
- The compost is not used in designated "No Salt Areas";
- The compost is not used within the 100 foot buffer zone of a wetland or within wetland resource areas including bordering vegetative wetlands and riverfront areas;
- The compost is not used within 500 feet of a ground or surface drinking water supply.

Other Uses

Any use not pre-approved in the preceding section requires prior MassDEP approval under the Beneficial Use provisions of the Solid Waste Management Facility Regulations at 310 CMR 19.060. A "Beneficial Use Determination" or BUD can be made only after the submission of an application characterizing the waste and describing the proposed beneficial use.

Disposal

While the beneficial use of street sweepings is strongly encouraged, MassDEP does not prohibit the disposal of street sweepings. Street sweepings may be disposed in either lined or unlined permitted solid waste landfills without prior approval from the Department.

Handling

Collection of Street Sweepings

Although MassDEP does not regulate the collection of street sweepings, collection practices should be compatible with intended uses. For example, sweepings from Urban Center Roads are not approved for the uses allowed for sweepings from other areas. Keeping sweepings from Urban Center Roads separate from sweepings from other areas will make the full benefits of this policy available.

This policy does not cover sweepings known to be contaminated by spills, and such sweepings should be collected separately and kept segregated. Depending on the contamination and circumstances, the handling of contaminated sweepings may be governed by the Massachusetts Contingency Plan, 310 CMR 40, the Massachusetts Hazardous Waste Regulations, 310 CMR 30, the Massachusetts Site Assignment Regulations for Solid Waste Facilities, 310 CMR 16 or the Massachusetts Solid Waste Management Facility Regulations, 310 CMR 19.

Storage

Street sweepings shall be temporarily stored prior to use, only when the following conditions are satisfied:

- Storage must be at the site where the sweepings are generated (in the public way) or at a location, such as a DPW yard, that is under the control of the governmental entity which is doing the sweeping or has contracted for the sweeping;
- The sweepings shall be protected from wind and rain to the extent necessary to prevent dust, erosion and off-site migration;
- The sweepings shall not be stored within the 100 foot buffer zone of a wetland or within wetland resource areas including bordering vegetative wetlands and riverfront areas;
- The sweepings shall not be stored within 500 feet of a ground or surface drinking water supply;
- Storage shall incorporate good management practice and result in no public nuisance;

Storage must be temporary. Street sweepings shall be used within one year of collection unless the MassDEP Regional Office in the region where the sweepings are stored grants a written extension. An extension may be granted when it is demonstrated that all storage conditions will continue to be satisfied and the stored sweepings will be put to a specific identified use prior to the expiration of the extension period.

Preparation Prior to Use

Solid waste, such as paper, auto parts and other trash, shall be removed from the sweepings prior to use. Leaves, twigs and other organic matter should also be removed when good engineering practice indicates this is necessary to produce a material that is suitable for the intended use.

STANDARD OPERATING PROCEDURE | *Sweeping Streets and Town Owned Parking Lots*

Background

MassDEP has consistently classified street sweepings as solid waste subject to Massachusetts General Law Chapter 111, Section 150A and the Massachusetts Solid Waste Regulations (Site Assignment Regulations for Solid Waste Facilities, 310 CMR 16.00 and Solid Waste Management Facility Regulations, 310 CMR 19.000). There has been confusion among some in the regulated community about this classification.

Prior to the development of this policy, the options for handling street sweepings were limited to:

- Disposal at a permitted solid waste landfill,
- Use as cover at a permitted solid waste landfill or
- Use in accordance with a Beneficial Use Determination (BUD). BUD decisions are made on a case-by-case basis and require the submittal of a formal application to MassDEP containing data showing the chemical composition of the street sweepings.

The simplest of these options was either to use the sweepings for landfill cover or to dispose of the sweepings at the local landfill. As many local landfills close, these options become less available to many communities. However, transporting sweepings to a distant landfill involves increased transportation costs and possibly payment of tipping fees.

To clarify the requirements and to provide simpler and less expensive alternatives for handling street sweepings, the Department undertook the development of this policy. Because useful studies of the chemical composition of street sweepings could not be found in the literature, MassDEP solicited the help of municipalities and state agencies in conducting a study of the composition of street sweepings from various types of areas. The results showed that sweepings from all areas, except Urban Center Roads, were similar with the main constituents of concern being total petroleum hydrocarbons (TPH) and polynuclear aromatic hydrocarbons (PAHs). Very limited data from Urban Center Roads indicated that sweepings from these areas may be more contaminated than sweepings from other areas.

The test results indicate that sweepings may contain levels of contamination that are unsuitable for unrestricted use. However, except for sweepings from Urban Center Roads, the levels of contamination were consistent and low enough to allow the use of sweepings in restricted applications without requiring testing or pre-approval as long as certain conditions were met. Sweepings from urban areas were excluded from some pre-approved uses. This situation could change when more data are available from Urban Center Roads.

This policy makes it possible for municipalities, state agencies and other governmental entities to handle street sweepings in an environmentally sound manner with a minimum of paperwork and expense.

Additional Information

For additional copies of this policy, permit application forms or other MassDEP documents, call any MassDEP Regional Office and ask for the Service Center or visit http://www.mass.gov/dep. The permit application numbers for Beneficial Use Determinations are BWP SW 39, 40, 41 and 42.

Copies of all Massachusetts regulations, including the solid waste regulations, may be purchased from the State House Bookstore, 617-727-2834. The solid waste regulations are:

310 CMR 16.000, Site Assignment Regulations for Solid Waste Facilities

310 CMR 19.000, Solid Waste Management Facility Regulations

Questions about the Provisions of the Policy

If you have technical questions about the policy, please call any MassDEP office and ask to speak with a staff member about the provisions of the policy.

STANDARD OPERATING PROCEDURE | *Trash/Solid Waste Management*

TARGETED POLLUTANTS

Sediment
Nutrients
Trash
Metals
Oil & Grease
Organics
Low Dissolved Oxygen

RESPONSIBLE DEPARTMENTS

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.

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

Implement applicable suggested Standard Operating Procedures to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

Suggested Standard Operating Procedures

- Use environmentally friendly or non-hazardous substitutes when appropriate that include but are not limited to $H_2Orange_2$, Orange Thunder, and Simple Green®.
- Loose materials including any gravel piles should be covered or placed in shelter.

Solid Waste

Solid waste may be classified as both hazardous and non-hazardous waste consisting of agricultural, construction and demolition, dead animal, industrial, municipal, and tire waste.

- All staff shall be properly trained in correct solid waste management practices, including waste disposal and spill prevention and response. All employees shall also be knowledgeable of the potential hazards associated with solid waste handling and storage.
- Each waste storage location shall be properly labeled and all significant sources of pollution shall be kept in a secure, covered and contained area.
- Trash storage bins, dumpsters, and disposal areas should be clean and free of debris, especially those located near catch basins.
- Dumpsters should be maintained in good condition and securely closed at all times other than during normal hours of operation.
- Clean up equipment and materials.
- Schedule waste collection to prevent the containers from overfilling.
- Dispose of waste within local, state, and federal laws.
- Debris piled including sweepings, construction, and wood debris should be inspected weekly before removed off site.

Waste Collection, Handling, and Disposal

- 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.
- 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.
- Never dump wastes containing detergents to a storm drain system. All wastes containing detergents shall be directed to a sanitary sewer system for treatment at a wastewater treatment plant.
- Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal.

Inspection Procedures

- Physical on-site verification of sealed floor drains.
- If floor drains are not sealed, verify drains are connected to the municipal sanitary sewer system. In accordance with the Massachusetts Plumbing Code: 248 C.M.R. 10.09 (1)(b), if floor drains are not connected to the municipal sewer system or a holding tank, a facility is required to either:
    - Connect to the municipal sanitary sewer system;
    - Connect to a holding tank; or
    - Seal the floor drains with caps or plugs in accordance with 248 CMR 10.07, provided that, an application for sealing of floor drains that includes a WS-1 form from the Department of Environmental Protection Waste Minimization Program Procedures (MassDEP Form WS-1) is filed and approved by the Plumbing Inspector before commencing any work. A copy of the form indicating the Inspector's approval must be returned to the MassDEP by the applicant, as indicated on the document.
- Regular inspection and cleaning of oil/water separators or other pretreatment holding tanks by qualified contractor or facility personnel.
- Regular inspection of material storage areas (inside and outside) to verify items are not exposed to precipitation and are covered or in enclosed areas.
- Inspect stormwater discharge locations and onsite stormwater drainage infrastructure (e.g., catch basins) regularly for contaminants, soil staining, and plugged discharge lines.

Maintenance Procedures

- Train employees routinely and when new products enter the facility on proper use, storage, disposal, and safety concerns. MSDS should be reviewed and readily accessible in central facility location.
- 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.
- Spill Prevention Control and Countermeasure Plan (SPCC) Plan must be prepared and kept on file at facilities that store over 1,320 aggregate, where a spill could reach water. When determining the total quantity of oil stored onsite, include all aboveground containers with a capacity of 55-gallons. Add up all the tanks and drums, any tanks on portable equipment, hydraulic reserves, and oil-filled electrical transformers. The USEPA enforces the Oil SPCC Plan through the Code of Federal Regulations (C.F.R.) Title 40 C.F.R. Part 112—Oil Pollution Prevention.

STANDARD OPERATING PROCEDURE

Vehicle and Equipment Storage and Maintenance

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 become polluted by a variety of contaminants.

Pollution Prevention Approach

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 Standard Operating Procedures to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

TARGETED POLLUTANTS

Sediments
Nutrients
Trash
Metals
Oil and Grease
Organics

RESPONSIBLE DEPARTMENTS

Suggested Standard Operating Procedures

General

- If possible, take vehicles to a commercial car wash where wash water is 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 conduct any vehicle maintenance near storm drains.
- Vehicle maintenance should be completed in covered facility.

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 or directly to the sewer or storm drain.

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.

Vehicle Maintenance

- 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. This is best conveyed with a facility map.
- 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 according to manufacturer's recommendations that include cleaning intervals, methods, and supplies.
- Keep ample supplies of spill cleanup materials onsite. Clean up spills immediately.
- Properly train employees on fueling and handling oil and waste oil.

STANDARD OPERATING PROCEDURE

Vehicle and Equipment Washing

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

Implement applicable suggested Standard Operating Procedures to reduce the influx of pollutants to the stormwater drainage system to the maximum extent practicable.

Suggested Standard Operating Procedures

General

- If possible, take vehicles to a commercial car wash where wash water is properly treated and does not enter the storm drainage system.
- All vehicle washing must discharge to the sanitary sewer system or into a holding tank. Vehicle washing discharged to the drainage system is an illicit (illegal) discharge. Discharge into any Title V septic system is also prohibited.
- All vehicle washing from an area that discharges to floor drains must discharge to a gas, sand, and oil separator for pretreatment before discharging to the sanitary sewer system per Massachusetts Plumbing Code 248 C.M.R. 10.09 (1) (b).
- Mark the area clearly as a wash area.
- Post signs stating 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.
- Avoid detergents as much as possible. If detergents are necessary, use a biodegradable, phosphate free detergent such as Zep-O-Shine™.

Vehicle and Equipment Cleaning

- 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 the gas, sand, and oil separator.
    - Cover the wash area when not in use to prevent contact with rain water.
    - If sewer system access is not available, wash vehicle on a grassed area with a biodegradable, phosphate free detergent such as Zep-O-Shine™.
- Use hoses with nozzles that automatically turn off when left unattended. Use high-pressure, low-volume sprays.

TARGETED POLLUTANTS

Sediments
Nutrients
Trash
Metals
Oil and Grease
Organics

RESPONSIBLE DEPARTMENTS

- 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.

Disposal

- Filter and recycle wash water if possible.
- If discharging to a gas, sand, and oil separator, do not use detergents that disperse oil in wash water and make separators ineffective with oil passing to the sanitary sewer system. It is best to use high pressure water with no cleaning agent. If one is not recommended for discharges pretreated by an oil/water separator, use a non-emulsifying cleaner such as Landa L-215 or QOR-110 ("Quick Oil Release").

Inspection Procedures

- Inspect floor drain systems and holding tanks regularly – use only those that discharge to a sanitary sewer.
- Identify the need for cleaning of catch basins and gas, sand, and oil separators or 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.

STANDARD OPERATING PROCEDURE | *Winter Deicing and Snow Removal*

Road Salt/Sand Application and Storage

Proper road salt and facility sand/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

Best Management Practices

Proper Storage

Westford has a covereed storage facilities on impervious surface for salt and sand/salt mixtures at the Highway Garage that is properly sited. For other facilities should have the following key elements:

- Covered structure on impervious surface.
- Drainage should be diverted away from storage facility.
- Sand/salt handling should be done within storage facility.
- Should not be located in a water supply watershed or within 100 year floodplain.

Proper Disposal

Disposal of sand/salt mixtures should not be done in the following areas:

- Wetlands
- Any surface waters
- Well locations and public drinking supplies

Proper Removal

- Sweet sweeping in spring
- Catch basin cleaning completed as necessary.

Proper Use

- Establish a low salt area near any water bodies or residential areas.
- When feasible, use higher percentage of sand in sand/salt mixture.
- Regulate the amount of road salt 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.
- Use alternative materials, such as sand or gravel, in especially sensitive areas.

Inspection Procedures

- Inspect salt storage shed for leaks on a regular basis.
- Inspect salt application equipment including calibration equipment and spreaders.

TARGETED POLLUTANTS

Sediments
Nutrients
Trash
Metals
Bacteria
Oil and Grease
Organics
Low Dissolved Oxygen

RESPONSIBLE DEPARTMENTS

MASSDEP SNOW DISPOSAL GUIDANCE SOURCE:

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

- 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.

Snow Stockpiling and Removal

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.

Best Management Practices

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

- 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. This includes sweeping roadways and parking lots or other impervious areas.
- During plowing activities, avoid blocking drainage structures including catch basins, swales, and channels.

MassDEP Snow Disposal Guidance

Effective Date: March 8, 2001

Guideline No. BRPG01-01

Applicability: Applies to all federal, state, regional and local agencies, as well as to private businesses.

Supersedes: BRP Snow Disposal Guideline BRPG97-1 issued 12/19/97, and all previous snow disposal guidance

Approved by: Glenn Haas, Assistant Commissioner for Resource Protection

Purpose

To provide guidelines to all government agencies and private businesses regarding snow disposal site selection, site preparation and maintenance, and emergency snow disposal options that are acceptable to the Department of Environmental Protection, Bureau of Resource Protection.

STANDARD OPERATING PROCEDURE | *Winter Deicing and Snow Removal*

Applicability

These Guidelines are issued by the Bureau of Resource Protection on behalf of all Bureau Programs (including Drinking Water Supply, Wetlands and Waterways, Wastewater Management, and Watershed Planning and Permitting). They apply to public agencies and private businesses disposing of snow in the Commonwealth of Massachusetts.

Introduction

Finding a place to dispose of collected snow poses a challenge to municipalities and businesses as they clear roads, parking lots, bridges, and sidewalks. While we are all aware of the threats to public safety caused by snow, collected snow that is contaminated with road salt, sand, litter, and automotive pollutants such as oil also threatens public health and the environment.

As snow melts, road salt, sand, litter, and other pollutants are transported into surface water or through the soil where they may eventually reach the groundwater. Road salt and other pollutants can contaminate water supplies and are toxic to aquatic life at certain levels. Sand washed into waterbodies can create sand bars or fill in wetlands and ponds, impacting aquatic life, causing flooding, and affecting our use of these resources.

There are several steps that communities can take to minimize the impacts of snow disposal on public health and the environment. These steps will help communities avoid the costs of a contaminated water supply, degraded waterbodies, and flooding. Everything we do on the land has the potential to impact our water resources. Given the authority of local government over the use of the land, municipal officials and staff have a critically important role to play in protecting our water resources.

The purpose of these guidelines is to help municipalities and businesses select, prepare, and maintain appropriate snow disposal sites before the snow begins to accumulate through the winter.

Recommended Guidelines

These snow disposal guidelines address: (1) site selection; (2) site preparation and maintenance; and (3) emergency snow disposal.

1. Site Selection

The key to selecting effective snow disposal sites is to locate them adjacent to or on pervious surfaces in upland areas away from water resources and wells. At these locations, the snow meltwater can filter in to the soil, leaving behind sand and debris which can be removed in the springtime. The following areas should be avoided:

Avoid dumping of snow into any waterbody, including rivers, the ocean, reservoirs, ponds, or wetlands. In addition to water quality impacts and flooding, snow disposed of in open water can cause navigational hazards when it freezes into ice blocks.

Do not dump snow within a Zone II or Interim Wellhead Protection Area (IWPA) of a public water supply well or within 75 feet of a private well, where road salt may contaminate water supplies.

Avoid dumping snow on MassDEP-designated high and medium-yield aquifers where it may contaminate groundwater (see the next page for information on ordering maps from MassGIS showing the locations of aquifers, Zone II's, and IWPAs in your community).

Avoid dumping snow in sanitary landfills and gravel pits. Snow meltwater will create more contaminated leachate in landfills posing a greater risk to groundwater, and in gravel pits, there is little opportunity for pollutants to be filtered out of the meltwater because groundwater is close to the land surface.

Avoid disposing of snow on top of storm drain catch basins or in stormwater drainage swales or ditches. Snow combined with sand and debris may block a storm drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water.

Site Selection Procedures

It is important that the municipal Department of Public Works or Highway Department, Conservation Commission, and Board of Health work together to select appropriate snow disposal sites. The following steps should be taken:

Estimate how much snow disposal capacity is needed for the season so that an adequate number of disposal sites can be selected and prepared.

Identify sites that could potentially be used for snow disposal such as municipal open space (e.g., parking lots or parks).

Sites located in upland locations that are not likely to impact sensitive environmental resources should be selected first.

If more storage space is still needed, prioritize the sites with the least environmental impact (using the site selection criteria, and local or MassGIS maps as a guide).

MassGIS Maps of Open Space and Water Resources

If local maps do not show the information you need to select appropriate snow disposal sites, you may order maps from MassGIS (Massachusetts Geographic Information System) which show publicly owned open spaces and approximate locations of sensitive environmental resources (locations should be field-verified where possible). Different coverages or map themes depicting sensitive environmental resources are available from MassGIS on the map you order. At a minimum, you should order the Priority Resources Map. The Priority Resources Map includes aquifers, public water supplies, MassDEP-approved Zone II's, Interim Wellhead Protection Areas, Wetlands, Open Space, Areas of Critical Environmental Concern, NHESP Wetlands Habitats, MassDEP Permitted Solid Waste facilities, Surface Water Protection areas (Zone A's) and base map features. The cost of this map is $25.00. Other coverages or map themes you may consider, depending on the location of your city or town, include Outstanding Resource Waters and MassDEP Eelgrass Resources. These are available at $25.00 each, with each map theme being depicted on a separate map. Maps should be ordered from MassGIS. Maps may also be ordered by fax at 617-626-1249 (order form available from the MassGIS web site) or mail. For further information, contact MassGIS at 617-626-1189.

2. Site Preparation and Maintenance

In addition to carefully selecting disposal sites before the winter begins, it is important to prepare and maintain these sites to maximize their effectiveness. The following maintenance measures should be undertaken for all snow disposal sites:

A silt fence or equivalent barrier should be placed securely on the downgradient side of the snow disposal site.

To filter pollutants out of the meltwater, a 50-foot vegetative buffer strip should be maintained during the growth season between the disposal site and adjacent waterbodies.

Debris should be cleared from the site prior to using the site for snow disposal.

Debris should be cleared from the site and properly disposed of at the end of the snow season and no later than May 15.

3. Emergency Snow Disposal

As mentioned earlier, it is important to estimate the amount of snow disposal capacity you will need so that an adequate number of upland disposal sites can be selected and prepared.

If despite your planning, upland disposal sites have been exhausted, snow may be disposed of near waterbodies. A vegetated buffer of at least 50 feet should still be maintained between the site and the waterbody in these situations. Furthermore, it is essential that the other guidelines for preparing and maintaining snow disposal sites be followed to minimize the threat to adjacent waterbodies.

Under extraordinary conditions, when all land-based snow disposal options are exhausted, disposal of snow that is not obviously contaminated with road salt, sand, and other pollutants may be allowed in certain waterbodies under certain

conditions. In these dire situations, notify your Conservation Commission and the appropriate MassDEP Regional Service Center before disposing of snow in a waterbody.

Use the following guidelines in these emergency situations:

- Dispose of snow in open water with adequate flow and mixing to prevent ice dams from forming.
- Do not dispose of snow in saltmarshes, vegetated wetlands, certified vernal pools, shellfish beds, mudflats, drinking water reservoirs and their tributaries, Zone IIs or IWPAs of public water supply wells, Outstanding Resource Waters, or Areas of Critical Environmental Concern.
- Do not dispose of snow where trucks may cause shoreline damage or erosion.
- Consult with the municipal Conservation Commission to ensure that snow disposal in open water complies with local ordinances and bylaws.

For More Information

If you need more information, contact one of MassDEP's Regional Service Centers:

Northeast Regional Office, Wilmington, 978-694-3200
Southeast Regional Office, Lakeville, 508-946-2714
Central Regional Office, Worcester, 508-792-7683
Western Regional Office, Springfield, 413-755-2214

or

Call Thomas Maguire of DEP's Bureau of Resource Protection in Boston at 617-292-5602.

STANDARD OPERATING PROCEDURE

Structural Stormwater Best Management Practices Inspections & Maintenance

TARGETED POLLUTANTS

Nutrients (nitrogen, phosphorus)
Total Suspended Solids (TSS)
Metals (copper, lead, zinc)
Pathogens (*E. coli*, coliform)
Invasive species
Trash

MASSACHUSETTS STORMWATER HANDBOOK (VOLUME 2, CHAPTER 2):

https://www.mass.gov/doc/massachusetts-stormwater-handbook-vol-2-ch-2-stormwater-best-management-practices/download

Description

Procedures for inspecting and maintaining common types of constructed stormwater best management practices (BMPs). Constructed BMPs are permanent site features designed to retain, treat, and/or infiltrate stormwater before discharging it to a surface waterbody. While the majority of the BMPs listed below can be found in the Town, information for additional BMP types is also included in case they are constructed in the future. A map of the Town's BMPs (as of June 2020) is attached.

This SOP is based on the Massachusetts Stormwater Handbook (February 2008) and is not intended to replace that document. This SOP is also not intended to replace a site-specific Operation and Maintenance (O&M) Plan required by the Massachusetts Wetlands Protection Act Order of Conditions or a local stormwater requirement.

In accordance with Part 2.3.7.a.iii.6 of the MS4 General Permit, all municipally-owned stormwater treatment structures (excluding catch basins) shall be inspected annually, at a minimum. The description of each BMP type and the recommended activities for inspection and maintenance in this SOP should be considered guidelines to follow, but *the maintenance schedules presented herein are more prescriptive and stringent than the MS4 General Permit and will be followed on a case-by-case basis.* The Town will complete the required inspection annually and complete maintenance on an as-needed basis.

In accordance with General Permit requirements, the Town must keep a written record (hard copy or electronic) of all maintenance activities and inspections completed and report on the status each year in the Annual Report. Maintain records for a period of at least five years.

In Westford, the Engineering Department is responsible for completing BMP inspections and logging recommended maintenance activities. A general inspection form is attached. The Highway Department will complete any needed maintenance activities. The Engineering Department is responsible for maintaining and compiling the records for the Annual report.

Note: Information related to catch basins is provided in a separate SOP in Volume 3 of the Town's Stormwater Management Master Plan. Also, BMP accessories (e.g., level spreaders, check dams, plunge pools, outlet structures, and catch basin inserts) are not formally described in this SOP. Maintenance of BMP accessories generally includes regular inspections (especially after large rainfall events and per the manufacturer's recommendation), noting and repairing any erosion or damage as needed, removing sediment as needed, and lawfully disposing of any cleanings or used filtration media.

Structural Pretreatment BMPs

Sediment Forebays

Description

A sediment forebay is a post-construction practice consisting of an excavated pit, bermed area, or cast structure combined with a weir, designed to slow incoming stormwater runoff and facilitating the gravity separation of suspended solids. This practice is different from a sediment trap used as a construction period BMP.

Inspection & Maintenance

Regular maintenance is critical for filter strips to be effective and to ensure that flow does not shortcircuit the system. Conduct semi-annual inspections during the first year (and annually thereafter). Inspect the level spreader for sediment buildup and the vegetation for signs of erosion, bare spots, and overall health.

Regular, frequent mowing of the grass is required. Remove sediment from the toe of slope or level spreader, and reseed bare spots as necessary. Periodically, remove sediment that accumulates near the top of the strip to maintain the appropriate slope and prevent formation of a "berm" that could impede the distribution of runoff as sheet flow. When the filter strip is located in the buffer zone to a wetland resource area, the operation and maintenance plan must include strict measures to ensure that maintenance operations do not alter the wetland resource areas. Please note, filter strips are restricted to the outer 50 feet of the buffer zone.

Recommended Maintenance Schedule

Activity	Frequency
Inspect sediment forebays	Monthly
Clean sediment forebays	Four times per year and when sediment depth is between 3 to 6 feet.

Vegetated Filter Strips

Description

Vegetated filter strips, also known as filter strips, grass buffer strips and grass filters, are uniformly graded vegetated surfaces (i.e., grass or close-growing native vegetation) that receive runoff from adjacent impervious areas. Vegetated filter strips typically treat sheet flow or small concentrated flows that can be distributed along the width of the strip using a level spreader. Vegetated filter strips are designed to slow runoff velocities, trap sediment, and promote infiltration, thereby reducing runoff volumes.

Inspection & Maintenance

Sediments and associated pollutants are removed only when sediment forebays are actually cleaned out, so regular maintenance is essential. Frequently removing accumulated sediments will make it less likely that sediments will be resuspended. At a minimum, inspect sediment forebays monthly and clean them out at least four times per year. Stabilize the floor and sidewalls of the sediment forebay before making it operational, otherwise the practice will discharge excess amounts of suspended sediments. When mowing grasses, keep the grass height no greater than 6 inches. Set mower blades no lower than 3 to 4 inches. Check for signs of rilling and gullying and repair as needed. After removing the sediment, replace any vegetation damaged during the clean-out by either reseeding or resodding. When reseeding, incorporate practices such as hydroseeding with a tackifier, blanket, or similar practice to ensure that no scour occurs in the forebay, while the seeds germinate and develop roots.

Recommended Maintenance Schedule

Activity	Frequency
Inspect the level spreader for sediment buildup and the vegetation for signs of erosion, bare spots, and overall health.	Every six months during the first year. Annually thereafter.
Regularly mow the grass.	As needed
Remove sediment from the toe of slope or level spreader and reseed bare spots.	As needed

Oil and Grit Separators

Description

Oil/grit separators are underground storage tanks with three chambers designed to remove heavy particulates, floating debris and hydrocarbons from stormwater. Stormwater enters the first chamber where heavy sediments and solids drop out. The flow moves into the second chamber where oils and greases are removed and further settling of suspended solids takes place. Oil and grease are stored in this second chamber for future removal. After moving into the third outlet chamber, the clarified stormwater runoff is then discharged to a pipe and another BMP. There are other separators that may be used for spill control.

Inspection & Maintenance

Sediments and associated pollutants and trash are removed only when inlets or sumps are cleaned out, so regular maintenance is essential. Most studies have linked the failure of oil grit separators to the lack of regular maintenance. The more frequent the cleaning, the less likely sediments will be resuspended and subsequently discharged. In addition, frequent cleaning also makes more volume available for future storms and enhances overall performance. Cleaning includes removal of accumulated oil and grease and sediment using a vacuum truck or other ordinary catch basin cleaning device. In areas of high sediment loading, inspect and clean inlets after every major storm. At a minimum, inspect oil grit separators monthly, and clean them out at least twice per year. Polluted water or sediments removed from an oil grit separator should be disposed of in accordance with all applicable local, state and federal laws and regulations including M.G.L.c. 21C and 310 CMR 30.00.

Recommended Maintenance Schedule

Activity	Frequency
Inspect units	After every major storm but at least monthly
Clean units	Twice a year

Treatment BMPs

Extended Dry Detention Basins

Description

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

Inspection & Maintenance

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

Recommended Maintenance Schedule

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

Bioretention Areas and Rain Gardens

Description

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

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

Inspection & Maintenance

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

When failure is discovered, excavate the bioretention area, scarify the bottom and sides, replace the filter fabric and soil, replant vegetation and mulch the surface. Never store snow within a bioretention area or rain garden. This would prevent required water quality treatment and the recharge of groundwater.

Recommended Maintenance Schedule

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

Bioretention/Constructed Stormwater Wetlands

Description

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

Inspection & Maintenance

Regular inspection and maintenance are important for the health of constructed stormwater wetlands. Regular inspection and maintenance of pretreatment devices, such as forebays, should check for sediment buildup, structural damage and standing water. Inspection of the constructed wetlands should address the health of the vegetation, presence of invasive species, and identify the need to replace vegetation or media. Never store snow within a constructed stormwater wetland, as this would prevent required water quality treatment and the recharge of groundwater.

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

Recommended Maintenance Schedule – Years 0—3

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

Activity	Time of Year	Frequency
Accumulation of sediment in the forebay and micropool and survival rate of plants	Spring and Fall	Bi-Annually

Recommended Maintenance Schedule – Years 4+

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

Sand and Organic Filters

Description

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

Inspection & Maintenance

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

Recommended Maintenance Schedule

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

Wet Basins

Description

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

Inspection & Maintenance

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

Recommended Maintenance Schedule

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

Conveyance BMPs

Water Quality Swale

Description

Water quality swales are vegetated open channels designed to treat the required water quality volume and to convey runoff from the 10-year storm without causing erosion. There are two different types of water quality swales that may be used to satisfy the Stormwater Management Standards:

- Dry Swales
- Wet Swales

Unlike drainage channels which are intended to be used only for conveyance, water quality swales and grass channels are designed to treat the required water quality volume and incorporate specific features to enhance their stormwater pollutant removal effectiveness. Water quality swales have higher pollutant removal efficiencies than grass channels.

Inspection & Maintenance

Incorporate a maintenance and inspection schedule into the design to ensure the effectiveness of water quality swales. Inspect swales during the first few months after installation to make sure that the vegetation in the swales becomes adequately established. Thereafter, inspect swales twice a year. During the inspections, check the swales for slope integrity, soil moisture, vegetative health, soil stability, soil compaction, soil erosion, ponding and sedimentation. Regular maintenance includes mowing, fertilizing, liming, watering, pruning, and weed and pest control. Mow swales at least once per year. Do not cut the grass shorter than three to four inches, otherwise the effectiveness of the vegetation in reducing flow velocity and removing pollutants may be reduced. Do not let grass height exceed 6 inches. Manually remove sediment and debris at least once per year, and periodically re-seed, if necessary, to maintain a dense growth of vegetation. Take care to protect water quality swales from snow removal and disposal practices and off-street parking. When grass water quality swales are located on private residential property, the operation and maintenance plan must clearly identify the property owner who is responsible for carrying out the required maintenance. If the operation and maintenance plan calls for maintenance of water quality swales on private properties to be accomplished by a public entity or an association (e.g. homeowners association), maintenance easements must be secured.

Recommended Maintenance Schedule

Activity	Frequency
Inspect swales to make sure vegetation is adequate and slopes are not eroding. Check for rilling and gullying. Repair eroded areas and revegetate.	The first few months after construction and twice a year thereafter.
Mow dry swales. Wet swales may not need to be mowed depending on vegetation.	As needed.
Remove sediment and debris manually	At least once a year.
Reseed	As necessary.

Drainage Channels

Description

Drainage channels are traditional vegetated open channels that are designed to provide for non-erosive conveyance. They receive no infiltration or TSS removal credit (Standards 3 and 4).

Inspection & Maintenance

The maintenance and inspection schedule should take into consideration the effectiveness of the drainage channel. Regular maintenance tasks include mowing, fertilizing, liming, watering, pruning, weeding, and pest control. Keep grass

height under 6 inches to maintain the design depth necessary to serve as a conveyance. Do not mow excessively, because it may increase the design flow velocity. Remove sediment and debris manually at least once per year. Re-seed periodically to maintain the dense growth of grass vegetation. Take care to protect drainage channels from snow removal procedures and off-street parking. When drainage channels are located on private residential property, the operation and maintenance plan must clearly specify the private property owner who is responsible for carrying out the required maintenance. If the operation and maintenance plan calls for maintenance of drainage channels on private properties to be performed by a public entity or an association (e.g. homeowners association), maintenance easements must be obtained.

Recommended Maintenance Schedule

Activity	Frequency
Inspect channels to make sure vegetation is adequate and for signs of rilling and gullying. Inspect for slope integrity, soil moisture, vegetative health, soil stability, soil compaction, soil erosion, ponding, and sediment accumulation. Repair any rills or gullies. Replace dead vegetation.	The first few months after construction and twice a year thereafter.
Mow	As necessary. Grass height shall not exceed 6 inches.
Remove sediment and debris manually	At least once a year
Reseed	As necessary. Use of road salt or other deicers during the winter will necessitate yearly reseeding in the spring.

Grassed Channels

Description

Grassed Channels (formerly known as Biofilter swales) are treatment systems with a longer hydraulic residence time than drainage channels. The removal mechanisms are sedimentation and gravity separation, rather than filtration. To receive TSS credit, a sediment forebay or equivalent must be provided for pretreatment. Note that the sediment forebay does not receive a separate TSS removal credit.

Inspection & Maintenance

Maintenance access must be designed as part of the grass channel. If located adjacent to a roadway, make the maintenance access at least 15 feet wide, which can also be combined with a breakdown lane along a highway or onstreet parking along a residential street. When combined with on-street parking, post signs prohibiting parking when the swale is to be inspected and cleaned. Do not use travel lanes along highways and streets as the required maintenance access. Set mower blades no lower than 3 to 4 inches above the ground. Do not mow beneath the depth of the design flow during the storm associated with the water quality event (e.g., if the design flow is no more than 4 inches, do not cut the grass shorter than 4 inches). Mow on an as-needed basis during the growing season so that the grass height does not exceed 6 inches. Inspect semi-annually the first year, and at least once a year thereafter. Inspect the grass for growth and the side slopes for signs of erosion and formation of rills and gullies. Plant an alternative grass species if the original grass cover is not successfully established. If grass growth is impaired by winter road salt or other deicer use, re-establish the grass in the spring. Remove accumulated trash and debris prior to mowing. Check on a yearly basis and clean sediment as needed. Use hand methods (i.e., a person with a shovel) when cleaning to minimize disturbance to vegetation and underlying soils. Sediment build-up in the grass channel reduces its capacity to treat and convey the water quality event, 2-year and 10-year 24-hour storm.

Recommended Maintenance Schedule

Activity	Frequency
Remove sediment from forebay	Annually
Remove sediment from grass channel	Annually
Mow	Once a month during growing season
Repair areas of erosion and revegetate	As needed, but no less than once a year

Infiltration BMPs

Infiltration Basins

Description

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

Inspection & Maintenance

Regular maintenance is required to prevent clogging, which results in infiltration basin failure. Clogging may be due to upland sediment erosion, excessive soil compaction or low spots.

Inspections should include:

- signs of differential settlement
- cracking
- erosion
- leakage in the embankments
- tree growth on the embankments
- rip-rap condition
- sediment accumulation
- turf health

Recommended Maintenance Schedule

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

Infiltration Trenches

Description

Infiltration trenches are shallow excavations filled with stone. They can be designed to capture sheet flow or piped inflow. The stone provides underground storage for stormwater runoff. The stored runoff gradually exfiltrates through the bottom and/or sides of the trench into the subsoil and eventually into the water table.

Inspection & Maintenance

Because infiltration trenches are prone to failure due to clogging, it is imperative that they be aggressively maintained on a regular schedule. Using pretreatment BMPs will significantly reduce the maintenance requirements for the trench itself. Removing accumulated sediment from a deep sump catch basin or a vegetated filter strip is considerably less difficult and less costly than rehabilitating a trench. Eventually, the infiltration trench will have to be rehabilitated, but regular maintenance will prolong its operational life and delay the day when rehabilitation is needed. With appropriate design and aggressive maintenance, rehabilitation can be delayed for a decade or more. Remove tree seedlings, before

they become firmly established. Remove accumulated sediment, trash, debris, leaves and grass clippings from mowing. Check inlet and outlet pipes to determine if they are clogged. If the top of the trench is grassed, it must be mowed on a seasonal basis. Grass height must be maintained to be no more than four inches. Routinely remove grass clippings leaves and accumulated sediment from the surface of the trench. Inspect the trench 24 hours or several days after a rain event, to look for ponded water. If there is ponded water at the surface of the trench, it is likely that the trench surface is clogged. To address surface clogging, remove and replace the topsoil or first layer of stone aggregate and the filter fabric. If water is ponded inside the trench, it may indicate that the bottom of the trench has failed. To rehabilitate a failed trench, all accumulated sediment must be stripped from the bottom, the bottom of the trench must be scarified and tilled to induce infiltration, and all of the stone aggregate and filter fabric or media must be removed and replaced.

Recommended Maintenance Schedule

Activity	Frequency
Preventative maintenance	Twice a year
Inspect units and remove debris	Every 6 months and after every major storm
Remove sediment from pretreatment BMPs	Every 6 months and after every major storm
Inspect and clean pretreatment BMPs	Every 6 months and after every major storm (2 year return frequency)

Dry Wells

Description

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

Inspection & Maintenance

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

Recommended Maintenance Schedule

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

Subsurface Structures

Description

Subsurface structures are underground systems that capture runoff, and gradually infiltrate it into the groundwater through rock and gravel. There are a number of underground infiltration systems that can be installed to enhance groundwater recharge. The most common types include pre-cast concrete or plastic pits, chambers (manufactured pipes), perforated pipes, and galleys.

Inspection & Maintenance

Because subsurface structures are installed underground, they are extremely difficult to maintain. Remove any debris that might clog the system. Include mosquito controls in the Operation and Maintenance Plan.

Recommended Maintenance Schedule

Activity	Frequency
Inspect inlets	Twice a year
Remove any debris that might clog the system	As needed

Proprietary BMPs

Proprietary Separators

Description

A proprietary separator is a flow-through structure with a settling or separation unit to remove sediments and other pollutants. They typically use the power of swirling or flowing water to separate floatables and coarser sediments, are typically designed and manufactured by private businesses, and come in different sizes to accommodate different design storms and flow conditions. Some rely solely on gravity separation and contain no swirl chamber. Since proprietary separators can be placed in almost any location on a site, they are particularly useful when either site constraints prevent the use of other stormwater techniques or as part of a larger treatment train. The effectiveness of proprietary separators varies greatly by size and design, so make sure that the units are sized correctly for the site's soil conditions and flow profiles, otherwise the unit will not work as designed.

Inspection & Maintenance

Inspect and clean these units in strict accordance with manufacturers' recommendations and requirements. Clean the units using the method specified by the manufacturer. Vactor trucks are typically used to clean these units. Clamshell buckets typically used for cleaning catch basins are almost never allowed by manufacturers. Sometimes it will be necessary to remove sediment manually.

Recommended Maintenance Schedule

Activity	Frequency
Inspect in accordance with manufacturer requirements, but no less than twice a year following installation, and no less than once a year thereafter.	See activity
Remove sediment and other trapped pollutants at frequency or level specified by manufacturer.	Per manufacturer's schedule

Proprietary Media Filters

Description

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

Inspection & Maintenance

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

Recommended Maintenance Schedule

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

Other BMPs

Dry Detention Basin

Description

A dry detention basin is an impoundment or excavated basin for the short-term detention of stormwater runoff from a completed development that allows a controlled release from the structure at downstream, pre-development flow rates. Conventional dry detention basins typically control peak runoff for 2-year and 10-year 24-hour storms. They are not specifically designed to provide extended dewatering times, wet pools, or groundwater recharge. Sometimes flows can be controlled using an outlet pipe of the appropriate size but this approach typically cannot control multiple design storms.

Inspection & Maintenance

It is critical to provide access for maintenance, especially to the interior of the basin. Inspect dry detention basins at least once per year to ensure that they are operating as intended. Inspect basins during and after storms to determine if the basin is meeting the expected detention times. Inspect the outlet structure for evidence of clogging or outflow release velocities that are greater than design flow. Potential problems that should be checked include: subsidence, erosion, cracking or tree growth on the embankment; damage to the emergency spillway; sediment accumulation around the outlet; inadequacy of the inlet/outlet channel erosion control measures; changes in the condition of the pilot channel; and erosion within the basin and banks. Make any necessary repairs immediately. During inspections, note changes to the detention basin or the contributing watershed because these changes could affect basin performance. Mow the side slopes, embankment, and emergency spillway at least twice per year. Remove trash and debris at this time. Remove sediment from the basin as necessary, and at least once every 10 years or when the basin is 50% full. Provide for an on-site sediment disposal area to reduce the overall sediment removal costs.

Recommended Maintenance Schedule

Activity	Frequency
Inspect wet basins to ensure they are operating as designed	At least once a year.
Mow the upper-stage, side slopes, embankment and emergency spillway.	At least twice a year
Check the sediment forebay for accumulated sediment, trash, and debris and remove it.	At least twice a year.
Remove sediment from the basin.	As necessary, and at least once every 10 years

Porous Pavement

Description

Porous pavement is a paved surface with a higher than normal percentage of air voids to allow water to pass through it and infiltrate into the subsoil. This porous surface replaces traditional pavement, allowing parking lot, driveway, and roadway runoff to infiltrate directly into the soil and receive water quality treatment. All permeable paving systems consist of a durable, load-bearing, pervious surface overlying a stone bed that stores rainwater before it infiltrates into the underlying soil. Permeable paving techniques include porous asphalt, pervious concrete, paving stones, and manufactured “grass pavers” made of concrete or plastic. Permeable paving may be used for walkways, patios, plazas, driveways, parking stalls, and overflow parking areas.

Inspection & Maintenance

In most porous pavement designs, the pavement itself acts as pretreatment to the stone reservoir below. Consequently, frequent cleaning and maintenance of the pavement surface is critical to prevent clogging. To keep the surface clean, frequent vacuum sweeping along with jet washing of asphalt and concrete pavement is required. No winter sanding shall be conducted on the porous surface. As discussed, designs that include an “overflow edge” provide a backup in case the surface clogs. If the surface clogs, stormwater will flow over the surface and into the trench, where some infiltration and treatment will occur. For proper maintenance:

- Post signs identifying porous pavement areas.
- Minimize salt use during winter months. If drinking water sources are located nearby (see setbacks), porous pavements may not be allowed.
- No winter sanding is allowed.
- Keep landscaped areas well maintained to prevent soil from being transported onto the pavement.
- Clean the surface using vacuum sweeping machines monthly. For paving stones, periodically add joint material (sand) to replace material that has been transported.

- Regularly monitor the paving surface to make sure it drains properly after storms.
- Never reseal or repave with impermeable materials.
- Inspect the surface annually for deterioration or spalling.
- Periodically reseed grass pavers to fill in bare spots.
- Attach rollers to the bottoms of snowplows to prevent them from catching on the edges of grass pavers and some paving stones.

Recommended Maintenance Schedule

Activity	Frequency
Monitor to ensure that the paving surface drains properly after storms	As needed
For porous asphalts and concretes, clean the surface using power washer to dislodge trapped particles and then vacuum sweep the area. For paving stones, add joint material (sand) to replace material that has been transported.	As needed
Inspect the surface annually for deterioration	Annually
Assess exfiltration capability at least once a year. When exfiltration capacity is found to decline, implement measures from the Operation and Maintenance Plan to restore original exfiltration capacity.	As needed, but at least once a year
Reseed grass pavers to fill in bare spots	As needed

Attachments

- Constructed Stormwater BMP Inspection Form
- Figure 1: Westford Drainage System BMPs

CONSTRUCTED STORMWATER BMP INSPECTION FORM

Date of Inspection	
Start Time	

BMP Type/Description:

Structural Pretreatment

- ☐ Oil/Grit Separators
- ☐ Sediment Forebays
- ☐ Vegetated Filter Strips

Treatment

- ☐ Bioretention Areas/Rain Gardens
- ☐ Constructed Stormwater Wetlands
- ☐ Extended Dry Detention Basins
- ☐ Sand and Organic Filters
- ☐ Wet Basins

Conveyance

- ☐ Drainage Channels
- ☐ Grassed Channels
- ☐ Water Quality Swale

Infiltration

- ☐ Dry Wells
- ☐ Infiltration Basins
- ☐ Infiltration Trenches
- ☐ Subsurface Structures

Proprietary

- ☐ Proprietary Separators
- ☐ Proprietary Media Filters

Other

- ☐ Dry Detention Basin
- ☐ Porous Pavement
- ☐ Other:

BMP Address and Location on Site	
Inspector Name, Title, and Contact Information	

Type of Inspection:

☐ Routine ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event

Weather at time of this inspection:

☐ Clear ☐ Cloudy ☐ Rain ☐ Sleet ☐ Fog ☐ Snow ☐ High Winds

☐ Other: Temperature (F):

Photo(s) Taken: Yes ☐ No ☐ If Yes, describe:

Are there any discharges occurring at the time of inspection? Yes ☐ No ☐

If yes, are any physical indicators (color, turbidity, floatables, odor) present in the flow? If yes, describe below. If no, skip to "Maintenance Needs Observed."

Indicator & Description	**Relative Severity Index (1-3)**
☐ **Color present:** ☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 - Faint ☐ 2 - Clearly visible ☐ 3 - Brightly colored

CONSTRUCTED STORMWATER BMP INSPECTION FORM

Indicator & Description		**Relative Severity Index (1-3)**
☐ **Turbidity present:** ☐ Slight cloudiness ☐ Cloudy ☐ Opaque		☐ 1 - Faint ☐ 2 - Clearly visible ☐ 3 - Bright
☐ **Floatables present (does not include trash):** ☐ Sewage (toilet paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:		☐ 1 - Few/slight ☐ 2 - Some ☐ 3 - Many/obvious
☐ **Odor present**: ☐ Sewage ☐ Sulfide ☐ Rancid/sour ☐ Petroleum/gas ☐ Other:		☐ 1 - Faint ☐ 2 - Easily detected ☐ 3 - Noticeable from a distance
Maintenance Needs Observed	☐ Erosion ☐ Invasive species ☐ Dead vegetation ☐ Trash/sediment/debris ☐ Grates	☐ Filters/filter media ☐ Basins ☐ Slope integrity ☐ Cracking ☐ Clogging ☐ Standing water ☐ Deterioration ☐ Other:
Maintenance Performed Date: _____	☐ Repaired erosion ☐ Removed invasive species ☐ Pruned ☐ Removed sediment/trash/debris	☐ Reseeded ☐ Mowed ☐ Replaced vegetation ☐ Replaced media ☐ Mulched ☐ Cleaned ☐ Raked ☐ Other:
Additional Maintenance Required	Yes ☐ No ☐	If yes, describe:
Other Notes		

DUNSTABLE
TYNGSBOROUGH
LOWELL
GROTON
CHELMSFORD
LITTLETON
ACTON
CARLISLE
Forge Pond
Long Sought For Pond
Keyes Pond
Flushing Pond
Oak Hill Pond
Gilson Brook Pond
Nabnasset Pond
Grass Pond
Burges Pond
Stony Brook
Westford Station Pond
Granfville Pond
Forge Village Pond
Beaver Brook
Make Peace Road
Route 3
Chandler Road
Caldwell Drive
Morrison Lane
Vineyard Road
Stone Ridge Road
Sawmill Road
Russell's Way
North Hill Road
Tyngsboro Road
Dunstable Road
Tennyson Place
Tennyson Road
Wymans Beach Road
Flushing Pond Road
Groton Road
Lawson Road
Forrest Road
Gassett Road
Byrne Avenue
Oak Hill Road
Nabnasset Street
Grove Street
Williams Avenue
Myrtle Avenue
Brookside Road
Lake Shore Drive
Birch Road
Elm Road
Poplar Road
Pine Road
Lakeside Terrace
Cranmore Road
Newport Drive
Wing Road
Gould Road
Keyes Road
Butterfly Road
Cherry Lane
Rose Lane
Nutting Road
Access Road
Millstone Hill Road
Farmers Way
Allie Lane
Beacon Street
North Street
Maple Street
River Street
Broadway Street
Bridge Street
North Main Street
West Street
Depot Street
Almeria Circle
Tony Brook Road
Sherwood Drive
Villanova Drive
Blue Ridge Road
Stratton Hill Road
Plain Road
Pelley Road
Lillian Avenue
Lucille Avenue
Moore Road
Lowell Road
Farnces Hill Road
Hunt Road
Baldwin Road
Swedes Crossing
Chamberlain Road
Pine Hill Road
Buttonboard Drive
Fairview Drive
Douglas Road
Krisi Circle
Heywood Road
Fletcher Road
Beaver Dam Drive
Brookview Drive
Sawmill Drive
Crest Drive
Pierce Avenue
Fisher Way
Main Street
Leland Street
Providence Road
Dana Drive
Chippewa Road
Crusade Road
Court Road
Drawbridge Road
Boston Road
Crown Road
Drew Crossing
Blakes Hill Road
Nixon Road
Interstate 495
Littleton Road
Fieldstone Drive
Jefferson Road
Gage Road
South Chelmsford Road
Saint Mary Drive
Tanbuck Road
Vose Road
Sassafras Road
Old Lowell Road
Wayne Road
Griffin Road
Sleigh Road
Acton Road
Little Bear Hill Road
Mark Vincent Drive
Colonial Drive
Ashley Place
Wase Hill Road
Carlisle Road
Old Road
Landmark Road
Texas Road
Snow Drive
Trailside Way
Vinebrook Road
Power Road
Shelly Lane
Robbins Road
Banbury Drive
Monadnock Drive
Phillips Drive
Howard Road
Colson Road
Tallard Road
April Lane
May Road
Lanes End
Magnolia Drive
Honeysuckle Road
Heather Drive
Casie Lane
Butterfield Lane
True Bean Way
Christopher Road
Beaver Brook Road
Country Road
Flagg Road
Robinson Road
Hartford Road
Acorn Crossing
Hildreth Street
Patten Road
Pleasant Street
Abbot Street
Pine Street
East Prescott Street
West Prescott Street
Village View Road
Town Farm Road
Milot Road
Kylemore Drive
Pine Ridge Road
Old Homestead Road
Coldspring Road
Granfville Road
Blanchard Lane
Forge Village Road
Pierce Avenue
Broadway Street
Bridge Street
Route 3
Interstate 495

Legend

- Outfalls
- Catch Basins
- Inlets
- Manholes
- BMP Structure
- BMP Area
- Drain Pipes
- Culverts
- Major Basin Boundary
- Sub-basin Boundary
- Impervious Surface
- MassDEP Inland Wetlands
- Rivers and Streams
- Waterbody

1:18,000

0 1,500 3,000

Feet

Based on MassGIS Data and Town of Westford Data

Figure 1
Westford Drainage System BMPs

Westford, Massachusetts

August 2020

Tighe&Bond

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Appendix F

Forms

EMPLOYEE TRAINING LOG

Training Date:	
Title of Training:	
Training Duration (minutes):	
Subject(s) covered during Training: (Check items or attach copy of training materials)	
Employee(s) Trained:	**Signature:**

OPERATION & MAINTENANCE PLAN AMENDMENT LOG

Amend. No.	Description of Amendment	Date of Amendment	Prepared by (Name/Title)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Appendix G

Municipal Wastewater Asset Operation and Maintenance Plan

See Separate Link on Town Website