Stormwater Management Program (SWMP) Plan

Town of Topsfield, Massachusetts

June 2019
Revised June 30, 2023

Prepared For:

Town of Topsfield
8 West Common Street
Topsfield, MA 01983

Prepared By:

Comprehensive Environmental Inc.
41 Main Street
Bolton, MA 01740

Stormwater Management Program (SWMP) Plan Revision Log

Revision Date	Section(s) Revised	Revisions Made	Revisions Made by
June 2019	All	Original SWMP Plan prepared.	
June 30, 2023	All	Original SWMP Plan prepared.	Comprehensive Environmental Inc.

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Stormwater Management Program (SWMP) Plan Certification

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

Name: _____ Title: _____

Signature: _____ Date: _____

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1 Introduction

Topsfield is one of many Massachusetts communities regulated under the Environmental Protection Agency's (USEPA) National Pollutant Discharge Elimination System (NPDES) Phase II rule (40 CFR 122). The rule requires regulated operators of municipal separate storm sewer systems (MS4) to develop a Stormwater Management Program (SWMP) and Best Management Practices (BMPs) to reduce the impacts of stormwater discharges. The requirements are outlined in the NPDES General Permits for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts, which was signed on April 4, 2016, with an effective date of July 1, 2018, hereinafter referred to as the 2016 MS4 Permit.

This SWMP Plan describes and details the activities and measures that are being implemented to meet the terms and conditions of the permit.

1.1 Regulatory Background

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

On May 1, 2003, EPA Region 1 issued its Final General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (2003 MS4 Permit) consistent with the Phase II rule. The 2003 MS4 Permit covered "traditional" (i.e., cities and towns) and "non-traditional" (i.e., certain Federal and state agencies and/or facilities) MS4 Operators located in the states of Massachusetts and New Hampshire. This permit expired on May 1, 2008 but remained in effect until operators were authorized under the USEPA's 2016 NPDES General Permit for Stormwater Discharges from MS4 in Massachusetts, hereafter referred to as the "2016 Massachusetts MS4 Permit", "2016 Permit", "MS4 Permit, and/or "2016 MS4 Permit" which replaces the 2003 MS4 Permit.

The 2016 Massachusetts MS4 Permit was signed on April 4, 2016 with an original effective date of July 1, 2017, however was postponed by 1 year to a new effective date of July 1, 2018. The permit was cosigned by the Massachusetts Department of Environmental Protection (MassDEP) and thus is jointly regulated by EPA and MassDEP for Massachusetts permittees. After several years of litigation, the permit was updated in December 2020 with a revised effective date of January 6, 2021. Authorization to discharge was set to expire on

July 1, 2022, however, was administratively continued by EPA. The 2016 Permit remains in force and effect until a general permit is reissued at a future time.

The following sections outline how the Town of Topsfield is meeting Phase II regulatory and schedule requirements.

1.2 MS4 Program

As required by the 2016 MS4 Permit, The Town of Topsfield submitted a Notice of Intent (NOI) and required accompanying information, including endangered species, historic preservation, and an outfall map to EPA Region 1 by the September 28, 2018 deadline (**Appendix A**) requesting authorization to discharge under the new permit. Topsfield received official authorization to discharge stormwater form its MS4 on February 14, 2019. Authorization to discharge expires at June 30, 2022.

This Stormwater Management Program Plan has been developed by the Town of Topsfield to address the requirements of the 2016 MS4 Permit as a follow-up to the NOI. This SWMP Plan documents the Town of Topsfield's program, including Best Management Practices, plans, activities, and measures that have been implemented to date, those that are ongoing, and those proposed for the future to comply with the 2016 MA MS4 Permit. This is a "living" document and should be updated and/or modified as required during the permit term as the permittee's activities are modified, changed or updated to meet permit conditions during the permit term.

This permit in part requires that each permittee, or regulated community, address 6 Minimum Control Measures (MCMs). These measures include the following:

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

In addition to the 6 MCMs above, permittees must also address water quality impacts from waterbodies with approved Total Maximum Daily Loads (TMDLs) and certain impairments, generally known as water quality limited waterbodies.

1.3 Regulated Area

Requirements of the 2016 MS4 Permit are limited to a regulated area, defined as the Town's Urbanized Areas (UAs) which generally constitute the largest and most dense areas of settlement in a region. The Bureau of the Census determines UAs by applying a detailed set of published UA criteria to the latest decennial census data. Although the full UA definition is complex, the Bureau of the Census' general definition of a UA, based on population and population density, is provided below:

"An urbanized area (UA) is a densely settled core of census tracts and/or census blocks that have population of at least 50,000, along with adjacent territory containing non-residential urban land uses as well as territory with low population density included to link outlying densely settled territory with the densely settled core. It is a calculation used by the Bureau of the Census to determine the geographic boundaries of the most heavily developed and dense urban areas."

The most recent UA maps are based on the 2010 Census. **Figure 1-1** shows the UA, which covers the more developed western and most of the southern areas of the Town. Per the most recent census data, the UA covers 5,273 people out of the total Town population of 6,089 or approximately 87% of the population. The UA area increased moderately since the 2000 Census, generally including expanded areas to include most of the southern half of the Town. The UA is subject to change every 10 years based on the application of the Census definition, thus a larger area may be covered in the future.

1.4 How to Use this Plan

For the purposes of the 2016 MS4 Permit and ease of use, the Town's SWMP encompasses four separate written documents:

1. SWMP Plan (this document);
2. Illicit Discharge Detection and Elimination (IDDE) Plan (standalone document);
3. Operation and Maintenance (O&M) Plan (standalone document);
4. Nutrient Impairment Plan (standalone document that covers both TMDL and impaired waters requirements. See Section 9.)

This SWMP Plan is divided into several sections and includes the following components:

Section 2 **Town Characteristics** – Section 2 provides an overview of relevant characteristics, focusing on those aspects related to stormwater runoff and the water quality of surface waters.

Section 3 **MCM 1: Public Education and Outreach** – regulated operators of MS4s are required to implement a public education program. Section 3 discusses activities to comply with this measure.

Section 4 **MCM 2: Public Participation and Involvement** – regulated MS4s are required to obtain public participation throughout the stormwater management program. Section 4 discusses activities to comply with this measure.

Section 5 **MCM 3: Illicit Discharge, Detection, and Elimination** – regulated MS4s must develop and implement an illicit discharge detection and elimination program and develop a regulation to prohibit illicit discharges. Section 5 discusses activities to comply with this measure.

Section 6 **MCM 4: Construction Site Stormwater Runoff Control** – regulated MS4s are required to implement and enforce a program to reduce pollutants in stormwater runoff from construction activities that disturb 1 or more acres. This requires the development of a local regulation requiring implementation of proper erosion and sediment controls. Permittees are also responsible for inspections and enforcement. Section 6 discusses activities to comply with this measure.

Section 7 **MCM 5: Stormwater Management in New Development and Redevelopment** – regulated MS4s are required to develop and enforce a regulation requiring implementation of post-construction runoff controls at sites where construction activities disturb 1 or more acres. The controls must be designed to treat stormwater runoff from post-development sites and must be maintained over the long-term. Section 7 discusses activities to comply with this measure.

Section 8 **MCM 6: Good Housekeeping and Pollution Prevention** – regulated MS4s must review their operations at specific facilities and those that occur throughout the Town (i.e., catch basin cleaning and street sweeping) and make improvements where needed to minimize pollution to stormwater runoff. Staff involved in these operations must also be trained on appropriate operations and maintenance techniques. Section 8 discusses activities to comply with this measure.

Section 9 **TMDL and Impaired Waters Controls** – regulated MS4s are required to evaluate and address stormwater contributions to impaired waters. Section 9 discusses activities to comply with this measure.

Section 10 **Annual Reporting** – Section 10 provides a summary of annual reporting requirements in order to meet the 2016 MS4 Permit.

Section 11 **Implementation of Best Management Practices** – Section 11 provides a summary of BMPs outlined in Sections 3 through 9 in a concise plan for easy reference.

1.5 Program Responsibilities

This plan is intended to be used by staff whose job involves administering the MS4 permit and associated requirements. The MS4 program is headed by the following personnel:

Table 1-1. MS4 Responsible Personnel

Name	Title, Department	Contact
David M. Bond	Stormwater Coordinator	(978) 887-1542, dbond@topsfield-ma.gov
Heidi Gaffney	Conservation Administrator	(978) 887-1510, hgaffney@topsfield-ma.gov

The Town of Topsfield has 7 departments responsible for implementing portions of its MS4 program as identified in the NOI. Therefore, due to the extensive number of departments involved as part of the Town's MS4 program, it is not feasible to list names and titles of responsible personnel for each one, as the information within this plan would be frequently out of date. However, **Table 1-2** provides a list of responsible departments and their general responsibilities within the MS4 program. The responsible person is the most senior person (e.g. department head, administrator, senior elected official, etc.) within each department listed below.

Table 1-2. Program Responsibilities

Department / Division	
Conservation Commission	Information distribution for public education; school curricula program; social media campaign; public participation; site inspections and enforcement of erosion controls; bylaw and regulation development.
DPW	IDDE legal authority; system mapping; SSO inventory; IDDE training; target properties to reduce impervious areas; develop operation and maintenance procedures; catch basin cleaning and street sweeping; winter road maintenance program; develop and implement SWPPPs for regulated facilities; inspect and maintain stormwater treatment structures; TMDL and impaired waters requirements
Greenscapes North Shore Coalition	Information distribution for public education; social media campaign; public participation.
Planning Board	Bylaw and regulation development; site plan review procedures; site inspections and enforcement procedures; street design, LID, and green infrastructure evaluation; site plan review procedures, site inspections and enforcement of erosion controls; as-built submittal.
Stormwater Coordinator	Information distribution for public education; IDDE program creation and implementation; IDDE training; system mapping; dry and wet weather sampling; site inspections and enforcement of erosion controls; bylaw and regulation development; develop operation and maintenance procedures; TMDL and impaired waters requirements
Town Manager/Mayor's Office	Public participation
Zoning Board	Bylaw and regulation development; street design, LID, and green infrastructure evaluation; as-built submittal.

2 Town Characteristics

This section provides some background information on the Town of Topsfield, Massachusetts, useful in understanding the Town's characteristics and resources to develop a tailored Stormwater Management Plan. Town characteristics are described below.

2.1 Community Information

Topsfield is a landlocked community located in northeastern Massachusetts within Essex County. It is generally bordered by Teal Pond on the east, with Hamilton directly across the pond on the east, Wenham to the southeast, Ipswich to the northeast, Boxford to the northwest, Middleton to the southwest, and Danvers to the south. It lies within the Ipswich River watershed. Select relevant community profile information is provided below:

- Total Area = 12.8 square miles *(source: Wikipedia)*
- 2010 Population = 6,089 *(source: EPA maps based on 2020 US Census)*
- Regulated Area Population = 5,273 *(source: EPA maps based on 2020 US Census)*

2.2 Demographics

Demographics play a role in developing a public education program that targets the appropriate audience through the most appropriate means. Information on owner occupancy versus rentals and languages spoken can help shape how information is disseminated. Demographic data from the U.S. Census Bureau's 2020 Census and 2016 American Community Survey indicate that the majority of homes (88.1%) in Topsfield are owner-occupied, and the majority of the population (90.5%) speaks English. Therefore, the Public Education and Outreach Program can proceed with disseminating its materials in English and be reasonably certain that any materials distributed to homes reaches permanent residents and homeowners.

2.3 Land Use

The land uses within the regulated area of the Town of Topsfield are shown on **Figure 2-1** and provided below. Impervious area is shown on **Figure 2-2**.

- Residential 23%
- Commercial 3%
- Industrial <1%
- Agriculture 9%
- Forest 43%
- Water <1%
- Wetlands 14%
- Disturbed land <1%
- Other cleared land 6%

As per the above, Topsfield has substantial forest, wetlands, water, and open land (73%) with much of the remaining consisting of low-density residential development (23%). Remaining land use (4%) consists mostly of minor commercial and industrial development.

2.4 303(d) Impaired Waterbodies

The ultimate goal of this Stormwater Management Plan is to outline a program to effectively maintain the Town's stormwater infrastructure and to improve the water quality of receiving waters (waters which receive stormwater discharges from the MS4) in compliance with the 2016 MS4 Permit. 303(d) impaired waters are those surface waters identified by the MassDEP as priority waters that do not meet water quality criteria. As part of the 2016 MS4 Permit, communities must implement BMPs to address all 303(d) waters and specifically address those that have a completed TMDL study. **Table 2-1** lists the "impaired waters" partially or wholly located within the boundaries of Topsfield's regulated area based on the Final Massachusetts Integrated List of Waters produced by MassDEP every 2 years[1]. These waters are shown in **Figure 2-3**. Topsfield will review changes as new lists are published and update this plan as required.

Table 2-1. Impaired Waters

Waterbody Name	Segment ID and Category		Impairment(s)	Approved TMDL[2]
Fish Brook	MA92-14	5	Escherichia coli	
Hood Pond	MA92025	4a	Mercury	33880
Howlett Brook	MA92-17	5	Escherichia coli	
			Fecal Coliform	
Ipswich River	MA92-06	5	(Dewatering*)	
			Dissolved Oxygen	
			Mercury in Fish Tissue	
Ipswich River	MA92-15	5	(Dewatering*)	
			Dissolved Oxygen	
			Mercury in Fish Tissue	
			Fish Bioassessments	

Category 4a Waters – impaired waters with a completed TMDL.
Category 5 Waters – impaired waters that require a TMDL.

Note that although Topsfield has a waterbody with an approved TMDL for mercury, as well as waterbodies listed as impaired for dissolved oxygen and fish bioassessments, the 2016 MS4 Permit does not specify a waste load allocation or other requirements for MS4 discharges. Topsfield is meeting the remaining requirements for water quality limited waterbodies related to bacteria as outlined further in Section 9.

[1]Note that at the time of preparation of this report, the 2018/2020 303d List is the most up to date finalized version.
[2]"Approved TMDLs" are those that have been approved by EPA as of the date of issuance of the 2016 MS4 Permit.

2.5 Measures to Protect Surface Drinking Water Supplies

All public drinking water is obtained from wells and there are no surface water supplies or tributaries within the Town. The town does not currently plan on using any surface waterbodies for public drinking water supplies in the near future and implementation of the SWMP helps protect water quality in all receiving waterbodies.

2.6 Endangered Species Act Determination

In order to be eligible to discharge stormwater under the 2016 MS4 Permit, the Town of Topsfield must certify that its stormwater system is not impacting federally listed rare or endangered species habitat or other critical environmental locations. This was completed in the summer of 2016 as meeting "Criterion C" on the Notice of Intent with the results documented in **Appendix A**. The Northern Long-eared Bat *(Myotis septentrionalis)* was identified as potentially being present within Topsfield's regulated areas. No critical habitats were identified.

2.7 National Historic Preservation Act Determination

Regulated MS4s must also evaluate whether its discharges have the potential to affect historic properties. The MS4 Permit typically authorizes discharges from existing facilities and requires control of the pollutants discharged from the facility, however, EPA does not anticipate effects on historic properties from the pollutants in the authorized discharges. Thus, to the extent EPA's issuance of the MS4 General Permit authorizes discharges of such constituents, confined to existing channels, outfalls or natural drainage areas, the permitting action does not have the potential to cause effects on historical properties. If there have been no relevant changes in operation of the MS4 since the 2003 MS4 General Permit, the discharge can still be considered to have no potential to have an effect on historic properties. This has been documented as "Criterion A" on the Notice of Intent (**Appendix A**) and thus no additional information is required for documentation.

Where there is disturbance of land through the construction and/or installation of control measures, there is a possibility that artifacts, records, or remains associated with historic properties could be impacted. In these cases, such as during future construction of structural stormwater BMPs, the Town will need to ensure that historic properties will not be impacted by their activities, or that they are in compliance with a written agreement with the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO), or other tribal representative that outlines all measures the applicant will carry out to mitigate or prevent any adverse effects on historic properties. This will be completed as required during a later date(s).

3 MCM 1: Public Education and Outreach

3.1 Summary of Permit Requirements

3.1.1 Core Permit Requirements

Under MCM 1, permittees must develop an educational program, define educational goals, express specific messages, define the targeted audience for each message, and identify responsible parties for program implementation. At a minimum, the program must provide information concerning the impact of stormwater discharges on water bodies within the community, especially those waters that are impaired or identified as priority waters. The program must identify steps and/or activities that the public can take to reduce the pollutants in stormwater runoff and their impacts to the environment.

Permittees must address 4 core target audiences, unless 1 of these audiences is not present in the MS4 community. The targeted audiences and educational topics requiring consideration under the permit are outlined below:

1. Residents
   - Effects of outdoor activities such as lawn care (use of pesticides, herbicides, and fertilizers) on water quality;
   - Benefits of appropriate on-site infiltration of stormwater;
   - Effects of automotive work and car washing on water quality;
   - Proper disposal of swimming pool water;
   - Proper management of pet waste; and
   - Maintenance of septic systems.

2. Businesses, Institutions, and Commercial Facilities
   - Proper lawn maintenance (use of pesticides, herbicides and fertilizer);
   - Benefits of appropriate on-site infiltration of stormwater;
   - Building maintenance and storage of materials;
   - Proper use and storage of salt or other de-icing and anti-icing materials;
   - Proper management of waste materials and dumpsters;
   - Proper management of parking lot surfaces;
   - Proper car care activities; and
   - Proper disposal of swimming pool water by entities such as motels, hotels, and health and country clubs.

3. Developers and Construction
   - Proper sediment and erosion control management practices;
   - Information about Low Impact Development (LID) principles and technologies; and
   - Information about EPA's construction general permit (CGP).

4. Industrial facilities
    - Equipment inspection and maintenance;
    - Proper storage of industrial materials (emphasizing pollution prevention);
    - Proper management of dumpsters;
    - Minimization of use of salt or other de-icing/anti-icing materials;
    - Proper storage of salt or other de-icing/anti-icing materials;
    - Benefits of appropriate on-site infiltration of stormwater runoff from areas with low exposure to industrial materials such as roofs or employee parking;
    - Proper maintenance of parking lot surfaces (sweeping); and
    - Requirements for coverage under EPA's multisector general permit (MSGP).

At least 2 educational messages must be distributed to each audience over the permit term spaced at least a year apart. See sections below for more information.

3.1.2 TMDL & Impaired Waters Requirements

Public education and outreach programs must also address impaired waterbodies or those identified as priority waters. As noted in **Table 2-1**, Topsfield has several waterbodies throughout the community that are listed as impaired for bacteria which are considered high priority. Therefore, relevant public information on bacteria topics as outlined in the 2016 MS4 Permit, and summarized below, are included within the education program:

- Annual message encouraging the proper management of pet waste, including noting any existing ordinances where appropriate;
- Distribute educational materials to dog owners with license issuance or renewal;
- Describe detrimental impacts of improper pet waste management, requirements for waste collection and disposal, and penalties for non-compliance; and
- Provide information to owners of septic systems about proper maintenance.

Due to the extent of impaired waters present throughout the Town, each message will be distributed community-wide. For details, see the following sections.

3.2 Objectives and Goals

The Town of Topsfield implements an education program that includes educational goals based on stormwater issues of significance within the MS4 area, increase knowledge, and change behavior of the public so that pollutants in stormwater are reduced.

3.3 Public Education Program

The Town of Topsfield is a member of the Greenscapes North Shore Coalition (www.greenscapes.org) which is a collaborative of municipalities and partner organizations, focusing on stormwater and watershed related issues. Specifically, Greenscapes provides outreach and education to support municipal compliance with water-related regulatory requirements, including the MS4 Stormwater and the Water Management Act permits.

Tables 3-1 through **3-4** summarize Topsfield's public education program, by targeted audience, to meet the requirements of the 2016 MS4 Permit.

3.4 Measuring Public Education Program Effectiveness

During completion of the Town's annual report as detailed further under **Section 10**, Topsfield reviews the effectiveness of each message and the Town's overall education program. Effectiveness is expected to vary by message, however is generally measured based on the number of students reached, quantities of materials distributed, and feedback from town employees based on observations in their area of work. Educational messages and/or distribution techniques are modified as needed, should program managers determine that they are ineffective. The table below provides a summary of public education and outreach programs for each of the four required audiences.

Table 3-1. Residential Public Outreach

BMP	BMP Description	Responsible Parties	Measurable Goal
Keeping Water Clean School Program	Program engages 5th grade students in several activities designed to raise their stormwater and water conservation awareness. Students learn about what a watershed is, what stormwater, groundwater and wastewater are, how they can negatively or positively impact these water systems, along with more details about each system and how it should be protected/maintained.	Conservation Commission	Conducted at all 5th grade classes in Topsfield.
Yard Waste Management	Social media describing the best ways to properly dispose of leaf litter and yard waste, keeping your yard clean and our water resources safe. Composting leaves, leaving them on the lawn for nutrient deposition, or having them picked up by the Town are described as good options	Greenscapes North Shore Coalition, Stormwater Coordinator	Sent to 70 municipal contacts for further dissemination, posted on partner social media platforms (Facebook and Twitter) and available at www.greenscapes.org//resources-social-media/

Table 3-1 (continued). Residential Public Outreach

BMP	BMP Description	Responsible Parties	Measurable Goal
Keep Drains Clean	Social media post describing the importance of keeping storm drains clear of leaf debris and litter.	Greenscapes North Shore Coalition, Stormwater Coordinator	Sent to 70 municipal contacts for further dissemination, posted on partner social media platforms (Facebook and Twitter) and available at www.greenscapes.org/resources-social-media/
New Greenscapes Guides	A revised version of the comprehensive Greenscapes Guide. A new 24-page magazine (PDF) outlining the importance of small-scale stormwater management and sustainable landscaping. Project ideas, plant suggestions and best practices included.	Conservation Committee, Planning Board	Distribute to residents via mailable flyer.

Table 3-2. Businesses, Institutions, and Commercial Public Outreach

BMP	BMP Description	Responsible Parties	Measurable Goal
Rain Garden Brochure	Informational brochure on the function and importance of Rain Gardens and stormwater filtration. Construction instructions and plant suggestions also included.	Stormwater Coordinator	500 made available in Town Hall. Distributed by Salem Sound Coastwatch and Ipswich River Watershed Association at many community events. PDF available for download at www.greenscapes.org/resources-brochures/
Stormwater webpage	Provide relevant information and links for viewing and/or download from Greenscapes webpage.	Greenscapes North Shore Coalition	Creation of website with periodic updates

Table 3-3. Developers and Construction Public Outreach

BMP	BMP Description	Responsible Parties	Measurable Goal
LID Workshop	Workshop/Seminar reintroduced the basics of low impact development and its importance. MS4 requirements, as they relate to LID were discussed and Fred Civian (MassDEP) provided tips for designing and passing municipal ordinances to promote LID.	Greenscapes North Shore Coalition	Attended by 35. Presentation PDF and "Tip Sheet" sent to municipal contacts and was temporarily available on Greenscapes website.
Greenscapes Table Events	Provided Greenscapes informational brochures at Town gatherings including Strawberry Festival and Grow Spring Expo.	Greenscapes North Shore Coalition	Communication with over 6,000 attendees.
Stormwater Webpage	Provide relevant information and links for viewing and/or download from Greenscapes webpage.	Greenscapes North Shore Coalition	Creation of website with periodic updates

Table 3-4. Industrial Public Outreach

BMP	BMP Description	Responsible Parties	Measurable Goal
Stormwater Webpage	Provide relevant information and links for viewing and/or download from Town webpage	Greenscapes North Shore Coalition	Creation of website with periodic updates
Social Media	Provide relevant information to different audiences via various social media platforms	Greenscapes North Shore Coalition	Follow statewide "Think Blue" campaign on social media platforms

4 MCM 2: Public Participation & Involvement

4.1 Summary of Permit Requirements

Under MCM 2, permittees must provide annual opportunities for public participation in the review and implementation of the Town's SWMP as part of a public education and involvement program. All public involvement activities must comply with state public notice requirements. The SWMP and annual reports must also be made available so that the public has opportunities to review and comment.

4.2 Objectives and Goals

Topsfield implements a public participation and involvement program that provides opportunities for review and implementation of the Town's SWMP. This helps support public education and outreach items under MCM 1.

4.3 Public Participation and Involvement Opportunities

The following outlines how Topsfield is meeting permit requirements to provide the public with opportunities to participate in reviewing and implementing the SWMP.

4.3.1 Make Documents Publicly Available for Comment

Topsfield makes this written SWMP Plan and annual reports available for review and comment via the Town's website, along with the name, email address and/or phone number of a contact person from the Town government to request additional information or submit comments. This allows the public to comment on the program at least once per year. An updated SWMP Plan is posted to the website annually as additional tasks are completed. The following table shows the BMP, responsible parties and measurable goals.

Table 4-1. BMP Description – Make Documents Publicly Available for Comment

BMP Description	Responsible Parties	Measurable Goal
BMP 2-1: Make SWMP Plan Publicly Available	Stormwater Coordinator	Stormwater Management Plan is publicly available. Stormwater Committee/Task Force allow annual review of Stormwater plan and posting of stormwater management plan on website

4.3.2 Household Hazardous Waste/Used Oil Collection

The Town sponsors at least 1 event annually during which residents can drop off household hazardous waste for proper disposal. The following table shows the BMP, responsible parties and measurable goals.

Table 4-2. BMP Description – Household Hazardous Waste Collection

BMP Description	Responsible Parties	Measurable Goal
BMP 2-2: Household Hazardous Waste Collection Event	Town Manager / Mayor's Office	Reduce available hazardous compounds that could leak into groundwater and surface waters

4.3.3 Public Comment

The Town provides contact information for reporting of illicit discharges or other concerns. The following table shows the BMP, responsible parties and measurable goals.

Table 4-3. BMP Description – Stormwater Management Program Development

BMP Description	Responsible Parties	Measurable Goal
BMP 2-3: Hotline/Webline Reporting Problems/Violations	Town Manager / Mayor's Office	Annual public input provided

5 MCM 3: Illicit Discharge, Detection, and Elimination

5.1 Summary of Permit Requirements

Under MCM 3, permittees must implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its MS4 and implement procedures to prevent such discharges. A summary of the required IDDE activities and timelines are provided below. See sections below for more information.

5.1.1 Legal Authority

The IDDE program shall include adequate legal authority in the form of a currently effective ordinance, bylaw, or other regulatory mechanism to prohibit, investigate, and eliminate illicit discharges. For permittees authorized by the MS4-2003 permit such as Topsfield, the ordinance, bylaw, or other regulatory mechanism was required to be effective by May 1, 2008.

5.1.2 Sanitary Sewer Overflow

Regulated communities must identify all known locations where SSOs have discharged to the MS4 during the previous 5-years and update it annually. Upon detection of an SSO, the permittee must eliminate it as quickly as possible and take interim mitigation measures to minimize or eliminate the discharge of pollutants until remediation work is complete.

5.1.3 System Mapping

Regulated communities must complete a comprehensive map of their stormwater system in 2 phases. Phase 1 must be completed within 2 years and include infrastructure such as outfalls and preliminary catchment delineations, waterbodies, open channel conveyances, interconnections with other MS4s, and structural stormwater BMPs. Phase 2 must be completed within 10 years and include information such as outfalls with high accuracy GPS location and refined catchment delineations, catch basins, manholes, pipe connectivity, and sanitary or combined sewer systems as available/applicable.

5.1.4 Illicit Discharge, Detection, and Elimination Program

The 2016 MS4 Permit requires preparation of a comprehensive written IDDE Program or IDDE Plan that provides detailed procedures for assessment and priority ranking of outfalls and interconnections, dry and wet weather outfall sampling, catchment investigation procedures, system vulnerability factor (SVF) assessment, identification of an illicit discharge, illicit discharge removal, and ongoing screening requirements. The written IDDE Program must be prepared as a standalone IDDE Plan separate from this SWMP Plan.

5.1.5 Annual IDDE Training

The 2016 MS4 Permit requires annual IDDE training to be provided to all employees involved in the IDDE program. Training must, at a minimum, include information on how to identify illicit discharges and SSOs and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program.

5.2 Objectives and Goals

The Town of Topsfield implements an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its MS4 and implement procedures to prevent such discharges. The ultimate goal is to remove sources of pollution and improve water quality in receiving waterbodies.

5.3 IDDE Program

The following sections outline how Topsfield is meeting the requirements of the 2016 MS4 Permit to implement an IDDE program to locate, eliminate, and prohibit illicit discharges.

5.3.1 Establish Legal Authority

Requirements
Permittees must develop an ordinance, bylaw or regulatory mechanism to:

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

Work to be Performed
The Town of Topsfield has established an "Illicit Connections and Discharges to Storm Sewer System" bylaw under Chapter 216 Storm Drains, Article I, Sections 216-1 to 216-13, dated May 4, 2010 which addresses all of the above legal requirements in order to create an IDDE program to satisfy the 2016 MS4 Permit, and is provided under **Appendix B**. The following table shows the BMP, responsible parties and measurable goals.

Table 5-1. BMP Description – Establish IDDE Legal Authority

BMP Description	Responsible Parties	Measurable Goal
BMP 3-1: Enforce Current IDDE Bylaw	DPW	Continue enforcing existing IDDE bylaw, created May 4, 2010

5.3.2 Complete System Mapping

Requirements
The 2016 MS4 Permit requires the storm system map to be updated in 2 phases. Phase I mapping must be completed within 2 years of the effective date of the permit (July 1, 2020) and include the following information:

- Outfalls and receiving waters (previously required by the MS4-2003 permit);
- Open channel conveyances (swales, ditches, etc.);
- Interconnections with other MS4s and other storm sewer systems;
- Municipally owned stormwater treatment structures;
- Waterbodies identified by name with a list of impairments as identified on the most recent EPA approved Massachusetts Integrated List of Waters report; and
- Initial catchment delineations based on topography or contributing structures.

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

- Outfall locations (latitude and longitude with a minimum accuracy of +/-30 feet);
- Pipe connectivity;
- Manholes;
- Catch basins;
- Refined catchment delineations based on updated mapping information;
- Municipal sanitary sewer system; and
- Municipal combined sewer system.

Work to be Performed
The Town of Topsfield has mapped much of its stormwater system and current mapping status is provided in **Appendix C**. All information is incorporated into its GIS library and where applicable, GIS information can be exported into other formats. The Town of Topsfield will continue to update its stormwater mapping by the required deadlines to include the above information. The following table shows the BMPs, responsible parties and measurable goals.

Table 5-2. BMP Description – Complete System Mapping

BMP Description	Responsible Parties	Measurable Goal
BMP 3-2: Phase I Storm Sewer System Map	DPW; Stormwater Coordinator	Complete preliminary system map within 2 years of effective date of permit
BMP 3-3: Phase II Storm Sewer System Map	DPW; Stormwater Coordinator	Complete full system map 10 years after effective date of permit

5.3.3 Complete Sanitary Sewer Overflow Inventory

Requirements

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

Work to be Performed

The Town of Topsfield completed an inventory of SSOs that have discharged to the MS4 within the 5 years prior to submitting the Year 1 Annual Report to EPA. According to the results of that inventory, there were no known SSOs to surface water or into the MS4 during those 5 years. The inventory is also included in the IDDE Plan, including the status of mitigation and corrective measures to address each identified SSO. The inventory is updated annually as part of the Town's annual report submittal to EPA in September of each year. The following table shows the BMP, responsible parties and measurable goals.

Table 5-3. BMP Description – Generate SSO Inventory

BMP Description	Responsible Parties	Measurable Goal
BMP 3-4: Complete SSO Inventory	DPW	Develop SSO inventory and complete within 1 year of effective date of permit. Annually track SSOs and update inventory as needed.

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

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

The MassDEP contacts are:

- MassDEP Northeast Region, 205B Lowell St., Wilmington, MA 01887; (978) 694-3215

The EPA contacts are:

- EPA New England, 5 Post Office Square, Boston, MA 02109; (617) 918-1510

5.3.4 Develop and Implement Written IDDE Program

Requirements
The Town of Topsfield must develop an IDDE Program, the majority of which is contained in a written Illicit Discharge, Detection, and Elimination Plan, a standalone document separate from this SWMP Plan. The IDDE Plan must include a statement of responsibilities and detailed written procedures for the following:

- Assessment and priority ranking of outfalls and interconnections;
- Dry and wet weather outfall sampling;
- Catchment investigation procedures;
- System vulnerability factor (SVF) assessment;
- Identification of an illicit discharge;
- Illicit discharge removal; and
- Ongoing screening requirements.

Work to be Performed
Topsfield has developed a written IDDE Plan as a separate standalone document to address the illicit discharge requirements of the 2016 MS4 Permit. Topsfield is working towards implementing a comprehensive IDDE Plan and program, according to the schedule set forth in the permit. The following table shows the BMPs, responsible parties and measurable goals.

Table 5-4. BMP Description – IDDE Program and Implementation

BMP Description	Responsible Parties	Measurable Goal
BMP 3-5: Written IDDE Program	Stormwater Coordinator	Create written IDDE program within 1 year of the effective date of the permit and update as required
BMP 3-6: Outfall / Interconnection Inventory and Ranking	Stormwater Coordinator	Classify and rank outfalls and interconnections within 3 years of the effective date of the permit.
BMP 3-7: Implement IDDE Program	Stormwater Coordinator	Implement catchment investigations and complete within 10 years of the effective date of the permit

5.3.5 Perform Dry and Wet Weather Outfall Screening

Requirements

Outfalls and contributing catchment areas must be categorized into Problem, High, Low, and Excluded outfalls and then ranked within each category. Additionally, catchments draining to each of the waterbodies designated as impaired for pathogens must be classified as either "Problem Catchments" or "High" priority as outlined further in Section 9. The 2016 MS4 Permit then requires all outfalls classified as High and Low to be inspected for the presence of dry conditions within 3 years of the permit effective date. While completing screening, permittees must also document various physical indicators of the outfall and sample flowing outfalls. Additionally, outfalls with at least 1 SVF must also be sampled during wet weather. Depending on the results, additional screening and sampling may be required further up into the contributing catchment. Once dry and wet weather sampling is complete, additional ongoing screening shall be performed once every 5 years in accordance with the catchment prioritization and ranking. Both dry and wet weather outfall screening must be conducted in accordance with screening procedures outlined in the written IDDE Plan. All sampling results shall be reported in the permittee's annual report.

Work to be Performed

Topsfield developed an outfall sampling program under the IDDE Plan which is being implemented moving forward according to the schedule outlined in the 2016 MS4 Permit. This includes dry and wet weather screening on Town outfalls, including those with SVFs where applicable. Known outfalls were evaluated during dry weather conditions in November 2022 and none of the sampling data collected from flowing outfalls met the Permit criteria as being highly likely to contain illicit discharges from sanitary sources. Results are documented in the standalone IDDE Plan.

Wet weather screening on Town outfalls, including those with SVFs, will be completed at a later date where applicable. The program will be performed in accordance with the written procedures and schedules in the IDDE Plan. Ongoing screening will also be performed after the conclusion of the initial sampling rounds. The following table shows the BMPs, responsible parties and measurable goals.

Table 5-5. BMP Description – Perform Outfall Screening

BMP Description	Responsible Parties	Measurable Goal
Dry Weather Screening	Stormwater Coordinator	Complete in accordance with outfall screening procedure within 3 years of the effective permit date
Wet Weather Screening	Stormwater Coordinator	Complete in accordance with outfall screening procedure within 10 years of the effective permit date
Ongoing Screening	Stormwater Coordinator	Conduct ongoing dry and wet weather outfall screening upon completion of the IDDE program

5.3.6 Perform Annual IDDE Training

The 2016 MS4 Permit requires annual IDDE training to be provided to all employees involved in the IDDE program. Therefore, Topsfield provides annual training that at a minimum includes information on how to identify illicit discharges and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program. The Department of Public Works and Stormwater Coordinator are the sole municipal departments responsible for implementing the IDDE program, and training focuses on these departments. Frequency and type(s) of training are included in the annual report. The following table shows the BMP, responsible parties and measurable goals.

Table 5-6. BMP Description – Perform Annual IDDE Training

BMP Description	Responsible Parties	Measurable Goal
Perform IDDE Training	Department of Public Works, Stormwater Coordinator	Complete annual training

5.4 Measuring IDDE Program Effectiveness

The success of the IDDE Program is evaluated according to the following parameters:

- Storm system mapping progress;
- Number of SSOs and illicit discharges identified and removed;
- Number and percent of total outfall catchments served by the MS4 evaluated using the catchment investigation procedures;
- Updated SVF and catchment inventory and ranking;
- Dry weather and wet weather screening and sampling results;
- Estimated volume or quantity of sewage removed; and
- Number of employees successfully trained on IDDE.

The above items are tracked throughout the year and reported as part of each annual report submitted to EPA each year by September 28.

6 MCM 4: Construction Site Stormwater Runoff Control

6.1 Summary of Permit Requirements

Under MCM 4, permittees are required to implement and enforce a program to reduce pollutants in stormwater runoff discharged to the MS4 from all construction activities that result in a land disturbance of greater than or equal to 1 acre within the regulated area. This program shall also regulate disturbances less than 1 acre if they are part of a larger common plan of development or sale that would disturb 1 or more acres. A summary of the required Construction Site Stormwater Runoff Control Program activities and timelines are provided below:

6.1.1 Legal Authority

The Construction Site Stormwater Runoff Control Program shall include adequate legal authority in the form of a currently effective ordinance, bylaw, or other regulatory mechanism to:

- Require the use of sediment and erosion control practices at construction sites; and
- Include controls for other wastes on construction sites.

For permittees authorized by the MS4-2003 permit such as Topsfield, the ordinance, bylaw, or other regulatory mechanism was required to be effective by May 1, 2008.

6.1.2 Construction Site Stormwater Runoff Control Program

The 2016 MS4 Permit requires preparation of a written Construction Site Stormwater Runoff Control Program procedures that includes pre-construction site plan review and onsite construction inspections. Permittees must also establish requirements for developers to implement a Sediment and Erosion Control Program as part of its Construction Site Stormwater Runoff Control Program that includes BMPs to reduce pollutant sources from construction sites. This program should also include requirements for controlling other wastes during construction.

6.2 Objectives and Goals

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

6.3 Construction Site Stormwater Runoff Control Program

The following sections outline how Topsfield is meeting the requirements of the 2016 MS4 Permit to establish a Construction Site Stormwater Runoff Control Program.

6.3.1 Establish Legal Authority

Requirements
Permittees must develop an ordinance, bylaw or regulatory mechanism to:

- Require the use of sediment and erosion control practices at construction sites;
- Include controls for other wastes on construction sites.

Work to be Performed
The Town of Topsfield has established a "Stormwater Management and Erosion Control" bylaw under Section 220, Part II of the Town's general bylaws, (adopted May 8, 2021) and accompanying "Stormwater and Erosion Control Regulations" (March 19, 2013) which regulate construction projects greater than 1 acre and is provided under **Appendix B**. The bylaw and accompanying regulations in part requires use of soil erosion and sediment controls to stormwater runoff at construction sites, and also includes controls for other wastes at construction sites. The following table shows the BMP, responsible parties and measurable goals

Table 6-1. BMP Description – Establish Sediment and Erosion Control Ordinance

BMP Description	Responsible Parties	Measurable Goal
BMP 4-1: Develop and Enforce sediment and erosion control	Planning Board	Complete bylaw within 1 year of the effective date of the permit

6.3.2 Establish Written Procedures for Site Plan Review

The 2016 MS4 Permit requires the development of written procedures for site inspections and enforcement actions to take place both during construction of BMPs and after construction of BMPs is completed to ensure they are working as described in the approved plans. Procedures must define the following:

- Who is responsible for site inspections;
- Qualifications necessary to perform inspections;
- Who has authority to implement enforcement procedures;
- Ability to impose sanctions to ensure program compliance;
- The use of standardized inspection forms (if appropriate); and
- How to track the number inspections and enforcement actions for reporting in the Annual Report.

Work to be Performed
The Town of Topsfield has established a "Stormwater Management and Erosion Control" bylaw under Section 220, Article II of the Town's general bylaws, (adopted May 8, 2021) and accompanying "Stormwater and Erosion Control Regulations" (adopted March 19, 2013) which regulate construction projects greater than 1 acre and is provided under **Appendix B**. The bylaw and accompanying regulations in part provide written procedures for reviewing plan submittals, including plans, calculations, and other items as required by the permit. The following table shows the BMP, responsible parties and measurable goals.

Table 6-2. BMP Description – Establish Site Inspections and Enforcement Procedures

BMP Description	Responsible Parties	Measurable Goal
BMP 4-2: Develop Written Procedures for Site Plan Review	Planning Board	Establish procedures for site inspections and enforcement within 1 year of the effective date of the permit

6.3.3 Establish Procedures for Site Inspections and Enforcement

Requirements
Permittees must establish requirements for construction site operators performing land disturbance activities within the MS4 jurisdiction that result in stormwater discharges to the MS4 to implement a sediment and erosion control program that includes BMPs appropriate for the conditions at the construction site. Examples of sediment and erosion control measures for construction sites include local requirements to:

1. Minimize the amount of disturbed area and protect natural resources;
2. Stabilize sites when projects are complete or operations have temporarily ceased;
3. Protect slopes on the construction site;
5. Protect all storm drain inlets and armor all newly constructed outlets;
6. Use perimeter controls at the site;
7. Stabilize construction site entrances and exits to prevent off-site tracking;
8. Inspect stormwater controls at consistent intervals.

Work to be Performed
The Town of Topsfield has established a "Stormwater Management and Erosion Control" bylaw under Section 220, Part II of the Town's general bylaws, (adopted May 8, 2021) and accompanying "Stormwater and Erosion Control Regulations" (adopted March 19, 2013) which regulate construction projects greater than 1 acre and is provided under **Appendix B**. The bylaw and accompanying regulations in part provide written procedures for site inspections, enforcement actions, and outlines qualified personnel. The following table shows the BMPs, responsible parties and measurable goals.

Table 6-3. BMP Description – Establish Site Inspections and Enforcement Procedures

BMP Description	Responsible Parties	Measurable Goal
BMP 4-3: Develop Written Procedures for Site Inspections and Enforcement	Conservation Commission; Stormwater Coordinator	Establish procedures for site inspections and enforcement within 1 year of the effective date of the permit

6.3.4 Establish a Sediment and Erosion Control Program

Requirements

Permittees must establish requirements for construction site operators performing land disturbance activities within the MS4 jurisdiction that result in stormwater discharges to the MS4 to implement a sediment and erosion control program that includes BMPs appropriate for the conditions at the construction site. Examples of sediment and erosion control measures for construction sites include local requirements to:

1. Minimize the amount of disturbed area and protect natural resources;
2. Stabilize sites when projects are complete or operations have temporarily ceased;
3. Protect slopes on the construction site;
9. Protect all storm drain inlets and armor all newly constructed outlets;
10. Use perimeter controls at the site;
11. Stabilize construction site entrances and exits to prevent off-site tracking;
12. Inspect stormwater controls at consistent intervals.

Work to be Performed

The Town of Topsfield has established a "Stormwater Management and Erosion Control" bylaw under Section 220, Part II of the Town's general bylaws, (adopted May 8, 2021) and accompanying "Stormwater and Erosion Control Regulations" (adopted March 19, 2013) which regulate construction projects greater than 1 acre and is provided under **Appendix B**. The following table shows the BMPs, responsible parties and measurable goals.

Table 6-4. BMP Description – Develop an Erosion and Sediment Control Program

BMP Description	Responsible Parties	Measurable Goal
BMP 4-4: Establish a Sediment and Erosion Control Program	Planning Board	Establish procedures for development of an erosion and sediment control program within 1 year of the effective date of the permit
BMP 4-5: Develop Procedures for Waste Control	Planning Board	Establish procedures for development of an erosion and sediment control program within 1 year of the effective date of the permit

7 MCM 5: Stormwater Management in New Development and Redevelopment

7.1 Summary of Permit Requirements

Under MCM 5, permittees shall develop, implement, and enforce a program to address post-construction stormwater runoff from new development and redevelopment sites that disturb 1 or more acres and discharge into an MS4 system. This program shall also regulate disturbances less than 1 acre if they are part of a larger common plan of development or sale that would disturb 1 or more acres. A summary of the required Stormwater Management in New Development and Redevelopment, also known as Post Construction Stormwater Management, activities and timelines are provided below:

7.1.1 Legal Authority

The Post Construction Stormwater Management Program shall include adequate legal authority in the form of a currently effective ordinance, bylaw, or other regulatory mechanism to:

- Require LID site planning and design strategies;
- Meet many of the requirements of the Massachusetts Stormwater Handbook and associated stormwater standards;
- Incorporate runoff volume storage and/or pollutant removal requirements; and
- Meet additional requirements for TMDL and water quality limited waterbodies.

Updates must be made within 3 years of the effective permit date.

7.1.2 As-Built Submittals

The permittee must require the submission of as-built drawings within 3 years after completion of construction projects and include structural and non-structural controls.

7.1.3 Operation and Maintenance

The program must include procedures to ensure adequate long-term operation and maintenance of BMPs are established after completion of a construction project, along with a dedicated funding source within 3 years of the effective permit date.

7.1.4 Regulatory Assessment

The permittee must complete an assessment of existing regulations that could affect creation of impervious cover to determine if changes are required to support LID. Additionally, the permittee must assess current regulations to ensure that certain green infrastructure is allowable where feasible. Any required changes must be completed within 4 years of the effective permit date.

7.1.5 Inventory of Potential Retrofit Sites

The permittee must complete an inventory within 4 years of the effective permit date to determine at least 5 permittee-owned properties that could be modified or retrofitted with stormwater BMP improvements.

7.2 Objectives and Goals

The Town of Topsfield implements and enforce a program to reduce pollutants in stormwater runoff discharged to the MS4 from all construction activities that result in a land disturbance greater than or equal to 1 acre within the regulated area.

7.3 Post-Construction Stormwater Management Program

The following sections outline how Topsfield is meeting the requirements of the 2016 MS4 Permit to establish a Post-Construction Stormwater Management Program.

7.3.1 Establish Legal Authority

Requirements
Under the 2016 MS4 Permit, permittees shall develop or modify an ordinance, bylaw, or other regulatory mechanism within 3 years of the effective date of the permit to contain provisions that are as least as stringent as the following:

1. Use LID site planning and design strategies unless in feasible;
2. Stormwater management system designs shall be consistent with, or more stringent than, the requirements of the 2008 Massachusetts Stormwater Handbook, as amended;
3. Stormwater management systems on new development shall be designed to meet an average annual pollutant removal equivalent to 90% of the average annual load of Total Suspended Solids (TSS) related to the total post-construction impervious area on the site AND 60% of the average annual load of Total Phosphorus related to the total postconstruction impervious surface area on the site as calculated based on the average annual loading and not on the basis of any individual storm event.
    a) Average annual pollutant removal requirements are achieved through one of the following methods:
        1) Installing BMPs that meet the pollutant removal percentages based on calculations developed consistent with EPA Region 1's BMP Accounting and Tracking Tool (2016) or other BMP performance evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance, then any federally or State-approved BMP design guidance or performance standards (e.g., State stormwater handbooks and design guidance manuals) may be used to calculate BMP performance; or

2) Retaining the volume of runoff equivalent to, or greater than, one inch multiplied by the total post-construction impervious surface area on the new development site; or
3) Meeting a combination of retention and treatment that achieves the above standards; or
4) Utilizing offsite mitigation that meets the above standards within the same USGS HUC12 as the new development site.

4. Stormwater management systems on redevelopment sites shall be designed to meet an average annual pollutant removal equivalent to 80% of the average annual postconstruction load of TSS related to the total post-construction impervious area on the site AND 50% of the average annual load of Total Phosphorus related to the total post-construction impervious surface area on the site as calculated based on the average annual loading and not on the basis of any individual storm event.
    b) Average annual pollutant removal requirements are achieved through one of the following methods:
        1) Installing BMPs that meet the pollutant removal percentages based on calculations developed consistent with EPA Region 1's BMP Accounting and Tracking Tool (2016) or other BMP performance evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance, then any federally or State-approved BMP design guidance or performance standards (e.g., State stormwater handbooks and design guidance manuals) may be used to calculate BMP performance; or
        2) Retaining the volume of runoff equivalent to, or greater than, 0.8 inch multiplied by the total post-construction impervious surface area on the redeveloped site; or
        3) Meeting a combination of retention and treatment that achieves the above standards; or
        4) Utilizing offsite mitigation that meets the above standards within the same USGS HUC12 as the redevelopment site.
    c) Redevelopment activities that are exclusively limited to maintenance and improvement of existing roadways, (including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving projects) shall improve existing conditions unless infeasible are exempt from part a) above. Roadway widening or improvements that increase the amount of impervious area on the redevelopment site by greater than or equal to a single lane width shall meet the requirements of part a) above.

Work to be Performed

The Town of Topsfield has established a "Stormwater Management and Erosion Control" bylaw under Section 220, Part II of the Town's general bylaws, (adopted May 8, 2021) and accompanying "Stormwater and Erosion Control Regulations" (adopted March 19, 2013) which regulate construction projects greater than 1 acre and is provided under **Appendix B**. Topsfield will work to adopt required changes to the general bylaws to meet permit requirements to require the use of LID techniques as feasible, as well as establishing

stormwater standards for TSS and total phosphorus removal for both new development and redevelopment. The following table shows the BMP, responsible parties and measurable goals.

Table 7-1. BMP Description – Establish Post-Construction Site Legal Authority

BMP Description	Responsible Parties	Measurable Goal
BMP 5-1: Develop and Enforce Post-Construction Ordinance	Planning Board, Zoning Board, Conservation Commission, Stormwater Coordinator	Complete bylaw within 2 years of the effective date of the permit

7.3.2 Require Submittal of As-Built Plans

The permittee must require the submission of as-built drawings that include structural and non-structural stormwater controls within 3 years after completion of construction projects. The Town of Topsfield has established a "Stormwater Management and Erosion Control" bylaw under Section 220, Part II of the Town's general bylaws, (adopted May 8, 2021) and accompanying "Stormwater and Erosion Control Regulations" (adopted March 19, 2013) which regulate construction projects greater than 1 acre and is provided under **Appendix B**. The bylaw and accompanying regulations in part requires the submittal of as-built plans prior to the completion of a project. The following table shows the BMPs, responsible parties and measurable goals.

Table 7-2. BMP Description – Require Submittal of As-Built Plans

BMP Description	Responsible Parties	Measurable Goal
BMP 5-2: Require Stormwater As-Built Plan Submittal	Planning Board, Zoning Department	Require submittal of as-built plans for completed projects within 3 years of completion

7.3.3 Require Long Term Operation and Maintenance

As part of its Post Construction Stormwater Management Program, the Town of Topsfield shall develop procedures to ensure that the adequate long-term operation and maintenance of BMPs is accounted for at the conclusion of a construction project, along with a dedicated funding source, within 3 years of the effective permit date. The permittee must require the submission of as-built drawings that include structural and non-structural stormwater controls within 3 years after completion of construction projects. The Town of Topsfield has established a "Stormwater Management and Erosion Control" bylaw under Section 220, Part II of the Town's general bylaws, (adopted May 8, 2021) and accompanying "Stormwater and Erosion Control Regulations" (adopted March 19, 2013) which regulate

construction projects greater than 1 acre and is provided under **Appendix B**. The bylaw and accompanying regulations in part requires preparation of comprehensive operation and maintenance plans prior to the completion of a project. The following table shows the BMPs, responsible parties and measurable goals.

Table 7-3. BMP Description – Require Long Term Operation and Maintenance Plans

BMP Description	Responsible Parties	Measurable Goal
BMP 5-3: Require Long Term Operation and Maintenance	Planning Board, Zoning Department	Require submittal of operation and maintenance plans and dedicated funding to ensure long term maintenance within 3 years of the effective date of the permit

7.3.4 Complete Regulatory Assessment

Requirements

The 2016 MS4 permit requires permittees to complete a report that assesses current street design, parking lot guidelines, and other local requirements that could affect creation of impervious cover to determine if changes to existing design standards are required to support LID. If the assessment indicates that changes can be made, the assessment shall include recommendations and proposed schedules to incorporate policies and standards into relevant documents and procedures to minimize impervious cover. Any required changes to reduce mandatory creation of impervious cover in support of LID should be made within 4 years of the effective permit date.

Additionally, the permittee must complete a report that assesses current regulations to determine the feasibility of allowing green roofs, infiltration practices, porous/pervious pavement, and water harvesting/storage devices where feasible. The assessment must indicate if the practices are allowed in the MS4 area and under what circumstances they are allowed. If the practices are not allowed, the permittee shall determine what hinders the use of these practices, what changes in local regulations may be made to make them allowable, and provide a schedule for implementation of recommendations. Any required changes to allow for these BMPs must be completed within 4 years of the effective permit date.

Work to be Performed

The Town of Topsfield completed a comprehensive review of its regulations to address the above requirements during Permit Year 4. A report (**Appendix D**) was developed that in part includes an assessment of requirements that affect creation of impervious cover, if design standards for streets and parking lots can be modified to better support LID options, and assesses the feasibility of making green infrastructure allowable when appropriate site conditions exist. Recommendations have been provided to the planning board, although no schedule has been developed to date. A detailed schedule is anticipated to be completed during Year 5 and beyond in cooperation with the Responsible Parties listed in the table below. The following table shows the BMPs, responsible parties and measurable goals.

Table 7-4. BMP Description – LID, GI, and Impervious Cover Regulatory Assessment

BMP Description	Responsible Parties	Measurable Goal
BMP 5-4: Street design and parking lot guidelines report	Planning Board, Zoning Department	Recommendations are implemented by 2022 with progress reported annually
BMP 5-5: Green Infrastructure Report	Planning Board, Zoning Department	Recommendations are implemented by 2022 with progress reported annually

7.3.5 Complete Inventory of Potential BMP Retrofit Sites

Requirements

Permittees must complete an inventory of at least 5 existing permittee-owned properties that could be modified or retrofitted with structural stormwater BMP improvements to reduce the frequency, volume, and pollutant loads within 4 years of the effective permit date. The inventory provided in **Appendix E** should include municipal properties with significant impervious cover such as parking lots, buildings, and maintenance yards, along with infrastructure such as existing rights-of-way, outfalls and stormwater conveyances such as swales or detention practices. The permittee should address potential site constraints that could hinder BMP construction, such as subsurface conditions, depth to water table, and utility impacts, and should ideally allow opportunities for public education.

Beginning with the fifth annual report, should BMPs at 1 or more sites be constructed, the inventory should be updated so that it always contains at least 5 sites in the inventory for potential improvement. The permittee must report on all properties that have been modified or retrofitted to mitigate impervious area.

Work to be Performed

The Town of Topsfield developed a comprehensive inventory and ranking (**Appendix E**) of all town-owned parcels within the regulated urbanized area that had impervious cover such as parking lots or buildings, or were located along/adjacent to roadways. This largely included all town-owned parcels present within the urbanized area with the exception of vacant conversation areas. The Town then conducted a desktop analysis of all parcels to assess them for potential BMP retrofit opportunities by reviewing relevant information such as available space, localized topography, soil types, opportunities to reroute existing drainage networks, etc. All properties were then evaluated in the field to further refine desktop assessments and were then ranked based on existing conditions and feasibility of retrofitting to improve water quality. The top five sites for potential BMP retrofit were then identified and pre-conceptual designs with costs were prepared for top sites. This inventory will be updated continuously starting in Year 5 as necessary. The following table shows the BMP, responsible parties and measurable goals.

Table 7-5. BMP Description – List of Municipal Retrofit Opportunities

BMP Description	Responsible Parties	Measurable Goal
BMP 5-6: Target properties to reduce impervious areas	DPW	List is completed within 4 years of the effective date of the permit and update annually on retrofitted properties

8 MCM 6: Good Housekeeping and Pollution Prevention

8.1 Summary of Permit Requirements

Under MCM 6, permittees shall develop and implement an operations and maintenance program to reduce stormwater pollution from permittee activities. This includes optimizing existing activities related to parks and open space, buildings and facilities, vehicles and equipment, and stormwater infrastructure maintenance. A summary of the required Good Housekeeping and Pollution Prevention for Permittee Owned Operations activities and timelines is provided below.

8.1.1 Operations and Maintenance Programs

Permittees shall develop written operations and maintenance procedures for parks and open space, buildings and facilities, vehicles and equipment, winter road maintenance, stormwater infrastructure, and structural stormwater BMPs within 2 years of the effective permit date. This program shall also optimize catch basin cleaning and street sweeping, along with establishing proper storage techniques for cleaning residuals. All maintenance activities, inspections, and training shall be logged for annual reporting.

8.1.2 Stormwater Pollution Prevention Plans

Develop and implement Stormwater Pollution Prevention Plans (SWPPPs) for municipally-owned maintenance garages, public works yards, transfer stations within 2 years of the effective permit date.

8.2 Objectives and Goals

The Town of Topsfield implements an effective good housekeeping, pollution prevention, and operation and maintenance program with a goal of preventing or reducing pollutant runoff, protecting water quality from municipal operations, and maintain its infrastructure in good working order.

8.3 Good Housekeeping and Pollution Prevention Program

The following sections outline how Topsfield is meeting the requirements of the 2016 MS4 Permit to establish a Good Housekeeping and Pollution Prevention Program.

8.3.1 Complete Facilities O&M Procedures

Requirements

The permittee must complete an inventory of all parks and open space, buildings and facilities where pollutants are exposed to stormwater runoff, including those coming from vehicles and equipment, within 2 years of the permit effective date. The inventory must be reviewed annually and updated as necessary. Upon completion, the permittee must establish written procedures as part of an Operation and Maintenance Plan within 2 years of the permit effective date for the following items:

Parks and Open Space

- Proper use, storage, and disposal of pesticides, herbicides, and fertilizers;
- Lawn maintenance and landscaping activities to protect water quality, such as reducing mowing, lawn clippings handling, and use of alternative materials;
- Pet waste handling collection and disposal locations at all locations where pets are permitted, including signage;
- Control of waterfowl in areas where they congregate to reduce waterfowl droppings from entering the MS4s;
- Management of trash containers; and
- Addressing erosion or poor vegetative cover, particularly near a surface waterbody.

Buildings and Facilities

- Use, storage, and disposal of petroleum products and other potential pollutants.
- Materials handling training to applicable employees;
- Ensuring that Spill Prevention, Control, and Countermeasures (SPCC) Plans are in place if needed (aboveground petroleum storage greater than 1,320 gallons or underground petroleum storage greater than 42,000 gallons);
- Dumpsters and other waste management equipment; and
- Sweeping parking lots and keeping facility areas clean to reduce pollutants in runoff.

Vehicles and Equipment

- Storage of vehicles to prevent fluid leaks to stormwater;
- Fueling area evaluation, including feasibility of fueling under cover; and
- Preventing vehicle wash waters from entering surface waters or the MS4.

Work to be Performed

The Town has prepared a comprehensive written O&M Plan, a standalone document separate from this SWMP Plan, that meets the above requirements. This document also includes the inventory of relevant Town-owned properties. The following table shows the BMP, responsible parties and measurable goals.

Table 8-1. BMP Description – Complete Written Facilities O&M Procedures

BMP Description	Responsible Parties	Measurable Goal
BMP 6-1: Inventory open spaces, buildings and facilities, and vehicles and equipment	DPW	Complete inventory of open spaces, buildings and facilities, and vehicles and equipment within 2 years of the effective date of the permit
BMP 6-2: Establish Operation and Maintenance Procedures	DPW; Stormwater Coordinator	Create written O&M Plan for open spaces, buildings and facilities, and vehicles and equipment within 2 years of the effective date of the permit

8.3.2 Complete Infrastructure O&M Procedures

Requirements

The permittee must establish written procedures as part of an Operation and Maintenance Plan within 2 years of the permit effective date to ensure that MS4 infrastructure is maintained in a timely manner to reduce the discharge of pollutants from the MS4 for the following items:

Street Sweeping (**Appendix F**)

- Sweeping all streets and permittee-owed parking lots, with the exception of rural uncurbed roads with no catch basins or high-speed limited access highways at least 1 per year in the spring following winter sanding events;
- More frequent sweeping of targeted areas based on inspections, land use, or known water quality impacts;
- For rural uncurbed roadways with no catch basins or limited access highways, either an evaluation to meet the minimum frequencies above or development and implementation of an inspection, documentation, and targeted sweeping plan within 2 years of the effective date and submitted with the Year 1 annual report.

Catch Basin Cleaning (**Appendix G**)

- Prioritization of catch basins located near construction activities for more frequent inspection and maintenance;
- Establishing a schedule with a goal that at the time of maintenance, no catch basin is more than 50% full;
- For catch basins that are more than 50% full during 2 consecutive inspections or cleaning events, methods for investigating the contributing drainage area for sources of excessive sediment loads; and
- Establishing a plan for optimizing catch basin cleaning, inspections, and documentation.

Catch Basin and Street Sweeping Residuals Management

- Ensure proper storage of catch basins cleanings and street sweepings prior to disposal or reuse such that they are not discharged to receiving waters based on available MassDEP policies.

Winter Operation and Maintenance

- Establish and implement procedures for winter road maintenance including the use and storage of salt and sand
- Minimizing use of sodium chloride and other salts and evaluation of opportunities to use alternative materials; and
- Ensuring that snow disposal activities do not result in disposal of snow into waters of the United States.

Work to be Performed

The Town recently updated its existing street sweeping, catch basin cleaning, and winter O&M procedures in order to meet permit requirements. Street sweeping will continue under the existing Street Sweeping Prioritization Plan provided in **Appendix F** for at least several years, possibly expanded in Year 4 and beyond. Catch basin prioritization will also continue for the next several years as catch basin inspections continue according to the methodology and schedule outlined in the Catch Basin Optimization Plan provided in **Appendix G**. The following table shows the BMP, responsible parties and measurable goals.

Table 8-2. BMP Description – Complete Written Infrastructure O&M Procedures

BMP Description	Responsible Parties	Measurable Goal
BMP 6-3: Review Infrastructure O&M Procedures	DPW; Stormwater Coordinator	Create written O&M Plan for stormwater infrastructure within 2 years of the effective date of the permit
BMP 6-4: Catch Basin Cleaning	DPW	Clean catch basins on established schedule and report number of catch basins cleaned and volume of material moved annually
BMP 6-5: Street Sweeping	DPW	Sweep 100% of all streets and 50% of all municipal parking lots annually
BMP 6-6: Winter Road Maintenance Program	DPW	Evaluate at least one salt/chloride alternative for use in the municipality by 2020

8.3.3 Stormwater Pollution Prevention Plans

Requirements

The permittee must establish written Stormwater Pollution Prevention Plans for the following permittee-owned or operated facilities: maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to

stormwater as determined by the permittee. SWPPPs must address a number of components, including the following:

- Pollution Prevention Team;
- Facility description, identification of potential pollutant sources, and identification of stormwater controls;
- Stormwater management practices, including measures to minimize or prevent exposure, good housekeeping and preventative maintenance, spill prevention and response, erosion and sediment control, management of runoff, salt storage, employee training, and control measure maintenance; and
- Procedures for site inspections and sampling.

Work to be Performed
The Town of Topsfield has no standalone transfer station, maintenance garage, or other waste handling facilities. The Town's Highway Garage and salt shed are located outside the urbanized area and do not require preparation of SWPPP as they are not regulated under the 2016 Permit. SWPPPs will be developed if needed at a future time, should facilities be determined to require a SWPPP under the 2016 Permit. The following table shows the BMP, responsible parties, and measurable goals.

Table 8-3. BMP Description – Prepare SWPPPs for Regulated Facilities

BMP Description	Responsible Parties	Measurable Goal
BMP 6-7: Assess regulated facilities to determine SWPPP eligibility	DPW	Complete facilities assessment within 2 years of the effective date of permit.
BMP 6-8: Develop SWPPPs for applicable facilities	DPW	Develop and implement SWPPPs for 100% of facilities by 2021

8.3.4 Structural Stormwater BMP Inspections

Requirements
The permittee must establish and implement written inspection and maintenance procedures and frequencies for all stormwater treatment structures, such as infiltration and detention basins, proprietary stormwater treatment structures, gravel wetlands, etc. at least annually.

Work to be Performed
The Town of Topsfield developed an inventory (**Appendix H)** of known structural stormwater BMPs within the Town's regulated area. The Town also developed inspection and maintenance procedures for the various types of BMPs located within the Town's regulated area. BMP inspection Standard Operating Procedures (SOPs) and logs for BMP inspection and maintenance are provided in the standalone O&M Plan. The following table shows the BMP, responsible parties and measurable goals.

Table 8-4. BMP Description – Inspect Structural BMPs Annually

BMP Description	Responsible Parties	Measurable Goal
BMP 6-9: Develop BMP O&M Procedures	DPW; Stormwater Coordinator	Create written O&M Plan for stormwater BMPs within 2 years of the effective date of the permit
BMP 6-10: Inspect and maintain stormwater treatment structures	DPW	Inspect and maintain 100% of treatment structures to ensure proper function

9 TMDL and Impaired Waters Controls

9.1 Permit Requirements

The 2016 MS4 Permit requires regulated operators of MS4s to determine whether stormwater discharges from their MS4 contribute to any impaired waterbodies, including those subject to an approved TMDL and certain water quality limited waterbodies. Water quality limited waters are any waterbodies that do not meet applicable water quality standards, including waterbodies listed in categories "4a" and "5" on the Massachusetts Integrated List of Waters, also known as the "303(d) List". MassDEP is responsible for preparing TMDLs for many of these listed waters to identify the problem pollutant and establish water quality goals. TMDLs are prepared based on the priority assigned to the waterbody and are completed over the course of several years.

As outlined in Section 2.3, the Town of Topsfield is subject to the following TMDL and impaired waters requirements:

Table 9-1. TMDL and Impaired Waters Requirements

Waterbody Name	Impairment	2016 Permit Requirements
Fish Brook	Escherichia coli	Appendix H, Part III
Howlett Brook	Escherichia coli Fecal Coliform	Appendix H, Part III

Thus, the Town of Topsfield must implement control measures for discharges to impaired waters without a TMDL as summarized in the sections below. The Town reviews the most recent approved list of impaired waters as it is released and outline any additional requirements associated with the most recent list.

9.2 Bacteria Water Quality Limited Waterbodies Requirements

The Town of Topsfield currently has 2 waterbodies that are impaired for bacteria; thus, the Town is required to implement the following requirements as outlines under Appendix H, Part III of the 2016 Permit.

9.2.1 Additional or Enhanced BMPs

The Town of Topsfield must include the following additional or enhanced BMPs, in addition to the 6 MCMs outlined previously:

- **Public Education** – supplement its Residential program with an annual message encouraging the proper management of pet waste and disseminate educational materials to dog owners at the time of issuance or renewal of a dog license. Educational materials shall describe the detrimental impacts improper management of pet waste, requirements for waste collection and disposal, and penalties for non-compliance. The Town must provide information to owners of septic systems about

proper maintenance in any catchment that discharges to a water body impaired for bacteria or pathogens.

- **Illicit Discharge, Detection, Elimination-** designate catchment drainage to bacteria or pathogen impaired segments as "Problem Catchments" or "High" priority.

Work to be Performed

Public education requirements have been incorporated into future public education outreach components as described in Section 3. IDDE requirements have been incorporated into Topsfield's IDDE Plan. The following table shows the BMP, responsible parties and measurable goals.

Table 9-2. Water Quality Limited Waterbody Requirements – Bacteria

BMP Description	Responsible Parties	Measurable Goal
BMP 7-1: TMDL Requirements-Fecal Coliform in Howlett Brook	DPW; Stormwater Coordinator	Adhere to requirements in part III of Appendix H

10 Annual Reporting

The permittee shall submit annual reports each year of the permit term. The reporting period is a one-year period commencing on the permit effective date, and subsequent anniversaries thereof, except that the first annual report under this permit shall also cover the period from May 1, 2018 to the permit effective date. The annual report is due 90 days from the close of each reporting period, or by September 28 of each year. The annual reports must contain the following relevant information which should be tracked throughout the year, and should be filed within **Appendix I**:

- A self-assessment review of compliance with the permit terms and conditions.
- An assessment of the appropriateness of the selected BMPs.
- The status of any plans or activities, including:
    - Identification of all discharges determined to be causing or contributing to an exceedance of water quality standards and description of response;
    - For discharges subject to TMDL or water quality limited waterbody requirements, identification of BMPs used to address the impairment and assessment of the BMPs effectiveness;
    - For discharges to water quality limited waters a description of each BMP and any deliverables required.
- An assessment of the progress towards achieving the measurable goals and objectives of each of the 6 minimum measures:
    - Evaluation of the public education program including a description of the targeted messages for each audience; method and dates of distribution; methods used to evaluate the program; and any changes to the program.
    - Description of the activities used to promote public participation including documentation of compliance with state public notice regulations.
    - Description of IDDE activities including: status of mapping and results of the ranking and assessment; identification of problem catchments; status of all IDDE Plan components; number and identifier of catchments evaluated; number and identifier of outfalls screened; number of illicit discharges located and removed; gallons of flow removed; identification of tracking indicators and measures of progress; and employee training.
    - Evaluation of construction runoff management including number of project plans reviewed; number of inspections; and number of enforcement actions.
    - Evaluation of stormwater management for new and redevelopment including status of ordinance development; review and status of the street design and barriers to green infrastructure assessment; and inventory status.
    - Status of the O&M Programs.
    - Status of SWPPPs, including inspection results.
- All outfall screening and monitoring data during the reporting period and cumulative for the permit term; and a description of any additional monitoring data received by the permittee during the reporting period.
- Description of activities for the next reporting cycle.
- Description of any changes in identified BMPs or measurable goals.
- Description of activities undertaken by any entity contracted for achieving any measurable goal or implementing any control measure.

11 Implementation of Best Management Practices

The Town of Topsfield's Best Management Practices Plan as outlined in the Town's NOI (**Appendix A**).

For consistency with the 6 MCMs and impaired water requirements, the BMPs are broken down into 7 categories:

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

The BMP tables also outline the measurable goals for each BMP to gauge permit compliance, the responsible party(ies) for implementing each BMP, and an implementation schedule to be used throughout the permit period. In addition to the implementation activities outlined in this plan, the Town also performs the following activities throughout the duration of the permit:

1. **Program Evaluation** – conduct annual evaluations of the Stormwater Management Program for compliance with permit conditions. The evaluation must include a determination of the appropriateness of the selected BMPs in efforts towards achieving the measurable goals.

2. **Record Keeping** – maintain records that pertain to the Stormwater Management Program for a period of at least 5 years. Records need to be made available to the public and the Town may charge a reasonable fee for copying. Records need not be submitted to EPA or MassDEP unless specifically requested.

3. **Reporting** – submit an annual report to EPA and MassDEP, including the information as noted in Section 10.

Refer to the following link for a copy of the 2016 MA MS4 Permit:
https://www.epa.gov/npdes-permits/massachusetts-small-ms4-general-permit

Appendix A

Notice of Intent and Authorization to Discharge

Appendix B

Stormwater Bylaws and Regulations

Appendix C

Stormwater System Mapping

Mapping Status

Requirement Summary	Status
Phase I – Must be Done by July 1, 2020	
1. Outfalls and receiving waters	Complete
2. Open channel conveyances	Not started
3. Interconnections with other MS4s	Ongoing
4. Municipally owned structural BMPs	Complete
5. Waterbody names and impairments	Complete
6. Initial catchment delineations by topography	Complete (updates ongoing)
Phase II – Must be Complete by July 1, 2028	
1. Outfalls with spatial accuracy +/-30 feet	Complete
2. Pipe connectivity	Not started
3. Manholes	Not started
4. Catch basins	Complete (updates ongoing)
5. Refined catchment delineations	Not started
6. Municipal sanitary system	Not Applicable
7. Municipal combined sewer system	Not Applicable

Appendix D

Regulatory Assessments

Appendix E

Inventory and Ranking of Town-Owned Property

Appendix F

Street Sweeping Optimization Plan

Appendix G

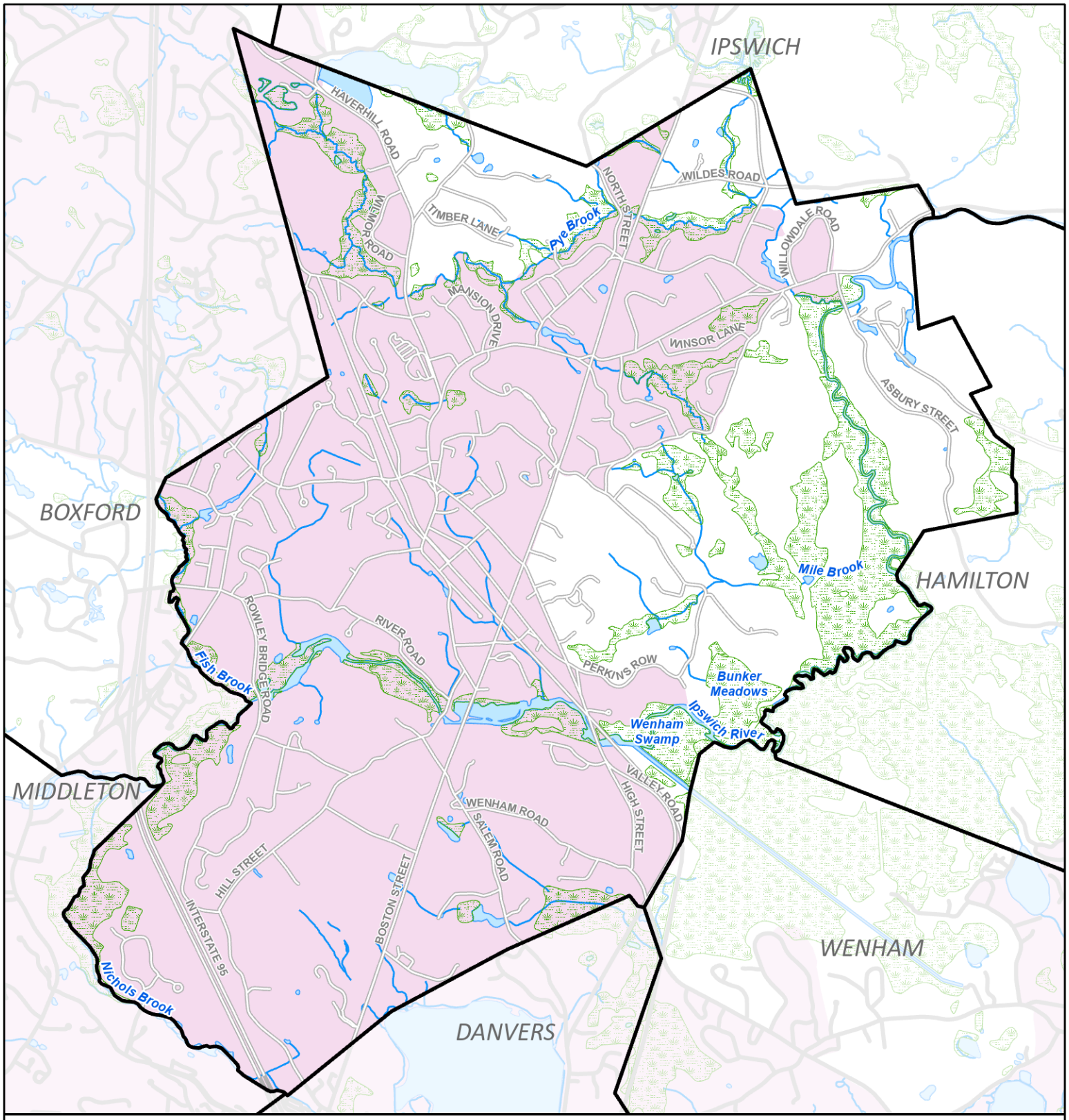
Catch Basin Optimization Plan

Appendix H

List of Stormwater BMPs and Inspection/Maintenance Records

Appendix I

Annual Reports



Urbanized Area

Lake, Pond, Reservoir

Wetland, Marsh, Swamp

Stream, Brook

N

W E

S

0 0.25 0.5 0.75 1

Miles

Figure 1-1

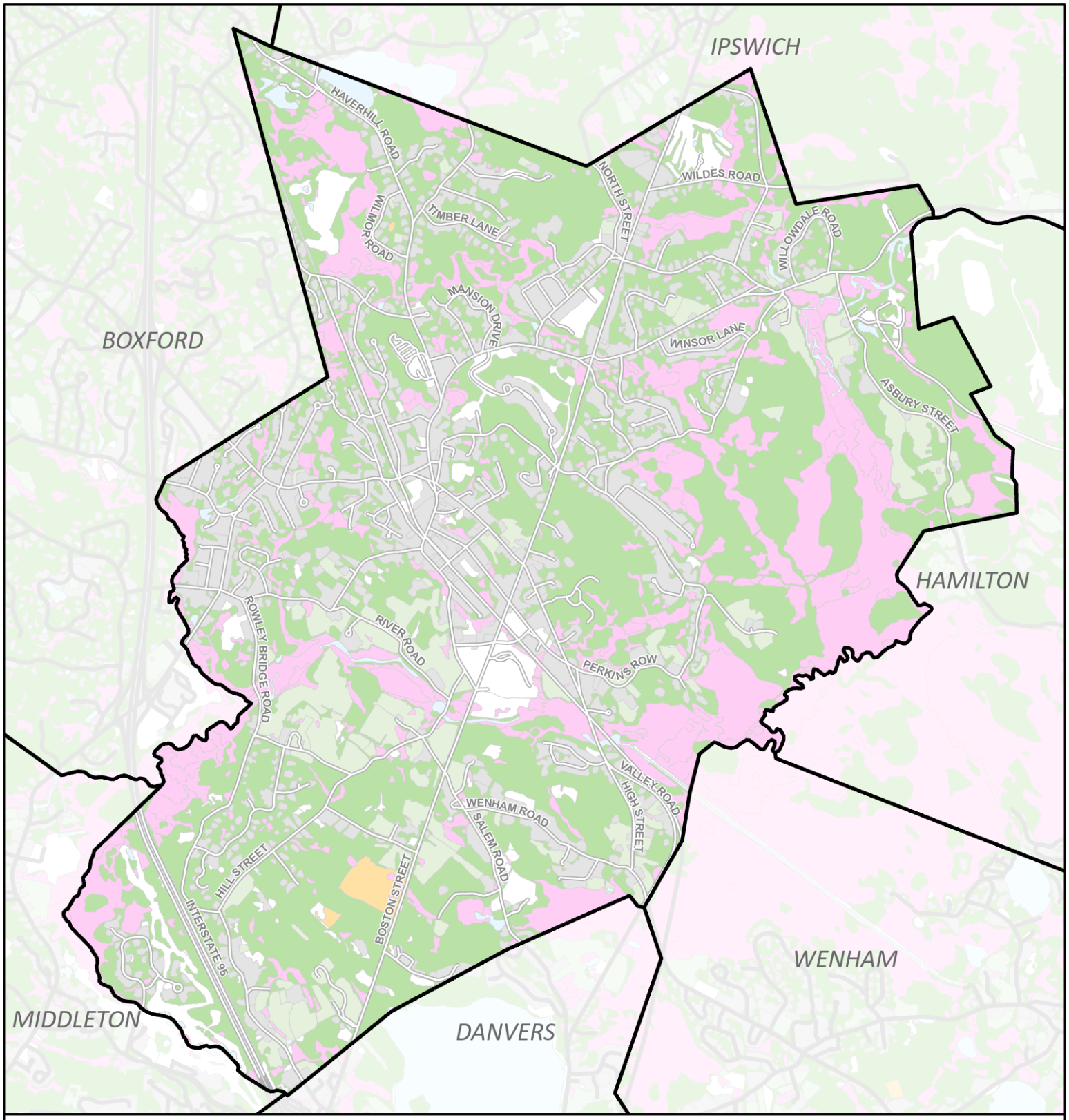
Urbanized Area

Topsfield, MA

Comprehensive Environmental Incorporated

Data Sources: MassGIS, Town of Topsfield, CEI

3/28/2023



Residential / Commercial / Industrial
Agriculture
Forest
Water
Wetland
Disturbed Land
Other Cleared Land

N
W E
S

0 0.25 0.5 0.75 1
Miles

Figure 2-1

Land Use Map

Topsfield, MA

Comprehensive Environmental Incorporated

Data Sources: MassGIS, Town of Topsfield, CEI

3/28/2023

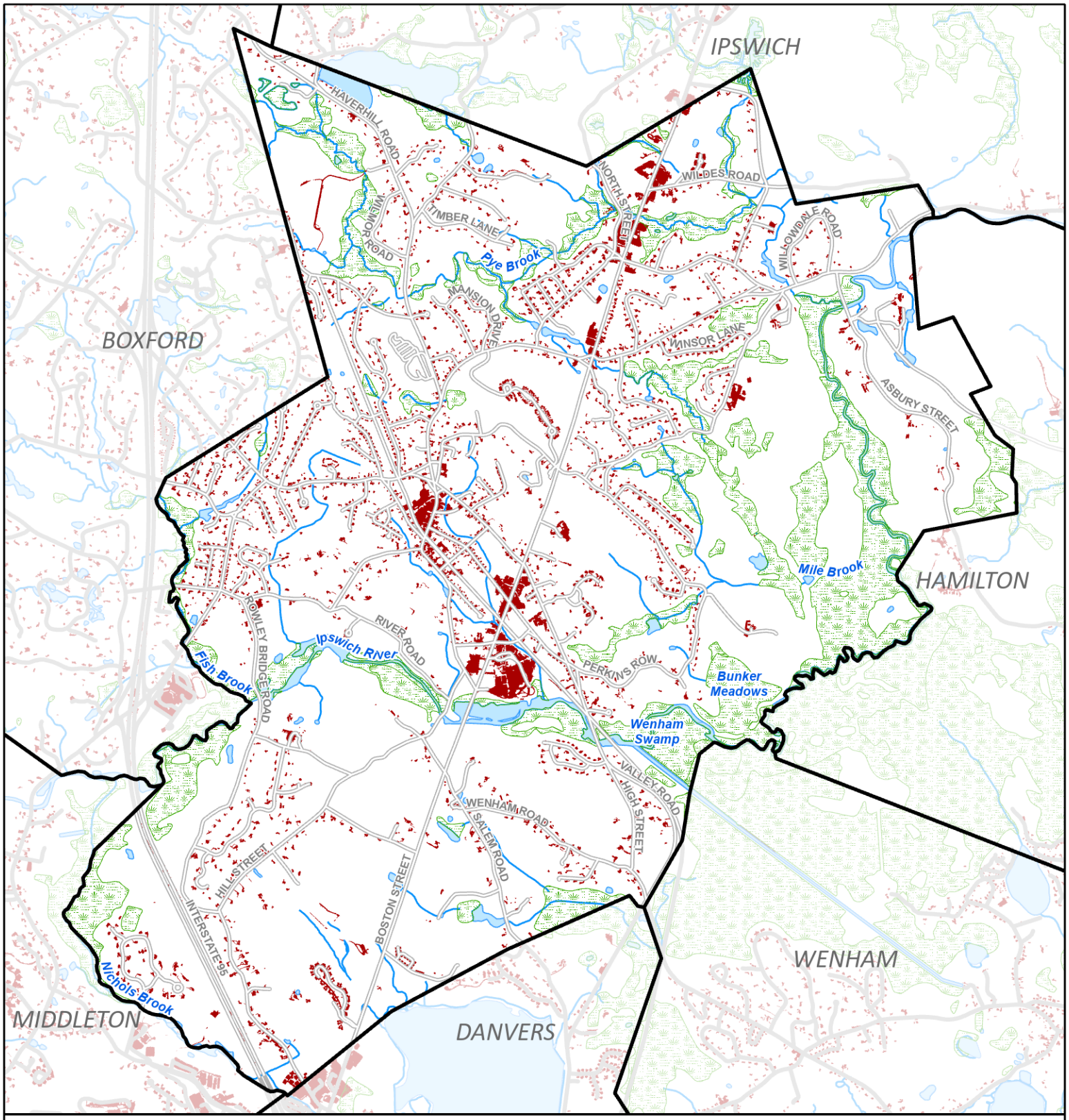


Figure 2-2

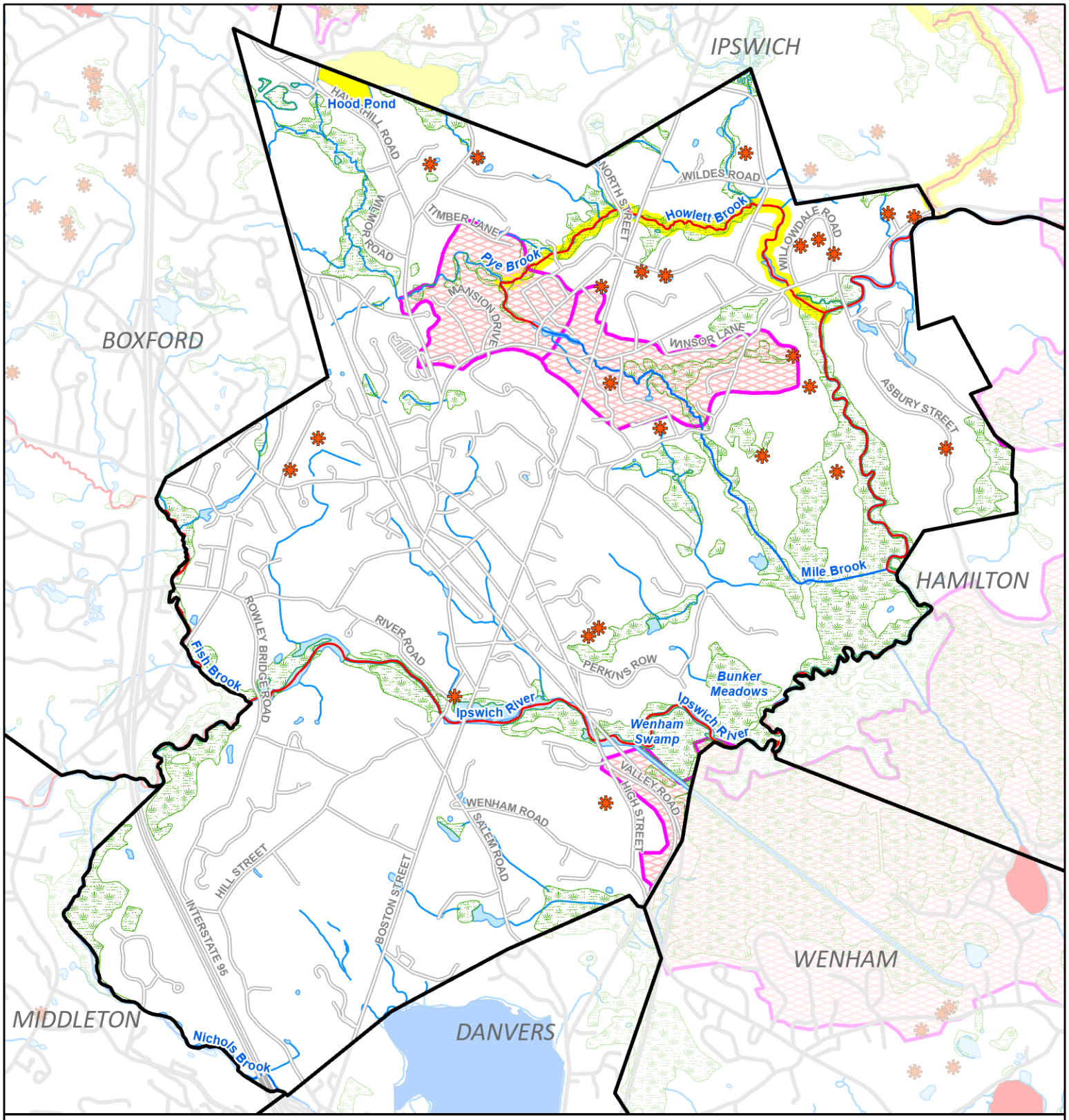
Impervious Area Map

Topsfield, MA

Comprehensive Environmental Incorporated

Data Sources: MassGIS, Town of Topsfield, CEI

3/28/2023



Certified Vernal Pool

MA DFW Coldwater Fisheries

DEP Approved Zone II

Lake, Pond, Reservoir

Wetland, Marsh, Swamp

Stream, Brook

MassDEP 303(d) Waters:

3 - No uses assessed

5 - Impaired - TMDL required

3 - No uses assessed

4A - Impaired - TMDL is completed

5 - Impaired - TMDL required

N W E S

0 0.25 0.5 0.75 1

Miles

Figure 2-3

Resource Waters Map

Topsfield, MA

Comprehensive Environmental Incorporated

Data Sources: MassGIS, Town of Topsfield, CEI

3/28/2023

Appendix A

Notice of Intent and Authorization to Discharge

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part I: General Conditions

General Information

Name of Municipality or Organization: Topsfield | State: MA

EPA NPDES Permit Number (if applicable): MAR041000

Primary MS4 Program Manager Contact Information

Name: David Bond | Title: Highway Superintendent/Stormwater Coordinator

Street Address Line 1: DPW Facility

Street Address Line 2: 279 Boston Street

City: Topsfield | State: MA | Zip Code: 01983

Email: dbond@topsfield-ma.gov | Phone Number: (978) 887-1542

Fax Number:

Other Information

Stormwater Management Program (SWMP) Location (web address or physical location, if already completed): Topsfield Town Hall

Eligibility Determination

Endangered Species Act (ESA) Determination Complete? Yes

Eligibility Criteria (check all that apply): ☐ A ☐ B ☒ C

National Historic Preservation Act (NHPA) Determination Complete? Yes

Eligibility Criteria (check all that apply): ☒ A ☐ B ☐ C

☑ Check the box if your municipality or organization was covered under the 2003 MS4 General Permit

MS4 Infrastructure (if covered under the 2003 permit)

Estimated Percent of Outfall Map Complete? *(Part II, III, IV or V, Subpart B.3.(a.) of 2003 permit)*: 70%

If 100% of 2003 requirements not met, enter an estimated date of completion (MM/DD/YY): 11/30/18

Web address where MS4 map is published: https://www.topsfield-ma.gov/documents/bylaws/general/documents/MS4map2018.pdf

If outfall map is unavailable on the internet an electronic or paper copy of the outfall map must be included with NOI submission (see section V for submission options)

Regulatory Authorities (if covered under the 2003 permit)

Illicit Discharge Detection and Elimination (IDDE) Authority Adopted? *(Part II, III, IV or V, Subpart B.3.(b.) of 2003 permit)*: Yes

Effective Date or Estimated Date of Adoption (MM/DD/YY): 05/04/10

Construction/Erosion and Sediment Control (ESC) Authority Adopted? *(Part II,III,IV or V, Subpart B.4.(a.) of 2003 permit)*: Yes

Effective Date or Estimated Date of Adoption (MM/DD/YY): 05/03/05

Post- Construction Stormwater Management Adopted? *(Part II, III, IV or V, Subpart B.5.(a.) of 2003 permit)*: Yes

Effective Date or Estimated Date of Adoption (MM/DD/YY): 05/05/15

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part II: Summary of Receiving Waters

Please list the waterbody segments to which your MS4 discharges. For each waterbody segment, please report the number of outfalls discharging into it and, if applicable, any impairments.

Massachusetts list of impaired waters: Massachusetts 2014 List of Impaired Waters- http://www.mass.gov/eea/docs/dep/water/resources/07v5/14list2.pdf

Check off relevant pollutants for discharges to impaired waterbodies (see above 303(d) lists) without an approved TMDL in accordance with part 2.2.2.a of the permit. List any other pollutants in the last column, if applicable.

Waterbody segment that receives flow from the MS4	Number of outfalls into receiving water segment	Chloride	Chlorophyll-a	Dissolved Oxygen/ DO Saturation	Nitrogen	Oil & Grease/ PAH	Phosphorus	Solids/ TSS/ Turbidity	E. coli	Enterococcus	Other pollutant(s) causing impairments
MA92-06		☐	☐	☒	☐	☐	☐	☐	☐	☐	Low flow, Hg in Fish
MA92-15		☐	☐	☒	☐	☐	☐	☐	☐	☐	Low flow, Fish Bioassessment
MA92-17		☐	☐	☐	☐	☐	☐	☐	☒	☐	Fish passage barrier
MA9205		☐	☐	☐	☐	☐	☐	☐	☐	☐	Hg in Fish
MA92-16 Category 3		☐	☐	☐	☐	☐	☐	☐	☐	☐	
MA92-14 Category 2		☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
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		☐	☐	☐	☐	☐	☐	☐	☐	☐	

Click to lengthen table

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary

Identify the Best Management Practices (BMPs) that will be employed to address each of the six Minimum Control Measures (MCMs). For municipalities/organizations whose MS4 discharges into a receiving water with an approved Total Maximum Daily Load (TMDL) and an applicable waste load allocation (WLA), identify any additional BMPs employed to specifically support the achievement of the WLA in the TMDL section at the end of part III.

For each MCM, list each existing or proposed BMP by category and provide a brief description, responsible parties/departments, measurable goals, and the year the BMP will be employed (public education and outreach BMPs also requires a target audience). **Use the drop-down menus in each table or enter your own text to override the drop down menu.**

MCM 1: Public Education and Outreach

BMP Media/Category (enter your own text to override the drop down menu)	**BMP Description**	**Targeted Audience**	**Responsible Department/Parties** (enter your own text to override the drop down menu)	**Measurable Goal**	**Beginning Year of BMP Imple-mentation**
Brochures/Pamphlets	Greenscapes	Residents	DPW Operations	fund Greenscapes	2013
Brochures/Pamphlets	Greenscapes	Businesses, Institutions and Commercial Facilities	DPW Operations	fund Greenscapes	2013
Brochures/Pamphlets	Greenscapes	Developers (construction)	Building Permitting and Enforcement	fund Greenscapes	2013
Brochures/Pamphlets	Greenscapes	Industrial Facilities	DPW Operations	fund Greenscapes	2013
Newspaper Articles/Press Releases	Greenscapes	Residents	Planning/zoning Department	fund Greenscapes	2013
Newspaper Articles/Press Releases	Greenscapes	Businesses, Institutions and Commercial Facilities	Planning/zoning Department	fund Greenscapes	2013
Newspaper Articles/Press Releases	Greenscapes	Developers (construction)	Planning/zoning Department	fund Greenscapes	2013
Newspaper Articles/Press Releases	Greenscapes	Industrial Facilities	Planning/zoning Department	fund Greenscapes	2013

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 2: Public Involvement and Participation

BMP Categorization	Brief BMP Description (enter your own text to override the drop down menu)	Responsible Department/Parties (enter your own text to override the drop down menu)	Additional Description/ Measurable Goal	Beginning Year of BMP Imple-mentation
Public Review	Stormwater Committee/Task Force	Planning Board/Stormwater Coordinator	Allow annual review of stormwater management plan and posting of stormwater management plan on website	2012
Public Participation	Household haz. waste/used oil collection	Town Administrator/Selectmen's Office	Notify public of special hazardous waste pick-up days. Post on website the proper method of disposal for pollutants.	1990
Public Participation	Hotline/webline - reporting problems/violations	Town Administrator/Selectmen's Office	Allow public to notify town of illegal dumping and observed spills.	2019

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 3: Illicit Discharge Detection and Elimination (IDDE)

BMP Categorization (enter your own text to override the drop down menu)	**BMP Description**	**Responsible Department/Parties** (enter your own text to override the drop down menu)	**Measurable Goal** (all text can be overwritten)	**Beginning Year of BMP Imple-mentation**
Storm sewer system map	Finish map and update during IDDE program completion	Mapping Committee	Update map within 2 years of effective date of permit and complete full system map 10 years after effective date of permit	2018
Written IDDE program	Create written IDDE program	DPW Operations	Complete within 1.5 years of the effective date of permit and update as required	2019
Implement IDDE program	Began many years ago. DPW standard operating procedures	DPW Operations	Complete 10 years after effective date of permit	2018
Employee training	Train employees on IDDE implementation. Establish instructional website.	Town Administrator/Selectmen's Office	Train annually	2018
Conduct dry weather screening	Appendix H3	Stormwater Coordinator/DPW	Complete 3 years after effective date of permit	2018
Conduct wet weather screening	Appendix H3	Stormwater Coordinator/DPW	Complete 10 years after effective date of permit	2018
Ongoing screening	Conduct dry weather and wet weather screening (as necessary)	Stormwater Coordinator/DPW	Complete ongoing outfall screening upon completion of IDDE program	2021

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 4: Construction Site Stormwater Runoff Control

BMP Categorization (enter your own text to override the drop down menu or entered text)	**BMP Description**	**Responsible Department/Parties** (enter your own text to override the drop down menu)	**Measurable Goal** (all text can be overwritten)	**Beginning Year of BMP Imple-mentation**
Site inspection and enforcement of Erosion and Sediment Control (ESC) measures	Complete written procedures of site inspections and enforcement procedures	Building Permitting and Enforcement	Complete within 1 year of the effective date of permit	2018
Site plan review	Complete written procedures of site plan review and begin implementation	Planning/Zoning Department	Complete within 1 year of the effective date of permit	2020
Erosion and Sediment Control	Adoption of requirements for construction operators to implement a sediment and erosion control program	Planning Board	Complete within 1 year of the effective date of permit	2018
Waste Control	Adoption of requirements to control wastes, including but not limited to, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes	Building Permitting and Enforcement	Complete within 1 year of the effective date of permit	2018

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 5: Post-Construction Stormwater Management in New Development and Redevelopment

BMP Categorization (enter your own text to override the drop down menu or entered text)	**BMP Description**	**Responsible Department/Parties** (enter your own text to override the drop down menu)	**Measurable Goal** (all text can be overwritten)	**Beginning Year of BMP Imple-mentation**
As-built plans for on-site stormwater control	The procedures to require submission of as-built drawings and ensure long term operation and maintenance will be a part of the SWMP	Planning/Zoning Department	Require submission of as-built plans for completed projects	2018
Target properties to reduce impervious areas	Identify permittee-owned properties that could be modified or retrofitted with BMPs to reduce impervious areas and update annually	DPW Operations	Complete 4 years after effective date of permit and report annually on retrofitted properties	2018
Allow green infrastructure	Develop a report assessing existing local regulations to determine the feasibility of making green infrastructure practices allowable when appropriate site conditions exist	Planning/Zoning Department and Conservation Commission	Complete 4 years after effective date of permit and implement recommendations of report	2020
Street design and parking lot guidelines	Develop a report assessing requirements that affect the creation of impervious cover. The assessment will help determine if changes to design standards for streets and parking lots can be modified to support low impact design options.	Planning/Zoning Department	Complete 4 years after effective date of permit and implement recommendations of report	2020

Ensure any stormwater controls or management practices for new development and redevelopment meet the retention or treatment requirements of the permit and all applicable requirements of the Massachusetts Stormwater Handbook	Read the Massachusetts Stormwater Handbook. Incorporate pertinent practices for Topsfield's geography.	Planning/Zoning Department	Complete 2 years after effective date of permit	2020

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 6: Municipal Good Housekeeping and Pollution Prevention

BMP Categorization (enter your own text to override the drop down menu or entered text)	**BMP Description**	**Responsible Department/Parties** (enter your own text to override the drop down menu)	**Measurable Goal** (all text can be overwritten)	**Beginning Year of BMP Imple-mentation**
O&M procedures	Create written O&M procedures including all requirements contained in 2.3.7.a.ii for parks and open spaces, buildings and facilities, and vehicles and equipment	Highway Dept, Parks and Cemetery Dept, Police Dept, Fire Dept, etc	Complete and implement 2 years after effective date of permit	
Inventory all permittee-owned parks and open spaces, buildings and facilities, and vehicles and equipment	Create inventory	Mapping Committee and Individual Departments with vehicles	Complete 2 years after effective date of permit and implement annually	
Infrastructure O&M	Establish and implement program for repair and rehabilitation of MS4 infrastructure	Storm-water Coordinator	Complete 2 years after effective date of permit	
Stormwater Pollution Prevention Plan (SWPPP)	Create SWPPPs for maintenance garages, transfer stations, and other waste-handling facilities	DPW Operations	Complete and implement 3 years after effective date of permit	2021
Catch basin cleaning	A catch basin cleaning schedule has been implemented and is adhered to. This activity has been conducted and tailored so that every catchbasin is never more than 50% full.	DPW Operations	Clean catch basins on established schedule and log number of catch basins cleaned.	2019
Street sweeping program	Sweep all streets and permitee-owned parking lots in accordance with permit conditions	DPW Operations	Sweep all streets and permitee-owned parking lots once per year in the spring	2018
Road salt use optimization program	Establish and implement a program to minimize the use of road salt	DPW Operations	Implement salt use optimization during deicing season	2020

Inspections and maintenance of stormwater treatment structures	Establish and implement inspection and maitenance procedures and frequencies	DPW Operations	Inspect and maintain treatment structures at least annually	2019

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

Actions for Meeting Total Maximum Daily Load (TMDL) Requirements

Use the drop-down menus to select the applicable TMDL, action description to meet the TMDL requirements, and the responsible department/parties. If no options are applicable, or more than one, **enter your own text to override drop-down menus.**

Applicable TMDL	**Action Description**	**Responsible Department/Parties** (enter your own text to override the drop down menu)

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

Actions for Meeting Requirements Related to Water Quality Limited Waters

Use the drop-down menus to select the pollutant causing the water quality limitation and enter the waterbody ID(s) experiencing excursions above water quality standards for that pollutant. Choose the action description from the dropdown menu and indicate the responsible party. If no options are applicable, or more than one, **enter your own text to override drop-down menus.**

Pollutant	Waterbody ID(s)	Action Description	Responsible Department/Parties (enter your own text to override the drop down menu)
Fecal Coliform	Howlett Brook	Adhere to requirements in part III of Appendix H	DPW Operations/Stormwater Coordinator

Part IV: Notes and additional information

Use the space below to indicate the part(s) of 2.2.1and 2.2.2 that you have identified as not applicable to your MS4 because you do not discharge to the impaired water body or a tributary to an impaired water body due to nitrogen or phosphorus. Provide all supporting documentation below or attach additional documents if necessary.
Also, provide any additional information about your MS4 program below.

An independent study of the main stem of the Ipswich River was conducted from 2010 to 2012 within the reaches of Wenham Swamp (Route 97 to Asbury Street.) Findings in dissolved oxygen, temperature and fish abundance showed a distinct collapse of dissolved oxygen from Pine Island downstream Asbury Street. The results were consistent in 3 years of testing in August during low flow conditions. The study demonstrated that localized depletions of oxygen in the Ipswich River are attributed to recharge zones influenced by land wetlands such as Wenham Swamp. The low dissolved oxygen currently and historically recorded in the Ipswich River during periods of low flow can be attributed the influence of naturally occurring swamps with high biological oxygen demand and less likely to water withdrawals or nutrient loading. For these reasons, we request an exemption from the requirements to test for nutrients within the main stem of the Ipswich River as it flows through Topsfield. Methods of this study and its results can be acquired from Jim MacDougall, Topsfield.

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part V: Certification

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

Name:	David M. Bond	Title:	Highway Supt./Stormwater Coordinator
Signature:	David Bond Digitally signed by David Bond DN: cn=David Bond, o=Town of Topsfield, ou=Highway Department, email=dbond@topsfield-ma.gov, c=US Date: 2018.08.21 09:13:22 -04'00'	Date:	08/21/18

[To be signed according to Appendix B, Subparagraph B.11, Standard Conditions]

Note: When prompted during signing, save the document under a new file name

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 6: Municipal Good Housekeeping and Pollution Prevention

BMP Categorization (enter your own text to override the drop down menu or entered text)	**BMP Description**	**Responsible Department/Parties** (enter your own text to override the drop down menu)	**Measurable Goal** (all text can be overwritten)	**Beginning Year of BMP Imple-mentation**
O&M procedures	Create written O&M procedures including all requirements contained in 2.3.7.a.ii for parks and open spaces, buildings and facilities, and vehicles and equipment	Highway Dept, Parks and Cemetery Dept, Police Dept, Fire Dept, etc	Complete and implement 2 years after effective date of permit	2021
Inventory all permittee-owned parks and open spaces, buildings and facilities, and vehicles and equipment	Create inventory	Mapping Committee and Individual Departments with vehicles	Complete 2 years after effective date of permit and implement annually	2021
Infrastructure O&M	Establish and implement program for repair and rehabilitation of MS4 infrastructure	Storm-water Coordinator	Complete 2 years after effective date of permit	2021
Stormwater Pollution Prevention Plan (SWPPP)	Create SWPPPs for maintenance garages, transfer stations, and other waste-handling facilities	DPW Operations	Complete and implement 3 years after effective date of permit	2021
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Road salt use optimization program	Establish and implement a program to minimize the use of road salt	DPW Operations	Implement salt use optimization during deicing season	2020

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Part V: Certification

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

Name:	Kellie A. Hebert	Title:	Town Administrator
Signature:	Kellie A. Hebert	Date:	9/27/18

[To be signed according to Appendix B, Subparagraph B.11, Standard Conditions]

Note: When prompted during signing, save the document under a new file name

GREENSCAPES NORTH SHORE COALITION

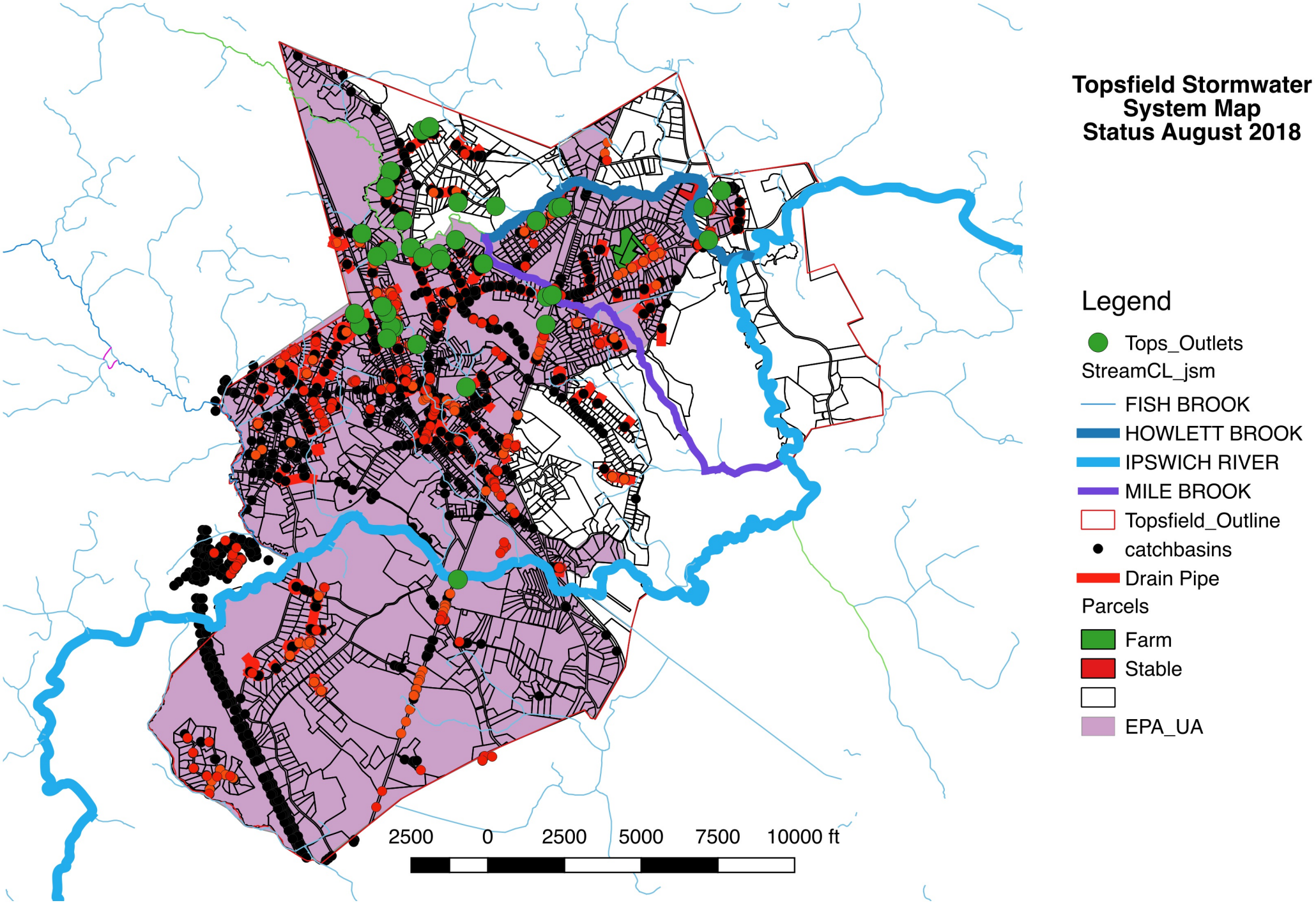
MCM 1: Public Education and Outreach - NOI FORM

* All literature and media will be available online at www.greenscapes.org and can be shared with member communities at any time.

** Community can decide how to address Greenscapes' involvement. They may choose to list GS as an external contractor, or can list whomever in their town GS communicated with for each BMP, respectively.

BMP Media/ Category	BMP Description*	Targeted Audience	Responsible Parties/ Depts**	Measurable Goal	Implementation Year
Brochure/ Pamphlets	Brochure will consist of a 'how-to-guide' for residents on how rain gardens work and how to install them at their home.	**Residents**	Greenscapes North Shore Coalition	- Number distributed - Resident testimonials	**2018 (Fall)**
Brochure/ Pamphlets	An updated version of comprehensive literature, discussing the importance of "greenscaping", small-scale stormwater management practices, sewer/septic system maintenance and other ways to avoid illicit discharge.	**Residents**	Greenscapes North Shore Coalition	- Number distributed - Resident testimonials	**2019 (Spring)**
Workshop/ Info Sheet	Workshop and associated literature will cover LID options for reducing runoff and promoting on-site infiltration. Pricing, maintenance and ordinances will also be discussed.	**Developers (Construction)**	Greenscapes North Shore Coalition and Town of Topsfield	- Number of attendees - Increase in LID use	**2019 (Winter)**
Displays/ Posters/ Kiosks	Informational poster will be placed in area with heavy dog/walker traffic. Poster will describe proper pet waste management and disposal.	**Residents**	Greenscapes North Shore Coalition	- Pilot surveys may be conducted before and after message posting	**2019 (Spring)**
Brochure/ Pamphlets	Pet Waste literature is available in two forms (one page info sheet or rack card) and can be redistributed as necessary.	**Residents**	Greenscapes North Shore Coalition	- Number distributed - Resident testimonials	**2018**
Social Media Post	Greenscapes will provide content for a social media "blast" on town Facebooks etc. Ex. Autumnal facebook post describing proper disposal of leaf collection, and springtime post about proper lawn/fertilizer maintenance.	**Residents**	Greenscapes North Shore Coalition and Town of Topsfield	- Number of views/ likes/ comments - Resident testimonials before and after posting	**2018**
School Curriculae/ Programs	Proctor School will host Greenscapes "Keeping Water Clean" Program.	**Residents**	Greenscapes North Shore Coalition	- Number of students/ teachers/ volunteers in attendance - Subset of students evaluated before and after program	**2018**
Brochure/ Pamphlets	Brochure will include general info on LIDs that can assist in stormwater management and pollution prevention. Content will be targeted to "environmental contacts" at industrial facilities, or property managers where applicable.	**Industrial Facilities**	Greenscapes North Shore Coalition	- Number distributed - Phone call followup	**FY2020**
Workshop	Stormwater presentation will discuss specific BMPs for parking lots; how to reduce impervious surfaces, and maintain the space more sustainably.	**Businesses/ Institutions and Commercial Facilities**	Greenscapes North Shore Coalition and Town of Topsfield	- Number of attendees - Number of presentations re-distributed to commercial representatives.	**FY2020**
Displays/ Posters/ Kiosks	An updated version of informational display, discussing the importance of "greenscaping", small-scale stormwater management practices, sewer/septic system maintenance and other ways to avoid illicit discharge.	**Residents**	Greenscapes North Shore Coalition	- Number distributed - Resident testimonials	**FY2020**
Brochure/ Pamphlets	Pet Waste literature is available in two forms (one page info sheet or rack card) and can be redistributed as necessary.	**Residents**	Greenscapes North Shore Coalition	- Number distributed - Resident testimonials	**FY2020**
Social Media Post	Greenscapes will provide content for a social media "blast" on town Facebooks etc. Ex. Autumnal facebook post describing proper disposal of leaf collection, and springtime post about proper lawn/fertilizer maintenance.	**Residents**	Greenscapes North Shore Coalition and Town of Topsfield	- Number of views/ likes/ comments - Resident testimonials before and after posting	**FY2020**
School Curriculae/ Programs	Proctor School will host Greenscapes "Keeping Water Clean" Presentation.	**Residents**	Greenscapes North Shore Coalition	- Number of students/ teachers/ volunteers in attendance - Subset of students evaluated before and after program	**FY2020**

Workshop	Workshop and literature will go into greater detail, following the workshop regarding low impact development held in year one. City ordinances and associated incentives will be outlined.	**Developers (Construction)**	Greenscapes North Shore Coalition and Town of Topsfield	- Number of attendees	**FY2021**
Web Page	Story Map will outline and describe different examples of existing low-impact-developments in the North Shore Community.	**Residents**	Greenscapes North Shore Coalition	- Number of map views - Resident testimonials on LID awareness	**FY2021**
Brochure/ Pamphlets	Pet Waste literature is available in two forms (one page info sheet or rack card) and can be redistributed as necessary.	**Residents**	Greenscapes North Shore Coalition	- Number distributed - Resident testimonials	**FY2021**
Social Media Post	Greenscapes will provide content for a social media "blast" on town Facebooks etc. Ex. Autumnal facebook post describing proper disposal of leaf collection, and springtime post about proper lawn/fertilizer maintenance.	**Residents**	Greenscapes North Shore Coalition and Town of Topsfield	- Number of views/ likes/ comments - Resident testimonials before and after posting	**FY2021**
School Curriculae/ Programs	Proctor School will host Greenscapes "Keeping Water Clean" Program.	**Residents**	Greenscapes North Shore Coalition	- Number of students/ teachers/ volunteers in attendance - Subset of students evaluated before and after program	**FY2021**
Meeting/ Presentation	Presentation will discuss proper "greenscaping" practices on a business/commercial level. Content will be targeted ro property managers and will include sand/salt storage and landscape management.	**Businesses/ Institutions and Commercial Facilities**	Greenscapes North Shore Coalition and Town of Topsfield	- Number of attendees	**FY2022**
Meeting/ Presentation	Presentation will discuss proper "greenscaping" practices on an industrial level. Content will be targeted ro property managers and will include sand/salt storage and landscape management.	**Industrial Facilities**	Greenscapes North Shore Coalition and Town of Topsfield	- Number of attendees	**FY2022**
Brochure/ Pamphlets	"What not to Flush" rack card will raise resident awareness of the damages of flushing things like wipes and grease in their toilets/sinks.	**Residents**	Greenscapes North Shore Coalition	- Number distributed - Resident testimonials	**FY2022**
Brochure/ Pamphlets	Pet Waste literature is available in two forms (one page info sheet or rack card) and can be redistributed as necessary.	**Residents**	Greenscapes North Shore Coalition	- Number distributed - Resident testimonials	**FY2022**
Social Media Post	Greenscapes will provide content for a social media "blast" on town Facebooks etc. Ex. Autumnal facebook post describing proper disposal of leaf collection, and springtime post about proper lawn/fertilizer maintenance.	**Residents**	Greenscapes North Shore Coalition and Town of Topsfield	- Number of views/ likes/ comments - Resident testimonials before and after posting	**FY2022**
School Curriculae/ Programs	Proctor School will host Greenscapes "Keeping Water Clean" Program.	**Residents**	Greenscapes North Shore Coalition	- Number of students/ teachers/ volunteers in attendance - Subset of students evaluated before and after program	**FY2022**
Meeting/ Presentation	Greenscapes NS will conduct a "Greenscapes 101" presentation for residents at site of community's choosing. Presentation will discuss the importance of clean and plentiful water.	**Residents**	Greenscapes North Shore Coalition	- Number of attendees - Resident testimonials	**FY2023**
Special Events/ Festivals/ Fairs	Greenscapes representatives will attend a trade show expo, with the intent of sharing "Greenscaping" practices and the importance of LIDs with Landscapers and Developers.	**Developers (Construction)**	Greenscapes North Shore Coalition	- Number of materials distributed - Number of contacts made - Developer testimonials	**FY2023**
Brochure/ Pamphlets	Pet Waste literature is available in two forms (one page info sheet or rack card) and can be redistributed as necessary.	**Residents**	Greenscapes North Shore Coalition	- Number distributed - Resident testimonials	**FY2023**
Social Media Post	Greenscapes will provide content for a social media "blast" on town Facebooks etc. Ex. Autumnal facebook post describing proper disposal of leaf collection, and springtime post about proper lawn/fertilizer maintenance.	**Residents**	Greenscapes North Shore Coalition and Town of Topsfield	- Number of views/ likes/ comments - Resident testimonials before and after posting	**FY2023**
School Curriculae/ Programs	Proctor School will host Greenscapes "Keeping Water Clean" Program.	**Residents**	Greenscapes North Shore Coalition	- Number of students/ teachers/ volunteers in attendance - Subset of students evaluated before and after program	**FY2023**


Topsfield Stormwater
System Map
Status August 2018
Legend
Tops_Outlets
StreamCL_jsm
FISH BROOK
HOWLETT BROOK
IPSWICH RIVER
MILE BROOK
Topsfield_Outline
catchbasins
Drain Pipe
Parcels
Farm
Stable
EPA_UA
2500
0
2500
5000
7500
10000 ft

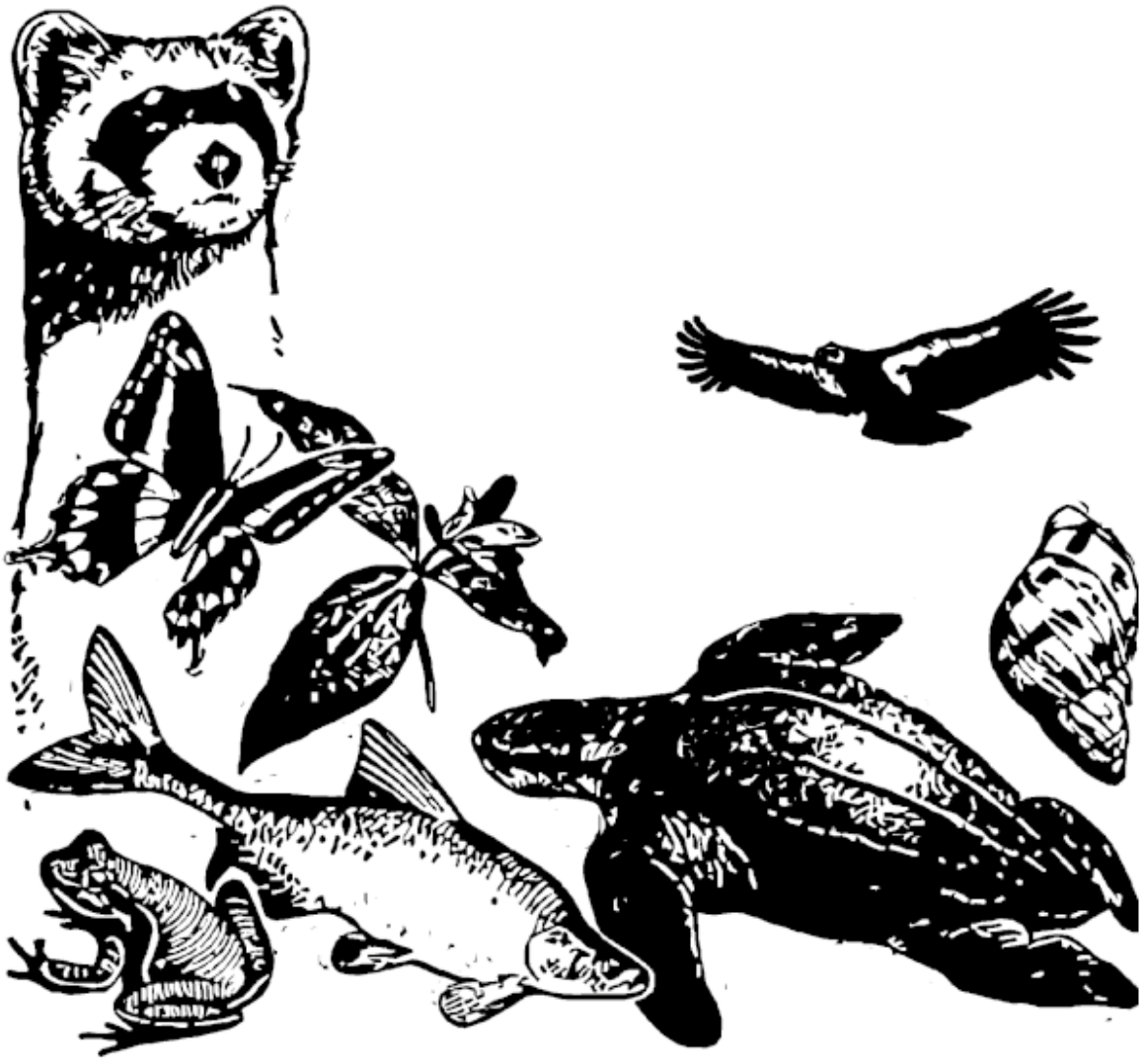
U.S. Fish & Wildlife Service

Town of Topsfield MS4 ESA review requirements

IPaC Trust Resources Report

Generated June 16, 2016 11:57 AM MDT, IPaC v3.0.7

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

Table of Contents

U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

Town of Topsfield MS4 ESA review requirements

LOCATION

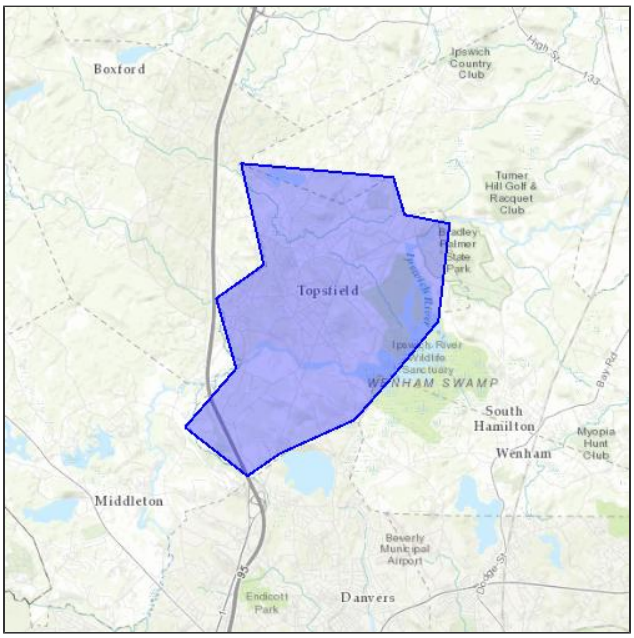
Essex County, Massachusetts

DESCRIPTION

This form is to demonstrate that the Town of Topsfield has used the appropriate tools for assessing impact of stormwater management on those Federally endangered species listed in the EPA MS4 permit.

IPAC LINK

https://ecos.fws.gov/ipac/project/PBNG3-EEP7J-GVHN5-AIGBY-G63D5M



U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Mammals

Northern Long-eared Bat Myotis septentrionalis — Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0JE

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

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1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The following species of migratory birds could potentially be affected by activities in this location:

American Oystercatcher Haematopus palliatus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G8

American Bittern Botaurus lentiginosus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F3

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Black-billed Cuckoo Coccyzus erythropthalmus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI

Blue-winged Warbler Vermivora pinus — Bird of conservation concern
Season: Breeding

Canada Warbler Wilsonia canadensis — Bird of conservation concern
Season: Breeding

Hudsonian Godwit Limosa haemastica — Bird of conservation concern
Season: Migrating

Least Bittern Ixobrychus exilis
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B092

Least Tern Sterna antillarum — Bird of conservation concern
Season: Breeding

Olive-sided Flycatcher Contopus cooperi — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0AN

Peregrine Falcon Falco peregrinus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Pied-billed Grebe Podilymbus podiceps — Bird of conservation concern
Season: Breeding

Prairie Warbler Dendroica discolor — Bird of conservation concern
Season: Breeding

Purple Sandpiper Calidris maritima — Bird of conservation concern
Season: Wintering

Saltmarsh Sparrow Ammodramus caudacutus — Bird of conservation concern
Season: Breeding

Seaside Sparrow Ammodramus maritimus — Bird of conservation concern
Season: Breeding

Short-eared Owl Asio flammeus — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Snowy Egret Egretta thula — Bird of conservation concern
Season: Breeding

Willow Flycatcher Empidonax traillii — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wood Thrush Hylocichla mustelina — Bird of conservation concern
Season: Breeding

Worm Eating Warbler Helmitheros vermivorum — Bird of conservation concern
Season: Breeding

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

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

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

DATA LIMITATIONS

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

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

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

DATA EXCLUSIONS

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

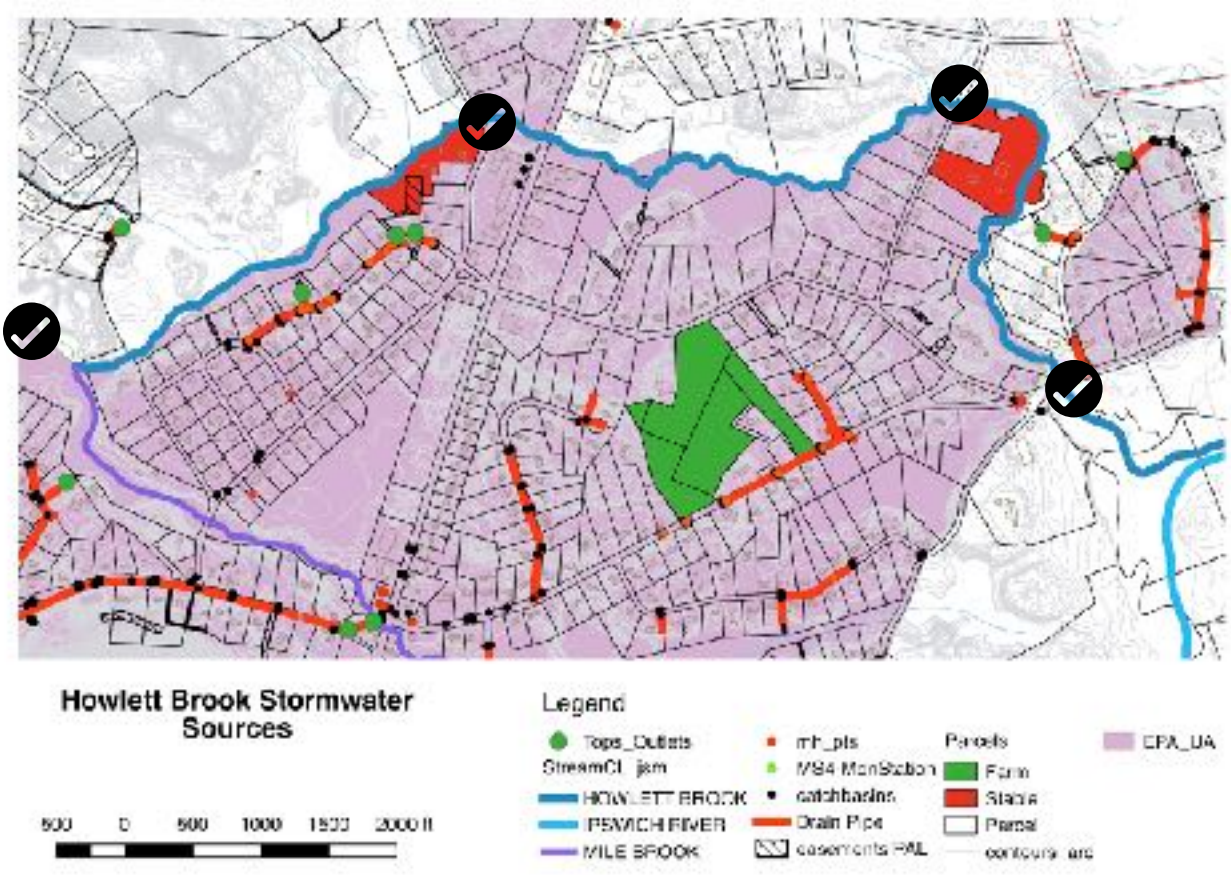
DATA PRECAUTIONS

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

Wetland data is unavailable at this time.

Biodiversity Consulting, LLC
Jim MacDougall
September 11, 2018

Howlett Brook Stormwater Monitoring



The Massachusetts Department of Environmental Protection has determined that Howlett Brook in Topsfield is contaminated with fecal bacteria. Hence, it is important for Topsfield to develop a monitoring plan for this watershed to isolate the source or sources of this pollution to meet the goals of the MS4 plan and more importantly improve water quality in Topsfield.

The first phase to develop a monitoring program is to map the contributions of stormwater to the Brook. This has been started and 90% of the point sources from road drains have been located and mapped. The remainder of point sources for Route One and Honor Place need to be investigated and

Details of horse stables

2014

documented. Also mapped are horse stables and farms that may be contributing bacteria from overland and groundwater flows.

On the map above, there are 4 monitoring sites marked such: ✔

Topsfield will conduct low flow sampling for Ecoli bacteria using the EPA approved method with m-ColiBlue24 medium. A link to this method can be found at:

https://www.hach.com/asset-get.download.jsa?id=53201915602

Simultaneous Detection and Enumeration of Total Coliforms and Escherichia coli using m-ColiBlue24 Membrane Filtration Medium

Summary of Method

A 100 mL water sample of surface water is filtered through a 47-mm, 0.45-µm pore size cellulose ester filter that retains the bacteria present in the sample. The filter is then transferred to a 50-mm Petri plate containing an absorbent pad saturated with m-ColiBlue24 broth or m-ColiBlue24 agar plate and incubated at 35 C for up to 24 hours. Both red and blue colonies may appear; the blue colonies are specific to the presence of E. coli while the red colonies are specific to non-E. coli coliforms. If the colonies are too numerous to count, a second test may be necessary with appropriate dilution with distilled water to make the number of colonies individually distinct for counting.

Results will be analyzed to isolate pollution contributions to the stream.

Appendix B

Stormwater Bylaws and Regulations

Stormwater and Erosion Control Regulations
Town of Topsfield Planning Board

1.0 PURPOSE

The purposes of these Stormwater and Erosion Control Regulations are to: 1) Protect, maintain and enhance the public health, safety, environment, and general welfare by establishing minimum requirements and procedures to control the adverse effects of increased post-development stormwater runoff, decreased groundwater recharge, and nonpoint source pollution associated with new development and redevelopment; 2) Protect, maintain and enhance the public safety, environment and general welfare by establishing minimum standards and procedures to control runoff and prevent soil erosion and sedimentation resulting from site construction/alteration and development, as more specifically addressed in the Stormwater Management and Erosion Control Bylaw of the Town of Topsfield.

These Stormwater Regulations address, among other issues, the difficulties of controlling stormwater runoff from developed areas located on drumlins within the Town of Topsfield. Drumlins are hills that consist of generally poorly drained soils, which moreover contain fragipan horizons in the subsoil. In a major rainstorm event the presence of these fragipan layers causes the uppermost region of the soil (from grade to about two feet below grade) to become saturated, which in turn causes stormwater to run off as if the area was an impervious surface. Moreover, in the presence of a grade the subsurface water between surface and fragipan horizon has been found to move at rates up to 30 feet per day. The combination of these runoff mechanisms may cause substantial flooding and damage to properties adjacent to a development that does not take drumlin soil conditions into account. Since the Town's residential and agricultural zones encompass a number of drumlins, the Stormwater Management and Erosion Control Bylaw and these Stormwater and Erosion Control Regulations have been implemented to take into account soil classifications to reflect stormwater runoff controls and protocols required to prevent damage to and flooding of adjacent properties.

2.0 DEFINITIONS

The definitions contained herein apply to issuance of a Stormwater Management Permit (SMP) established by the Town of Topsfield Stormwater Management and Erosion Control Bylaw and implemented through these Stormwater Regulations. Terms not defined in this section shall be construed according to their customary and usual meaning unless the context indicates a special or technical meaning.

ALTER: Any activity, which will measurably change the ability of a ground surface area to absorb water or will change existing surface drainage patterns. Alter may be similarly represented as "alteration of drainage characteristics," and "conducting land disturbance activities."

APPLICANT: A property owner or agent of a property owner who has filed an application for a stormwater management permit.

BEST MANAGEMENT PRACTICE (BMP): Structural, non-structural and managerial techniques that are recognized to be the most effective and practical means to prevent and/or reduce increases in stormwater volumes and flows, reduce point source and nonpoint source pollution, and promote stormwater quality and protection

of the environment. "Structural" BMPs are devices that are engineered and constructed to provide temporary storage and treatment of stormwater runoff. "Nonstructural" BMPs use natural measures to reduce pollution levels, do not require extensive construction efforts, and/or promote pollutant reduction by eliminating the pollutant source.

BETTER SITE DESIGN: Site design approaches and techniques that can reduce a site's impact on the watershed through the use of nonstructural stormwater management practices. Better site design includes conserving and protecting natural areas and greenspace, reducing impervious cover, and using natural features for stormwater management.

CERTIFIED PROFESSSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC): A recognized specialist in soil erosion and sediment control. This certification program, sponsored by the Soil and Water Conservation Society provides the public with evidence of professional qualifications.

CONVEYANCE: Any structure or device, including pipes, drains, culverts, curb breaks, paved swales or man-made swales of all types designed or utilized to move or direct stormwater runoff or existing water flow.

DEVELOPER: A person who undertakes or proposes to undertake land disturbance activities.

DEVELOPMENT: The modification of land to accommodate a new use or expansion of use, usually involving construction.

DISTURBANCE OF LAND: Any action that causes a change in the position, location, or arrangement of soil, sand, rock, gravel or similar earth material.

DRAINAGE EASEMENT: A legal right granted by a landowner to a grantee allowing the use of private land for stormwater management purposes.

DRUMLIN**:** A hill, mount, or ridge composed of compacted glacial till.

EROSION CONTROL: The prevention or reduction of the movement of soil particles or rock fragments.

EROSION CONTROL PLAN: A document containing narrative, drawings, and details developed by a qualified Professional Civil or Environmental Engineer (PE), Professional Land Surveyor (PLS), Certified Landscape Architect, or Certified Professional in Erosion and Sediment Control (CPESC), which includes best management practices, or equivalent measures designed to control surface runoff, erosion and sedimentation during all phases of construction related land disturbance activities.

ESTIMATED HABITAT OF RARE WILDLIFE AND CERTIFIED VERNAL POOLS: Habitats delineated for state-protected rare wildlife and certified vernal pools for use with the Wetlands Protection Act Regulations (310 CMR 10.00) and the Forest Cutting Practices Act Regulations (304 CMR 11.00).

FLOOD CONTROL: The prevention or reduction of flooding and flood damage

FLOODING: A local and temporary inundation or a rise in the surface of a body of water, such that it covers land not usually under water.

FRAGIPAN: A loamy, brittle subsurface layer low in porosity and organic matter, low in clay, and moderate to high in silt and fine sand content. A fragipan appears cemented when dry and restricts the growth of roots.

GRADING: Changing the level or shape of the ground surface.

GROUNDWATER: All water beneath any land surface including water in the soil and bedrock beneath water bodies.

GRUBBING: The act of clearing land by digging up roots and stumps.

HOTSPOT: Land uses or activities with higher potential pollutant loadings, such as auto salvage yards, auto fueling facilities, fleet storage yards, commercial parking lots with high intensity use, road salt storage areas, commercial nurseries and landscaping, outdoor storage and loading areas of hazardous substances, or marinas.

IMPERVIOUS SURFACE: Any material or structure on or above the ground that prevents water from infiltrating through the underlying soil. Impervious surface is defined to include, without limitation, parking lots, sidewalks, roof tops, driveways, patios, and paved, gravel, compacted dirt surfaced roads and similar surfaces with a runoff coefficient (Rational Method) greater than 85**.**

INFILTRATION: The act of conveying surface water into the ground to permit groundwater recharge and the reduction of stormwater runoff from a project site.

MASSACHUSETTS ENDANGERED SPECIES ACT: (MGL c.131A) with its implementing regulations (321 CMR 10.00) prohibits the taking of any rare plant or animal species listed as Endangered. Threatened, or of Special Concern (321 CMR 10.04 (1)).

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

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) or MUNICIPAL STORM DRAIN SYSTEM: The system of conveyances designed or used for collecting or conveying stormwater, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drainage system owned or operated by the Town of Topsfield*.*

NEW DEVELOPMENT: Any construction or land disturbance of a parcel of land that is currently in a natural vegetated state and does not contain alteration by man-made activities.

NONPOINT SOURCE POLLUTION: Pollution from many diffuse sources caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into water resource areas.

OPERATION AND MAINTENANCE PLAN: A plan that defines the functional, financial and organizational mechanisms for the ongoing operation and maintenance of a

stormwater management system to insure that it continues to function as designed.

OWNER: A person with a legal or equitable interest in a property.

PERSON: Any individual, group of individuals, association, partnership, corporation, company, business organization, trust, estate, the Commonwealth or political subdivision thereof to the extent subject to Town Bylaws, administrative agency, public or quasi-public corporation or body, the Town of Topsfield, and any other legal entity, its legal representatives, agents, or assigns.

POINT SOURCE: Any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, or container from which pollutants are or may be discharged.

POST-DEVELOPMENT: The conditions that reasonably may be expected or anticipated to exist after completion of the land development activity on a specific site or tract of land. Post-development refers to the phase of a new development or redevelopment project after completion, and does not refer to the construction phase of a project.

POORLY DRAINED SOILS: Poorly drained soils shall have the meaning as contained in the list of definitions set forth in the glossary under the heading of "drainage class" in the **Soil Survey of Essex County, Massachusetts - Northern Part** prepared by the US Department of Agriculture, Soil Conservation Service – Donald Fuller, editor, first printed 1981 and following editions. Poorly drained soils shall include all such soils listed as "moderately poorly drained, poorly drained, and very poorly drained" as well as soils that contain a fragipan layer in the section entitled Soil series and Morphology beginning on page 75 and ending on page 101 of the **Soil Survey of Essex County, Massachusetts – Northern Part.**

These soils are shown on the map adopted as part of the Stormwater and Erosion Control Regulations entitled **Topsfield, MA Areas of Severe Soil Limitations,** dated May 11, 2012 and are listed in Table 2-1 of the above publication, reproduced here.

Poorly Drained Soil Types Listed in the Natural Resources Conservation Service Soil Survey of Essex County North.

Soil Type (Series)	Origin	Features	Drainage
Leicester	Upland soils		P
Limerick	Floodplain areas		P
Maybid	Lacustrine		V
Paxton	Drumlins	Well drained, but has a fragipan 18-32 inches below grade	N/A
Pipestone	Outwash plains		M
Raynham	Lacustrine		P
Ridgebury	Drumlins	Fragipan 18" below grade	P
Saco	Floodplains		V
Scantic	Outwash, lacustrine		P
Scarboro	Outwash plains		V
Swanton	Outwash plains		P
Walpole	Outwash plains		P
Wareham	Outwash plains		P
Whately	Lacustrine		V
Whitman	Upland soils	Fragipan 18" below grade	V

M: Moderately poorly drained
P: Poorly drained
V: Very poorly drained

PRE-DEVELOPMENT: The conditions that exist at the time that plans for the land development of a tract of land are submitted to the Conservation Commission or Planning Board. Where phased development or plan approval occurs (preliminary grading, roads and utilities, etc.), the existing conditions at the time prior to the first plan submission shall establish pre-development conditions.

RECHARGE: The replenishment of underground water reserves.

REDEVELOPMENT: Any construction, alteration, or improvement of land that has been subject to previous development.

REGULATIONS: These Stormwater and Erosion Control Regulations as currently adopted and amended.

RESOURCE AREA: Any area protected under including, without limitation: the Massachusetts Wetlands Protection Act, Massachusetts Rivers Act, or Town of Topsfield Wetlands Protection Bylaw.

RUNOFF: Rainfall, snowmelt, or irrigation water flowing over the ground surface.

SEDIMENTATION: A process of depositing material that has been suspended and transported in water.

SITE: The parcel of land being developed, or a designated planning area in which the land development project is located.

SOILS MAP: The map adopted as part of the Stormwater and Erosion Control Regulations entitled **Topsfield, MA Areas of Severe Soil Limitations,** dated May 11, 2012,..

STORMWATER AUTHORITY: Town of Topsfield Planning Board or its authorized agents. The Topsfield Planning Board or its authorized agents are responsible for coordinating the review, approval and permit process as defined in this Bylaw. Other Boards and/or departments participate in the review process as defined in Section 5 of these Stormwater Regulations.

STORMWATER MANAGEMENT: The use of structural or non-structural practices that are designed to reduce storm water runoff pollutant loads, discharge volumes, and/or peak flow discharge rates.

STORMWATER MANAGEMENT PERMIT (SMP): A permit issued by the Planning Board, after review of an application, plans, calculations, and other supporting documents, which is designed to protect the environment of the Town from the deleterious affects of uncontrolled and untreated stormwater runoff.

STOP WORK ORDER: An order issued which requires that all construction activity on a site be stopped.

TSS: Total Suspended Solids**.**

WATER QUALITY VOLUME (WQ_v): The storage needed to capture a specified average annual stormwater runoff volume. Numerically (WQv) will vary as a function of drainage area or impervious area.

3.0 AUTHORITY

A) The Rules and Regulations contained herein have been adopted by Planning Board in accordance with the Town of Topsfield Stormwater and Erosion Control Bylaw.

B) Nothing in these Rules and Regulations is intended to replace or be in derogation of the requirements of the Town of Topsfield Wetlands General Bylaw and Regulations or the Town of Topsfield Floodplain Zoning Bylaw, the Town of Topsfield Rules and Regulations Governing the Subdivision of Land, the Ipswich River Protection District, the Groundwater Protection District or any Rules and Regulations adopted there under.

C) These Stormwater Regulations may be periodically amended by the Topsfield Planning Board in accordance with the procedures outlined in Section 51-4 of the Town of Topsfield Stormwater and Erosion Control Bylaw.

4.0 ADMINISTRATION

The Planning Board shall administer, implement and enforce these Regulations.

5.0 APPLICABILITY

A) These Stormwater and Erosion Control Regulations apply to all activities in accordance with the applicability section of the Town of Topsfield Stormwater Management and Erosion Control Bylaw and further described in this section. Projects and/or activities not within the jurisdiction of any of the Town of Topsfield Boards, Commissions or Departments but still within the jurisdiction of the Town of Topsfield Stormwater Management and Erosion Control Bylaw must obtain a Stormwater Management Permit from the Topsfield Planning Board in accordance with the permit procedures and requirements defined in Section 6 of these Stormwater and Erosion Control Regulations. For projects and/or activities within the jurisdiction of any of the Town of Topsfield Boards, Commissions or Departments, the specific application submission requirements, public notices, and fee requirements of the applicable Board, Commission and/or Department shall govern. Notwithstanding those requirements, the Stormwater Management and Erosion Control Plan Contents, Operation and Maintenance Plan Contents, and Stormwater Review Fee, under Section 6.0 L) and Section 6.0 M) of these Stormwater and Erosion Control Regulations must also be met, except as modified in Sections 5.0 B, C and D below.

B) If a project falls entirely within the jurisdiction of the Conservation Commission, pursuant to 310 CMR 10.05(6)(k)-(q), the Topsfield General Wetlands Bylaw and the Regulations for the General Wetlands Bylaw, the Planning Board will accept the Conservation Commission's hearing process and Order of Conditions in lieu of the requirements stated below. The applicant must submit to the Planning Board only two copies of the application cover sheet along with copies of the Conservation Commission's Order of Conditions. The Planning Board shall issue a Stormwater and Erosion Control Permit at its next regularly scheduled meeting after receipt of said materials. The filing fee shall be waived.

C) If a project is reviewed by the Planning Board for approval under the Town of Topsfield Subdivision Control Rules and Regulations, the Town of Topsfield Zoning By-Law Article IX, Site Plan Review or other rules and regulations, the Stormwater and Erosion Control permitting process shall run concurrently with that process. The standards described below shall apply to the stormwater management components of such review processes and must be met for approval of the project. The applicant must submit to the Planning Board such number of copies of the application for a Stormwater and Erosion Control Permit as it is required to submit under that process. The filing fee shall be waived. The Planning Board may issue a Stormwater and Erosion Control Permit in conjunction with approval of the following:

1. Definitive Plan for the Subdivision of Land - Any stormwater and erosion control permit issued in conjunction with a Definitive Plan for the Subdivision of Land shall apply to the alteration of the land approved in said plan, i.e. alteration associated with the construction of the infrastructure of the project and any grading or filling for the creation of lots indicated on the plan. Subsequent or additional alteration to individual lots in the subdivision will require stormwater and erosion control permits unless there are no changes from those approved in the Definitive Plan or the lots are exempt under the bylaw.
2. Open Space Development Plan
3. Site Plan Review
4. Elderly Housing District

D) If a project is reviewed for approval under the Town of Topsfield Zoning Bylaw Article IX, Site Plan Review by the Zoning Board of Appeals, the Stormwater and Erosion Control permitting process shall run concurrently with that process and the ZBA will review the application and will make a determination as to the issuance of the Stormwater Management Permit in accordance with these regulations. If the determination of the Zoning Board of Appeals is to approve the permit (or to approve it with conditions), then the applicant must submit to the Planning Board the decision of the ZBA and two copies of the application for a Stormwater and Erosion Control Permit along with any Orders of Conditions from the Conservation Commission. The Planning Board shall issue a Stormwater and Erosion Control Permit (subject to the same conditions, if any) at its next regularly scheduled meeting after receipt of said materials. The filing fee shall be waived.

6.0 PERMIT PROCEDURES AND REQUIREMENTS

A) Projects requiring a stormwater management permit shall be required to submit the materials as specified in this section, and are required to meet the stormwater management criteria as specified in Section 7.

B) Permit Required

1. No land owner or land operator shall receive any of the building, grading or other land development permits required for land disturbance activities without first meeting the requirements of the Stormwater Management and Erosion Control Bylaw prior to commencing the proposed activity.

2. The Planning Board may waive all or some of the requirements for a Stormwater Management and Erosion Control Permit application if it determines that some or all of the application requirements are unnecessary because of the size or character of the development project or because of the natural conditions of the site.

3. The applicant shall make all requests for waivers in writing and provide supporting information or documentation to demonstrate that some or all of the requirements are unnecessary because of minimal environmental impact or other reasons the why such waiver/s should be granted. The Planning Board's decision to grant or deny waivers shall be in writing and shall set forth reasons for the grant or denial. All waiver requests shall be acted upon within 45 calendar days of the date of application for such waivers*.*

4. If in the Planning Board's opinion, additional time or information is required for review of a waiver request, the Planning Board may request an extension of the review period. In the event **t**he applicant objects to an extension, or fails to provide requested information, the waiver request may be denied "without prejudice" by the Planning Board.

5. At the time of the application the applicant shall provide in writing the name of the person who is responsible for erosion and sediment control for the site disturbing activity which is the subject of the application. Said person shall ensure that the approved activity takes place in accordance with the application, plan and permit requirements.

6. Should a land-disturbing activity associated with an approved plan in accordance with this section not begin during the 3-year period following permit issuance, the Planning Board may evaluate the existing stormwater management plan to determine whether the plan still satisfies local stormwater management requirements and to verify that all design factors are still valid. If the authority finds the previously filed plan to be inadequate, a modified plan shall be submitted and approved prior to the commencement of land-disturbing activities.

C) Filing Application

The applicant shall file with the Town Clerk six (6) copies of a completed application package for a Stormwater Management Permit (SMP) and an electronic application in PDF format on a CD or DVD disc. Permit issuance is required prior to any site altering activity. While the applicant can be a representative, the permittee must be the owner of the site. The SMP Application package shall include:

1. A completed Application Form with original signatures of all owners;
2. A list of abutters, certified by the Assessors Office; (abutters at their mailing addresses shown on the most recent applicable tax list of the assessors, including owners of land directly opposite on any public or private street or way, and abutters to the abutters within 300 feet of the property line of the applicant, including any in another municipality or across a body of water);
3. Stormwater Management and Erosion Control Plan and project description;
4. Operation and Maintenance Plan;
5. Payment of the application and review fees;
6. Inspection and Maintenance agreement;
7. Surety bond.
8. One electronically formatted version of all of the above may be required.
9. The Planning Board reserves the right to request additional copies as necessary.

D) Entry

Filing an application for a permit grants the Planning Board, or its agent, permission to enter the site to verify the information in the application and to inspect for compliance with the resulting permit.

E) Fees

The Planning Board shall obtain with each submission an Application Fee established by the Planning Board to cover expenses connected with the review of the Stormwater Management Plan. The Planning Board is authorized to retain a Registered Professional Engineer or other professional consultant to advise the Planning Board on any or all aspects of these plans. Applicants must pay review fees before the review process may begin.

1. Rules

   a) Application fees are payable at the time of application and are non-refundable.

   b) Application fees shall be calculated by the Planning Board in accordance with the fee schedule below.

   c) These fees are in addition to any other local or state fees that may be charged under any other law, Bylaw, or local ordinance.

   d) The fee schedule may be reduced or increased by the Planning Board. Any such change shall be made at a posted public hearing of the Planning Board not less than (30) days prior to the date upon which the change is to be effective.

2. Application Fees

   A non-refundable application fee of $100 plus $.0030 times the total square footage of the area to be altered by the project shall be due and payable to the Town of Topsfield at the time an application is filed. Example for a project that alters 10,000 square feet: $100 + $.0030 x 10,000= $130.00 filing fee.

3. Engineering and Consultant Reviews and Fee

   a) The Planning Board is authorized to require an applicant to pay a fee for the reasonable costs and expenses for specific expert engineering and other consultant services deemed necessary by the Planning Board to come to a final decision on the application. This fee is called the "Engineering and Consultant Review Fee."

   b) Payment may be required at any point in the deliberations prior to a final decision.

   c) Any application filed with the Planning Board must be accompanied by a completed Engineering Consultant Fee Acknowledgement form.

   d) Consultant fees shall be determined at the time of project review based on a specific scope of work.

   e) The services for which a fee may be required include, but are not limited to, wetland survey and delineation, hydrologic and drainage analysis, wildlife evaluation, stormwater quality analysis, site inspections, as-built plan review, and analysis of legal issues.

   f) The Planning Board is authorized to require an applicant to pay reasonable costs and expenses for certain activities which utilize the services of Town Staff. This

includes such activities as inquiries concerning potential projects as well as site inspections not associated with a pending permit application.

g) The Planning Board may require any applicant to pay an additional fee of $30.00 per hour for review, inspection and monitoring services for any project filing that requires an excess of two (2) hours of review, inspection, and monitoring time by a Town Staff person prior to or during construction or after completion of the project..

h) Subject to applicable law, any unused portion of any fees collected shall be returned by the Planning Board to the applicant within forty-five calendar days of a written request by the applicant, unless the Planning Board decides in a public meeting that other action is necessary.

i) The Engineering and Consultant Review fees collected under this section shall be deposited in a pass book account held by the Town of Topsfield

4. Revision of Fee Schedules and Regulations Governing Fees

The Planning Board may review and revise its regulations and fee schedules periodically as it sees fit.

a) Amendments shall be preceded by a public hearing.

b) A copy of the written decision will be filed with the town clerk within 10 days after final action is taken.

F) Public Hearings

Unless the need for a public hearing is waived by the Planning Board, notice shall be posted and sent to all abutters within 300' of the project at least fourteen (14) days before the hearing. Applicants shall be responsible for the cost of mailings. For applications running concurrently with projects pursuant to Section 5. C and D above, notice relative to the Stormwater Management Permit shall be included in the legal notices for those projects.

G) Actions

The Planning Board's action, rendered in writing, shall consist of either:

1. Approval of the Stormwater Management Permit Application based upon determination that the proposed plan meets the Standards in Section 7 and will adequately protect the water resources of the community and is in compliance with the requirements set forth in the Bylaw;

2. Approval of the Stormwater Management Permit Application subject to any conditions, modifications or restrictions required by the Planning Board which will ensure that the project meets the Standards in Section 7 and adequately protects water resources, set forth in the Bylaw;

3. Disapproval of the Stormwater Management Permit Application based upon a determination that the proposed plan, as submitted, does not meet the Standards in Section 7 or fails to adequately protect water resources, as set forth in the Bylaw.

4. The Planning Board may disapprove an application "without prejudice" where an applicant fails to provide requested additional information that in the Planning Board's opinion is needed to adequately describe the proposed project. Information shall

generally be limited to those items listed in Section 6.0 L) of these Regulations.

H) Failure of the Planning Board to take final action upon an Application within 45 calendar days of the date of application shall be deemed to be approval of said Application. Upon certification by the Town Clerk that the allowed time has passed without Planning Board action, the Planning Board must issue a Stormwater Management Permit.

I) Plan Changes

The permittee must notify the Planning Board in writing of any drainage change or alteration in the system authorized in a Stormwater Management Permit before any change or alteration is made. If the Planning Board determines that the change or alteration is significant, based on the Stormwater Management Standards in Section 7 and accepted construction practices, the Planning Board may require that an amended application be filed.

J) Appeals of Actions of the Planning Board

A decision of the Planning Board shall be final. .

K) Project Completion

At completion of the project the permittee shall submit as-built record drawings of all structural stormwater controls and treatment best management practices required for the site as required in Section 7. The as-built drawing shall show deviations from the approved plans, if any, and be certified by a Registered Professional Civil or Environmental Engineer.

L) Stormwater Management and Erosion Control Plan Contents

1. The application for a stormwater management permit shall include the submittal of a Stormwater Management and Erosion Control Plan to the Planning Board. This Stormwater Management and Erosion Control Plan shall contain sufficient information for the Planning Board and/or Conservation Commission to evaluate the environmental impact, effectiveness, and acceptability of the measures proposed by the applicant for reducing adverse impacts from stormwater runoff. This plan shall be in accordance with the criteria established in these regulations and must be submitted with the stamp and signature of a Professional Civil or Environmental Engineer (PE) licensed in the Commonwealth of Massachusetts.

2. The Stormwater Management and Erosion Control Plan shall fully describe the project in drawings, narrative, and calculations. It shall include:

   a) Contact Information. The name, address, and telephone number of all persons having a legal interest in the property and the tax reference number and parcel number of the property or properties affected;

   b) A locus map, north arrow, map scale;

   c) The existing zoning, and land use at the site;

   d) The proposed land use;

   e) The location(s) of existing and proposed property lines and easements;

   f) The location of existing and proposed utilities, roads, Scenic Roads, structures and other impervious areas;

   g) The site's existing and proposed topography, including existing and proposed

slopes with contours at 2 foot intervals;

h) The existing site hydrology;

i) A description and delineation of existing stormwater conveyances, impoundments, and wetlands on or adjacent to the site or into which stormwater flows;

j) A delineation of 100-year flood plains, if applicable;

k) Estimated seasonal high groundwater elevation in areas to be used for stormwater retention, detention, or infiltration;

l) The existing vegetation, including all trees over 12 inch diameter measured at 4 feet above ground level, and proposed vegetation and ground surfaces with runoff coefficients for each;

m) Habitats mapped by the Massachusetts Natural Heritage and Endangered Species Program as Endangered, Threatened or of Special Concern, Estimated Habitats of Rare Wildlife and Certified Vernal Pools and Priority Habitats of Rare Species within 500 feet of any construction activity;

n) A drainage area map showing pre and post construction watershed boundaries, drainage area and stormwater flow paths, including municipal drainage system flows;

o) A description and drawings of all components of the proposed stormwater management and erosion control systems including:

   i. Locations, cross sections, and profiles of all brooks, streams, drainage swales and their method of stabilization;
   ii. Detailed drawings, structural details, materials to be used, construction specifications, and design calculations of all temporary and permanent stormwater, erosion and sediment control structures and devices;
   iii. Narrative that includes a discussion of each measure, its purpose, it construction sequence and installation timing as they relate to soil disturbance;
   iv. A plan showing areas of vegetation alteration, soil disturbance and areas of cut and fill;
   v. The project's phases as they relate to vegetation alteration, soil disturbance, cut and fill, including proposed designated stockpile locations with a tabulated sequence of construction and construction schedule, including earthworks;
   vi. Proposed schedule for the inspection and maintenance of erosion control measures for the project throughout the construction period;
   vii. Name and 24hr/7day contact information of the person responsible for the site's development;
   viii. The structural details for all components of the proposed drainage systems;
   ix. Notes on drawings specifying materials to be used, construction specifications, and expected hydrology with supporting calculations;
   x. Proposed improvements including location of buildings or other structures, impervious surfaces, and drainage facilities, if applicable;
   xi. Any other information requested by the Conservation Commission or Planning Board.

3. Hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in this Regulation. Such calculations shall include:

   a) Description of the design storm frequency, intensity and duration;

b) Time of concentration;

c) Soil Runoff Curve Number (RCN) based on land use and soil hydrologic group;

d) Peak runoff rates and total runoff volumes for each watershed area;

e) Information on construction measures used to maintain the infiltration capacity of the soil where any kind of infiltration is proposed;

f) Infiltration rates, where applicable;

g) Culvert capacities;

h) Flow velocities;

i) Data on the increase in rate and volume of runoff for the specified design storms, and

j) Documentation of sources for all computation methods and field test results.

4. Post-Development downstream analysis if deemed necessary by the Conservation Commission or Planning Board*;*

5. Soils Information from test pits performed at the location of proposed stormwater management facilities, including but not limited to soil descriptions, depth to seasonal high groundwater, depth to bedrock, and percolation rates. Soils information will be based on site test pits logged by a Massachusetts Registered Soil Evaluator, or a Massachusetts Registered Professional Engineer;

6. Landscaping plan describing the woody and herbaceous vegetative stabilization and management techniques to be used within and adjacent to the stormwater practice.

7. Applicants whose lots are located in any of the areas of the Soils Map listed as "Poorly Drained" shall also , submit the following material in support of the proposed activity:

   a) Observation or test pit logs from Title V septic system soils assessment, or soil logs to a depth of at least three feet, to establish the soil characteristics on which any post-development stormwater runoff analysis and provisions will be based. Soil/test pit logs shall include, at a minimum, the soil type and the presence of fragipan layers, if any, within the soil horizon under investigation and/or within the proposed area of work.

   b) A written description and a drawing(s) of the proposed activity inclusive of all construction activity and access requirements. Said plan shall show all items that may impact the characteristics of stormwater runoff on the site, such as, but not limited to: buildings, septic systems, swimming pools, tennis courts, riding rings, patios or terraces, and any areas of restricted storm-water recharge capacity. The plan shall bear the signature and seal of an engineer or land surveyor registered in the Commonwealth of Massachusetts.

   c) The plan shall show all resource areas pursuant to the Wetlands Protection Act (MGL Chapter 131, Section 40) and the Topsfield General Wetlands Bylaw (Chapter 62) within and adjacent to the work area.

   d) The plan shall show all culverts, pipes or drainage facilities (such as swales, trenches or ditches) that lead from the lot to adjoining properties or public ways.

   e) The plan shall contain topological data that is related to a USGS datum.

8. If the storm-water run-off analysis is conducted using any computer-aided modification of the “Rational Method” such as Hydro-Cad®, the applicant shall demonstrate the model’s ability to include the effects of the presence of fragipan layers within the catchment area analyzed. An analysis based upon the Drainmod model or one that incorporates the presence of fragipan layers in its storm-water run-off model is preferred.

9. Proposed storm-water drain facilities inclusive of drainage swales that will be connected to existing off-lot drainage systems shall require an analysis that demonstrates that the off-lot drains have sufficient capacity to accommodate the additional run-off from the proposed drain. Any connection to a municipal storm drain system or in an easement owned by the Town of Topsfield shall require written permission from the Topsfield Highway Department prior to making that connection.

M) Operation and Maintenance Plan Contents

An Operation and Maintenance plan (O&M Plan) is required at the time of application for all projects. The maintenance plan shall be designed to ensure compliance with the Permit and the Stormwater and Erosion Control Bylaw and that the Massachusetts Surface Water Quality Standards, 314, CMR 4.00 are met in all seasons and throughout the life of the system. The Operation and Maintenance Plan shall remain on file with the Planning Board and shall be an ongoing requirement. The O&M Plan shall include:

1. The name(s) of the owner(s) for all components of the system;

2. A map showing the location of the systems and facilities including catch basins, manholes/access lids, main, and stormwater devices;

3. Maintenance agreements that specify:

   a) The names and addresses of the person(s) responsible for operation and maintenance;
   b) The person(s) responsible for financing inspections, maintenance and emergency repairs;
   c) An Inspection and Maintenance Schedule for all stormwater management facilities including routine and non-routine maintenance tasks to be performed;
   d) A list of easements with the purpose and location of each;
   e) The signature(s) of the owner(s).

4. Stormwater Management Easement(s)

   a) Stormwater management easements shall be provided by the property owner(s) as necessary for:

      i. Access for facility inspections and maintenance;
      ii. Preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities, including flood routes for the 100-year storm event;
      iii. Direct maintenance access by heavy equipment to structures requiring regular maintenance.

   b) The purpose of each easement shall be specified in the maintenance agreement signed by the property owner.

   c) Stormwater management easements are required for all areas used for off-site stormwater control, unless a waiver is granted by the Planning Board.

d) Easements shall be recorded with the Essex County Registry of Deeds.

5. Changes to Operation and Maintenance Plans

a) The owner(s) of the stormwater management system must notify the Planning Board of changes in ownership or assignment of financial responsibility.

b) The maintenance schedule in the Maintenance Agreement may be amended to achieve the purposes of this Regulation by mutual agreement of the Planning Board and the Responsible Parties. Amendments must be in writing and signed by all Responsible Parties. Responsible Parties shall include owner(s), persons with financial responsibility, and persons with operational responsibility.

7.0 POST-DEVELOPMENT STORMWATER MANAGEMENT CRITERIA

A) At a minimum all projects shall comply with the performance standards of the most recent version of Massachusetts Department of Environmental Protection (DEP) Stormwater Management Policy, as well as the following:

B) General Criteria

The following general performance criteria shall be applicable to all stormwater management plans, unless otherwise provided for in this Regulation:

1. No Untreated Discharges

All stormwater runoff generated from land development and land use conversion activities shall not discharge untreated stormwater runoff directly to a wetland, local water body, municipal drainage system, or abutting property, without adequate treatment.

2. Channel Protection

Protection of channels from bank and bed erosion and degradation shall be provided by controlling the peak discharge rate from the 2-yr storm event to the pre-development rate as required by the MA DEP Stormwater Management Policy.

3. Overbank Flooding Protection

Downstream overbank flood and property protection shall be provided by attenuating the post-development peak discharge rate to the pre-development rate for the 10-year, 24-hour return frequency storm event as required by the MA DEP Stormwater Management Policy.

4. Extreme Flooding Protection

Extreme flooding and public safety protection shall be provided by evaluating the 100-year, 24-hour return frequency storm event to demonstrate no increased flooding impacts off-site, as required by the MA DEP Stormwater Management Policy.

5. Recharge

a) Annual groundwater recharge rates shall be maintained, by promoting infiltration through the use of structural and non-structural methods. At a minimum, annual recharge from the post development site shall mimic the annual recharge from

pre-development site conditions.

The recharge volume may be reduced for developments where clean rooftop runoff (as defined by the MA DEP Stormwater Management Policy) is directed to pervious areas where it can either infiltrate into the soil or flow over it with sufficient time and velocity to allow for filtering. In such a situation, the effective impervious area of the site may be reduced by the roof area to be infiltrated. To use this credit the following conditions must be met:

i. The rooftop contributing area to any one discharge location cannot exceed 1000 sq. ft.
ii. The contributing length of a rooftop to a single discharge location cannot exceed 75 feet.
iii. Slopes must be less than 5.0% to permit infiltration.
iv. Discharges must be located at least 10 feet away from the nearest impervious surface, and the rooftop runoff must not commingle with any runoff from paved surfaces at any designated 'hotspot' land use.
v. Dry wells or infiltration trenches can be used where necessary to ensure infiltration into less permeable soils.
vi. The use of rain gardens and bio-retention cells to receive and infiltrate rooftop runoff is encouraged.

b) The stormwater runoff volume to be recharged to groundwater should be determined using the methods prescribed in the latest version of the Massachusetts DEP Stormwater Management Manual. The recharge requirements shall apply to all activities within the jurisdiction of this Regulation except as noted, and unless specifically waived by Planning Board. The recharge criterion is not required for any portion of a site designated as a stormwater hotspot (see Section 7.10 of this Regulation). In addition, the Planning Board or Conservation Commission may relax or eliminate the recharge requirement at its discretion, if the site is situated on unsuitable soils or is in a redevelopment area with documentation of prior contaminated soils.

6. Structural Practices for Water Quality

a) Presumed Compliance with Massachusetts Water Quality Standards

All structural stormwater management facilities shall be selected and designed using the appropriate criteria from the most recent version of the Massachusetts DEP Stormwater Management Manual.

Applicants are encouraged to meet water quality standards through the use of low impact techniques such as bio-retention cells and vegetated filter strips. For structural stormwater controls not included in the Massachusetts Stormwater Management Manual, or for which pollutant removal rates have not been previously documented by prior applicants, the applicant must document the effectiveness and pollutant removal of the structural control by providing scientific studies, literature reviews, or other citations, in order to receive approval from the Planning Board before including such techniques in the design of a stormwater management system.

Structural best management practices (BMPs) must be designed to remove 80% of the average annual post development total suspended solids (TSS) and 40% for total phosphorus (TP), and 30%for total nitrogen (TN). It is presumed that a BMP complies with this performance goal if it is:

i. Sized to capture the prescribed water quality volume;
ii. Designed according to the specific performance criteria outlined in the Massachusetts Stormwater Management Manual;
iii. Constructed properly; and
iv. Maintained regularly.

b) Pollutant Loading Calculation Assessment

i. For residential developments of 20-acres or more, any commercial project with a building 10,000 square feet or more, or any project in an area designated by the Planning Board or Conservation Commission as a sensitive/critical area, a pollutant loading calculation may be conducted upon the request of the Planning Board or Conservation Commission to document compliance with water quality standards by calculating pre-development loads, calculating uncontrolled post-development loads and then applying a prescribed pollutant removal efficiency to selected practices to arrive at a net pollutant load delivery. The post-developed load must be equal to or less than the pre-developed load.

ii. The methodology for this calculation shall be in accordance with The Simple Method, located in the Massachusetts Stormwater Management Manual entitled: Method of Pollutant Control Calculation for Compliance with Water Quality Standards

7. Water Quality Volume

The prescribed water quality volume required in the sizing of a structural stormwater practice shall be 0.50 inches x the total impervious area of the drainage area and 1.0 inches x the total impervious area of the drainage area in critical areas, as specified in the Massachusetts DEP Stormwater Policy.

The water quality volume may be reduced for developments where clean rooftop runoff (as defined by the MA DEP Stormwater Management Policy) is directed to pervious areas where it can either infiltrate into the soil or flow over it with sufficient time and velocity to allow for filtering. In such a situation, the total impervious area of the site may be reduced by the roof area to be infiltrated. To use this credit the following conditions must be met:

a) The rooftop contributing area to any one discharge location cannot exceed 1000 sq. ft.

b) The contributing length of a rooftop to a single discharge location cannot exceed 75 feet.

c) Slopes must be less than 5.0% to permit infiltration.

d) Discharges must be located at least 10 feet away from the nearest impervious surface, and the rooftop runoff must not commingle with any runoff from paved surfaces at any designated ‘hotspot’ land use.

e) Dry wells or infiltration trenches can be used where necessary to ensure infiltration into less permeable soils.

f) The use of rain gardens and bio-retention cells to receive and infiltrate rooftop runoff is encouraged.

8. Hydrologic Basis for Design of Structural Practices

For facility sizing criteria, the basis for hydrologic and hydraulic evaluation of development sites are as follows:

a) Impervious cover is measured from the site plan and includes any material or structure on or above the ground that prevents water from infiltrating through the underlying soil. Impervious surface is defined to include, without limitation: parking lots, sidewalks, roof tops, driveways, patios, and paved, gravel and compacted dirt surfaced roads.

b) Off-site areas shall be assessed based on their “pre-developed condition” for computing the water quality volume (i.e, treatment of only on-site areas is required). However, if an offsite area drains to a proposed BMP, flow from that area must be accounted for in the sizing of a specific practice.

c) Off-site areas draining to a proposed facility should be modeled as "present condition" for peak-flow attenuation requirements.

d) The length of sheet flow used in time of concentration calculations is limited to no more than 50 feet for predevelopment conditions and 50 feet for post development conditions.

e) Detention time for the one-year storm is defined as the center of mass of the inflow hydrograph and the center of mass of the outflow hydrograph.

f) The models TR-55 and TR-20 (or approved equivalent) will be used for determining peak discharge rates.

g) The standard for characterizing pre-development land use for on-site areas shall be woods.

h) For purposes of computing runoff, all pervious lands in the site shall be assumed prior to development to be in good condition regardless of conditions existing at the time of computation.

i) If an off-site area drains to a facility, off-site areas should be modeled, assuming an "ultimate buildout condition" upstream.

j) Determination of flooding and channel erosion impacts to receiving streams due to land development projects shall be measured at each point of discharge from the development project and such determination shall include any runoff from the balance of the watershed which also contributes to that point of discharge.

k) The specified design storms shall be defined as a 24-hour storm using the rainfall distribution recommended by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) or the Northeast Regional Climate Center “Atlas of Precipitation Extremes for the Northeastern United State and Southeastern Canada.”

l) Proposed residential, commercial, or industrial subdivisions shall apply these stormwater management criteria to the land development as a whole. Individual lots in new subdivisions shall not be considered separate land development projects, but rather the entire subdivision shall be considered a single land development project. Hydrologic parameters shall reflect the ultimate land development and shall be used in all engineering calculations.

9. Sensitive Areas

Stormwater discharges to critical areas with sensitive resources (i.e., swimming areas, aquifer recharge areas, water supply reservoirs) may be subject to additional criteria, or may need to utilize or restrict certain stormwater management practices at

the discretion of the Conservation Commission or the Planning Board. The Planning Board may designate sensitive areas and specific criteria for these areas after conducting a public hearing in accordance with the provisions of Section 51-4 of the Town of Topsfield Stormwater and Erosion Control Bylaw.

10. Hotspots

    Stormwater discharges from land uses or activities with higher potential pollutant loadings, known as "hotspots", as defined in the most recent version of the MA DEP Stormwater Management Manual require the use of specific stormwater management BMPs as specified in the most recent version of the MA DEP Stormwater Management Manual. The use of infiltration practices without pretreatment is prohibited.

8.0 SURETY

The Planning Board may require the permittee to post before the start of land disturbance or construction activity, a surety bond, irrevocable letter of credit, cash, or other acceptable security to be known as the Stormwater Completion Surety. The form of the bond shall be approved by town counsel, and be in an amount deemed sufficient by the Planning Board to ensure that the work will be completed in accordance with the permit. If the project is phased, the Planning Board may release part of the bond as each phase is completed in compliance with the permit but the bond may not be fully released until the Planning Board has received the as built plans as required by Section 11 of these Regulations and issued a Certificate of Completion.

The Planning Board may also require the permittee to secure the future maintenance of the stormwater system by a perpetual surety bond or by a deposit of money of an amount as determined by the Planning Board. This shall be named the Stormwater Maintenance Surety. In the event that the permittee does not follow maintenance procedures and programs as approved by the Planning board, the Board shall have the authority to expend any portion of said, security to provide such maintenance.

9.0 CONSTRUCTION INSPECTIONS

A) Notice of Construction Commencement. The applicant must notify the Planning Board at least a week in advance before the commencement of construction. In addition, the applicant must notify the Planning Board in advance of construction of critical components of the stormwater management system.

B) At the discretion of the Planning Board, periodic inspections of the stormwater management system construction shall be conducted by a professional civil or environmental engineer or who has been approved by the Planning Board. All inspections shall be documented and written reports prepared that contain the following information:

    1. The date and location of the inspection;

    2. Whether construction is in compliance with the approved stormwater management plan;

    3. Variations from the approved construction specifications; and

    4. Any other variations or violations of the conditions of the approved stormwater

management plan.

C) The Planning Board or its designee shall have the right to inspect the project site at the following stages, at a minimum:

1. Initial Site Inspection: prior to approval of any plan;

2. Erosion Control Inspection: to ensure erosion control practices are in accord with the filed plan;

3. Stormwater Management System Inspection: An inspection will be made of the completed stormwater management system, prior to backfilling of any underground drainage or stormwater conveyance structures.

4. Final Inspection

   a) After the stormwater management system has been constructed and before the Stormwater Completion surety has been released, all applicants are required to submit actual “as built” plans for any stormwater management facilities or practices after final construction is completed and must be certified by a Professional Civil or Environmental Engineer.

   b) The Planning Board or its designee shall inspect the system to confirm its "as-built" features. This inspector shall also evaluate the effectiveness of the system in an actual storm. If the inspector finds the system to be adequate he shall so report to the Planning Board. As built plans shall be full size plans which reflect the “as built” conditions, including all final grades, developed by a Professional Civil or Environmental Engineer. All changes to the approved project design should be recorded in red ink on all copies of plans to define changes made. All work deleted, corrections in elevations, and changes in materials, should be shown on the as built drawings.

D) Inadequacy of System

1. If the system is found to be inadequate by virtue of physical evidence of operational failure, even though it was built as called for in the Stormwater Management Plan, it shall be corrected by the applicant. If the applicant fails to act the Planning Board may use the Stormwater Completion Surety to complete the work.

2. If the Planning Board determines that there is a failure to comply with the plan, the property owner shall be notified in writing of the nature of the violation and the required corrective actions. A Stop Work Order shall be issued until any violations are corrected and all work previously completed has received approval by the Planning Board.

10.0 INSPECTION AND MAINTENANCE

A) Maintenance Responsibility

1. Stormwater management facilities and practices included in a stormwater management plan with an inspection and maintenance agreement in accordance with Section 6.M of these Regulations must undergo ongoing inspections to document maintenance and repair needs and ensure compliance with the requirements of the agreement, the plan and these Regulations.

2. The owner of the property on which work has been done pursuant to these Regulations for private stormwater management facilities, or any other person or agent in control of such property, shall maintain in good condition and promptly repair and restore all grade surfaces, walls, drains, dams and structures, vegetation, erosion and sedimentation controls, and other protective devices. Such repairs or restoration and maintenance shall be in accordance with approved plans.

B) Maintenance Inspections

1. All stormwater management facilities must undergo inspections to document maintenance and repair needs and ensure compliance with the requirements of this bylaw and accomplishment of its purposes as specified in the Operation and Maintenance Plan and Maintenance Agreement described under Section 6.M of these regulations.

2. At a minimum, inspections shall occur during the first year of operation and at least once every 3 years thereafter. In addition, a maintenance agreement as specified under Section 6.M of these regulations between the owner and the Planning Board shall be executed for privately-owned stormwater management systems that specifies the Responsible Party for conducting long term inspections.

3. Inspection reports shall be submitted to and maintained by the Planning Board for all stormwater management systems. Inspection reports for stormwater management systems shall include:

   a) The date of inspection;
   b) Name of inspector;
   c) The condition of:

      i. Pretreatment devices
      ii. Vegetation or filter media
      iii. Fences or other safety devices
      iv. Spillways, valves, or other control structures
      v. Embankments, slopes, and safety benches
      vi. Reservoir or treatment areas
      vii. Inlet and outlet channels and structures
      viii. Underground drainage
      ix. Sediment and debris accumulation in storage and forebay areas (including catch basins)
      x. Any nonstructural practices
      xi. Any other item that could affect the proper function of the stormwater management system

   d) Description of the need for maintenance;

C) Right-of-Entry for Inspection

The terms of the inspection and maintenance agreement as specified in Section 6.M of these regulations shall provide for the Planning Board or its designee to enter the property at reasonable times and in a reasonable manner for the purpose of inspection. The Planning Board, its agents, officers, and employees shall have authority to enter upon privately owned land for the purpose of performing their duties under this Regulation and may make or cause to be made such examinations, surveys, or sampling as the Planning Board deems necessary, subject to the constitutions and laws of the United States and the Commonwealth.

D) Records of Maintenance and Repair Activities

Parties responsible for the operation and maintenance of a stormwater management facility shall provide records of all maintenance and repairs to the Planning Board, upon request. Parties responsible for the operation and maintenance of a stormwater management facility shall make records of the installation and of all maintenance and repairs, and shall retain the records for at least 5 years. These records shall be made available to the Planning Board during inspection of the facility and at other reasonable times upon request.

E) Failure to Maintain

1. If a responsible person fails or refuses to meet the requirements of the inspection and maintenance agreement, the Planning Board or its agents, officers and employees, after 30 days written notice (except, that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient), may correct a violation of the design standards or maintenance requirements by performing the necessary work to place the facility or practice in proper working condition. In the event that the responsible person, permittee or subsequent owners do not follow maintenance procedures and programs for stormwater facilities as approved by the Planning Board, the Board or its agents shall have the authority to expend any portion of the Stormwater Maintenance Surety to provide such maintenance and repairs as needed.

2. After notification is provided to the person responsible for carrying out the maintenance plan of any deficiencies discovered from an inspection of a stormwater management system, the person responsible for carrying out the maintenance plan shall have 30 days or other time frame mutually agreed to between the Planning Board and the person responsible for carrying out the maintenance plan to correct the deficiencies. The Planning Board or its designee shall then conduct a subsequent inspection to ensure completion of repairs.

11.0 ENFORCEMENT

A) The Stormwater Coordinator, the Planning Board or an authorized agent of the Planning Board shall enforce this Bylaw, regulations, orders, violation notices, and enforcement orders, and may pursue all civil, criminal and non-criminal remedies for such violations.

B) Notices and Orders

1. The Planning Board or an authorized agent of the Planning Board may issue a written notice of violation or enforcement order to enforce the provisions of this Bylaw or the regulations there under, which may include requirements to:

   a) Cease and desist from construction or land disturbing activity until there is compliance with the Bylaw and the stormwater management permit;

   b) Repair, maintain; or replace the stormwater management system or portions thereof in accordance with the operation and maintenance plan;

   c) Perform monitoring, analyses, and reporting;

   d) Fix adverse impact resulting directly or indirectly from malfunction of the stormwater management system.

2. If the enforcing person determines that abatement or remediation of adverse impacts is required, the order may set forth a deadline by which such abatement or remediation must be completed. Said order may further advise that, should the violator or property owner fail to abate or perform remediation within the specified deadline, the Town of Topsfield may, at its option, undertake such work, and the property owner shall reimburse the Town of Topsfield for expenses incurred.

3. Within thirty (30) days after completing all measures necessary to abate the violation or to perform remediation, the violator and the property owner shall be notified of the costs incurred by the Town of Topsfield including administrative costs. The violator or property owner may file a written protest objecting to the amount or basis of costs with the Planning Board within thirty (30) days of receipt of the notification of the costs incurred. If the amount due is not received by the expiration of the time in which to file a protest or within thirty (30) days following a decision of the Planning Board affirming or reducing the costs, or from a final decision of a court of competent jurisdiction, the costs shall become a special assessment against the property owner and shall constitute a lien on the owner's property for the amount of said costs. Interest shall begin to accrue on any unpaid costs at the statutory rate provided in G.L. Ch. 59, § 57, after the thirty-first day at which the costs first become due.

C) Any person who violates any provision of the Town of Topsfield Stormwater and Erosion Control Bylaw, or regulation, order or permit issued there under, may be ordered to correct the violation and/or shall be punished by a fine of not more than $300. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

D) Non-Criminal Disposition. As an alternative to criminal prosecution or civil action, the Town of Topsfield may elect to utilize the non-criminal disposition procedure set forth in G.L. Ch. 40, §21D and the applicable Town by-law should the Town of Topsfield adopt said statute. In such case the Highway Superintendent or his agent of the Town of Topsfield shall be the enforcing person. The penalty for the 1st violation shall be **$**100. The penalty for the 2nd violation shall be $200. The penalty for the 3rd and subsequent violations shall be $300 Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

E) Appeals**.** The decisions or orders of the Planning Board shall be final. Further relief shall be to a court of competent jurisdiction.

F) Remedies Not Exclusive. The remedies listed in this Bylaw are not exclusive of any other remedies available under any applicable federal, state or local law.

13.0 SEVERABILITY

The invalidity of any section, provision, paragraph, sentence, or clause of these Regulations shall not invalidate any section, provision, paragraph, sentence, or clause thereof, nor shall it invalidate any permit or determination that previously has been issued.

Accepted unanimously by the Planning Board
March 19, 2013

Chapter 216

STORM DRAINS

[HISTORY: Adopted by the Town Meeting of the Town of Topsfield as indicated in article histories. Amendments noted where applicable.]

ARTICLE I

Illicit Discharges to Storm Drains

[Adopted 5-4-2010 TM by Art. 38 (Ch. LIX of the General Bylaws)]

§ 216-1. Findings and intent.

A. Increased and contaminated stormwater runoff is a major cause of impairment of water quality and flow in lakes, ponds, streams, rivers, wetlands and groundwater; contamination of drinking water supplies; alteration or destruction of aquatic and wildlife habitat; and flooding.

B. Regulation of illicit connections and discharges to the municipal storm drain system is necessary to protect the Town of Topsfield's water bodies and groundwater, and to safeguard the environment and public health, safety and welfare.

C. The objectives of this bylaw are:

(1) To prevent pollutants from entering Topsfield's municipal separate storm sewer system (MS4);

(2) To prohibit illicit connections and unauthorized discharges to the MS4;

(3) To require the removal of all such illicit connections;

(4) To comply with state and federal statutes and regulations relating to stormwater discharges; and

(5) To establish the legal authority to ensure compliance with the provisions of this bylaw through inspection, monitoring, and enforcement.

§ 216-2. Definitions.

As used in this bylaw, the following terms shall have the meanings indicated:

AUTHORIZED ENFORCEMENT AGENCY — The Topsfield Stormwater Officer shall administer and implement this bylaw. Any powers granted to or duties imposed upon the Stormwater Officer may be delegated in writing by the Stormwater Officer to the appropriate agents of the Town, i.e., the employees and agents of the Highway Department, the Board of Health, the Police and Fire Departments, the Conservation Commission and the Inspectional Services Department.

BEST MANAGEMENT PRACTICE (BMP) — An activity, procedure, restraint, or structural improvement that helps to reduce the quantity or improve the quality of stormwater runoff.

CLEAN WATER ACT — The Federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and as hereafter amended.

GROUNDWATER — Water beneath the surface of the ground.

ILLICIT CONNECTION — Any indoor or outdoor drain or conveyance, whether on the surface or subsurface, that allows an illicit discharge to enter the storm drain system, including but not limited to any conveyances that allow any non-stormwater discharge, including sewage, process wastewater, and wash water, to enter the storm drain system, regardless of whether said drain or connection had been previously allowed, permitted, or approved.

ILLICIT DISCHARGE — Direct or indirect discharge to the municipal storm drain system that is not composed entirely of stormwater, except as exempted in § 216-8. The term does not include a discharge in compliance with an NPDES stormwater discharge permit or a surface water discharge permit.

IMPERVIOUS SURFACE — Any material or structure on or above the ground that prevents water from infiltrating the underlying soil. Impervious surfaces include without limitation roads, paved parking lots, sidewalks, and rooftops.

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) or MUNICIPAL STORM DRAIN SYSTEM —

The system of conveyances designed or used for collecting or conveying stormwater, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drainage system owned or operated by the Town of Topsfield.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER DISCHARGE PERMIT — A permit issued by United States Environmental Protection Agency or jointly with the state that authorizes the discharge of pollutants to waters of the United States.

NON-STORMWATER DISCHARGE — Discharge to the municipal storm drain system not composed entirely of stormwater.

PERSON — A partnership, association, firm, company, trust, corporation, agency, authority, department or political subdivision of the commonwealth or the federal government, to the extent permitted by law, and any officer, employee, or agent of such entity or an individual.

POLLUTANT — Anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; nonhazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordnance, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; sedimentary material and noxious or offensive matter of any kind.**[Amended 5-8-2021 ATM by Art. 33]**

PROCESS WASTEWATER — Water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any material, intermediate product, finished product, or waste product.

RECHARGE — The process by which groundwater is replenished by precipitation through the percolation of runoff and surface water through the soil.

STORMWATER — Precipitation runoff, snow melt runoff, and surface water runoff and drainage.

SURFACE WATER DISCHARGE PERMIT — A permit issued by the Department of Environmental Protection (DEP) pursuant to 314 CMR 3.00 that authorizes the discharge of pollutants to waters of the Commonwealth of Massachusetts.

TOXIC OR HAZARDOUS MATERIAL OR WASTE — Any material which, because of its quantity, concentration, chemical, corrosive, flammable, reactive, toxic, infectious or radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential threat to the environment or to human health, safety, or welfare. Toxic or hazardous materials include any synthetic organic chemical, petroleum product, heavy metal, radioactive or infectious waste, acid and alkali, and any substance defined as toxic or hazardous under MGL c. 21C and c. 21E, and the regulations at 310 CMR 30.000 and 310 CMR 40.0000.

WASTEWATER — Any sanitary waste, sludge, or septic tank or cesspool overflow, and water that, during manufacturing, cleaning or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, by-product or waste product.

WATERCOURSE — A natural or man-made channel through which water flows or a stream of water, including a river, brook or underground stream.

WATERS OF THE COMMONWEALTH — All waters within the jurisdiction of the commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, coastal waters, and groundwater.

§ 216-3. Applicability.

This bylaw shall apply to flows entering the municipally owned storm drainage system.

§ 216-4. Authority.

This bylaw is adopted under the authority granted by the Home Rule Amendment of the Massachusetts Constitution and the Home Rule Procedures Act, and pursuant to the regulations of the Federal Clean Water Act found at 40 CFR 122.34.

§ 216-5. Responsibility for administration.

The Select Board shall appoint the Stormwater Officer. The Stormwater Officer shall administer, implement and enforce this bylaw.

§ 216-6. Regulations.

The Stormwater Management Committee may promulgate rules and regulations to effectuate the purposes of this bylaw. Failure by the Committee to promulgate such rules and regulations shall not have the effect of suspending or invalidating this bylaw.

§ 216-7. Prohibited activities.

A. Illicit discharges. No person shall dump, discharge, cause or allow to be discharged any pollutant or non-stormwater discharge into the municipal separate storm sewer system (MS4).

B. Illicit connections. No person shall construct, use, allow, maintain or continue any illicit connection to the municipal storm drain system, regardless of whether the connection was permissible under applicable law, regulation or custom at the time of connection.

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

§ 216-8. Exemptions.

A. Discharge or flow of water or other fire-fighting materials resulting from fire-fighting activities.

B. The following non-stormwater discharges or flows are exempt from the prohibition of non-stormwaters, provided that the source is not a significant contributor of a pollutant to the municipal storm drain system:

(1) Water line flushing;

(2) Flow from potable water sources;

(3) Springs;

(4) Natural flow from riparian habitats and wetlands;

(5) Diverted stream flow;

(6) Groundwater;

(7) Uncontaminated groundwater infiltration as defined in 40 CFR 35.2005(20), or uncontaminated pumped groundwater (e.g., sump pump);

(8) Water from exterior foundation drains, footing drains (not including active groundwater dewatering systems), crawl space pumps, or air conditioning condensation;

(9) Discharge from landscape irrigation or lawn watering;

(10) Water from individual residential car washing;

(11) Discharge from dechlorinated swimming pool water (less than one ppm chlorine), provided the water is allowed to stand for one week prior to draining and the pool is drained in such a way as not to cause a nuisance;

(12) Discharge from street sweeping;

(13) Discharge of dye for testing purposes, provided verbal notification is given to the Stormwater Officer prior to the time of the test;

(14) Discharge of non-stormwater as permitted under an NPDES permit, or under a surface water discharge permit, or by a waste discharge order or waiver administered under the authority of the United States Environmental Protection Agency or the Department of Environmental Protection, provided that the discharge is in full compliance with the requirements of the permit, waiver, or order and applicable laws and regulations; and

(15) Discharge of non-stormwater for which advanced written approval is received from the Stormwater Officer as necessary to protect the environment or public health, safety, or welfare.

§ 216-9. Emergency suspension of storm drainage system access.

The Stormwater Officer may suspend municipal storm drain system access to any person or property without prior written notice when such suspension is necessary to stop an actual or threatened discharge of pollutants that presents imminent risk of harm to the environment or to the public health, safety or welfare. In the event any person fails to comply with an emergency suspension order, the Stormwater Officer may take all reasonable steps to prevent or minimize harm to the environment or to public health, safety or welfare.

§ 216-10. Notification of spills.

Notwithstanding other requirements of local, state or federal law, as soon as a person responsible for a facility or operation, or responsible for emergency response for a facility or operation, has information of or suspects a release of materials at that facility or operation resulting in or which may result in discharge of pollutants to the municipal drainage system or waters of the commonwealth, the person shall take all necessary steps to ensure containment and cleanup of the release. In the event of a release of oil or hazardous materials, the person shall immediately notify the municipal Fire, Police and Highway Departments. In the event of a release of other than oil or nonhazardous material, the reporting person shall notify the Stormwater Officer no later than the next business day. The reporting person shall provide to the Stormwater Officer written confirmation of all telephone, facsimile or in-person notifications within three business days thereafter. If the discharge of prohibited materials is from a commercial or industrial facility, the facility owner or operator of the facility shall retain on-site a written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

§ 216-11. Enforcement; violations and penalties.

A. The Stormwater Officer or an authorized agent of the Stormwater Officer shall enforce this bylaw, regulations, orders, violation notices, and enforcement orders, and may pursue all civil and criminal remedies for such violations.

B. Civil relief. If a person violates the provisions of this bylaw, regulations, permit, notice, or order issued hereunder, the Stormwater Officer may seek injunctive relief in a court of competent jurisdiction to restrain the person from activities which would create further violations or compelling the person to perform abatement or remediation of the violation.

C. Orders. The Stormwater Officer or an authorized agent of the Stormwater Officer may issue a written order to enforce the provisions of this bylaw or the regulations hereunder, which may include:

(1) Elimination of illicit connections or discharges to the MS4;

(2) Performance of monitoring, analyses, and reporting;

(3) That unlawful discharges, practices or operations shall cease and desist; and

(4) Remediation of contamination in connection therewith.

D. If the enforcing person determines that abatement or remediation of contamination is required, the order shall set forth a deadline by which such abatement or remediation must be completed. Said order shall further advise that, should the violator or property owner fail to abate or perform remediation within the specified deadline, the Town may, at its option, seek a court order requiring the property owner to perform the work or allowing the Town to perform the work and recover its costs.

E. Criminal penalty. Any person who violates any provision of this bylaw, regulation, order or permit issued hereunder shall be punished by a fine of not more than $300. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

F. Noncriminal disposition. As an alternative to criminal prosecution or civil action, the Town of Topsfield may elect to utilize the noncriminal disposition procedure set forth in MGL c. 40, § 21D, in which case the Stormwater Officer shall be the enforcing person. The penalty for the first violation shall be $25. The penalty for the second violation shall be $50. The penalty for the third and subsequent violations shall be $100. Each day that such violation occurs or continues shall constitute a separate offense.

G. Entry to perform duties under this bylaw. To the extent permitted by state law, or if authorized by the owner or other party in control of the property, the Stormwater Officer, its agents, officers, and employees may enter upon privately owned property for the purpose of performing their duties under this bylaw and regulations and may make or cause to be made such examinations, surveys or sampling as the Stormwater Officer deems reasonably necessary.

H. Appeals. The decisions or orders of the Stormwater Officer shall be final; except that relief may be sought in a court of competent jurisdiction. **[Amended 5-8-2021 ATM by Art. 33]**

I. Remedies not exclusive. The remedies listed in this bylaw are not exclusive of any other remedies available under any applicable federal, state or local law.

§ 216-12. Compatibility with other regulations.

This bylaw is not intended to modify or repeal any other bylaw, rule, regulation, or other provision of law. The requirements of this bylaw are in addition to the requirements of any other bylaw, rule, regulation, or other provision of law, and where any provision of this bylaw imposes restrictions different from those imposed by any other bylaw, rule, regulation, or other provision of law, whichever provision is more restrictive or imposes higher protective standards for human health or the environment shall control.

§ 216-13. Severability.

The provisions of this bylaw are hereby declared to be severable. If any provision, paragraph, sentence, or clause of this bylaw or the application thereof to any person, establishment or circumstances shall be held invalid, such invalidity shall not affect the other provisions or application of this bylaw.

Chapter 220

STORMWATER MANAGEMENT AND EROSION CONTROL

[HISTORY: Adopted by the Town Meeting of the Town of Topsfield 5-3-2005 TM by Art. 44, as amended 5-4-2010 TM by Art. 29 and 5-1-2012 ATM (Ch. LI of the General bylaws). Subsequent amendments noted where applicable.]

§ 220-1. Findings.

It is hereby determined that:

A. Land development projects and other land use conversions, and their associated changes to land cover, permanently alter the hydrologic response of local watersheds and increase stormwater runoff rates and volumes, which in turn increase flooding, stream channel erosion and sediment transport and deposition, and decrease groundwater recharge;

B. Land development projects and other land use conversions also contribute to increased nonpoint source pollution and degradation of receiving waters;

C. The impacts of construction site/alteration and post-development stormwater runoff quantity and quality can adversely affect public safety, public and private property, surface water drinking water supplies, groundwater resources, drinking water supplies, recreation, aquatic habitats, fish and other aquatic life, property values and other uses of lands and waters;

D. These adverse impacts can be controlled and minimized through the regulation of stormwater runoff quantity and quality from construction site/alteration, new development and redevelopment, by the use of both structural and nonstructural best management practices;

E. Localities in the Commonwealth of Massachusetts are required to comply with a number of both state and federal laws, regulations and permits which require a locality to address the impacts of construction site/alteration runoff, post-development stormwater runoff quality and nonpoint source pollution.

F. Therefore, the Town of Topsfield has established this stormwater management bylaw to provide reasonable guidance for the regulation of construction site/ alteration and post-development stormwater runoff for the purpose of protecting local water resources from degradation. This bylaw regulates the construction site/ alteration and post-construction stormwater controls for both new and redevelopment projects.

G. It has been determined that it is in the public interest to regulate construction site/ alteration and post-development stormwater runoff discharges in order to control and minimize increases in stormwater runoff rates and volumes, construction site/ alteration and post-construction soil erosion and sedimentation, stream channel erosion, and nonpoint source pollution associated with post-development stormwater runoff.

§ 220-2. Purposes.

A. The purposes of this bylaw are to:

(1) Protect, maintain and enhance the public health, safety, environment and general welfare by establishing minimum requirements and procedures to control the adverse effects of increased post-development stormwater runoff and nonpoint source pollution associated with new development and redevelopment;

(2) Protect, maintain and enhance the public safety, environment and general welfare by establishing minimum standards and procedures to control runoff and prevent soil erosion and sedimentation resulting from construction/ alteration and development.

B. It has been determined that proper management of construction site/alteration and post-development stormwater runoff will minimize damage to public and private property and infrastructure, safeguard the public health, safety, environment and general welfare of the public, protect water and aquatic resources, and promote groundwater recharge to protect surface and groundwater drinking supplies. This bylaw seeks to meet that purpose through the following objectives:

(1) Establish decision-making processes surrounding land development activities that protect the integrity of the watershed and preserve the health of water resources;

(2) Require that new development, redevelopment and all land conversion activities maintain the after-development runoff characteristics as equal to or less than the pre-development runoff characteristics in order to reduce flooding, stream bank erosion, siltation, nonpoint source pollution, property damage, and to maintain the integrity of stream channels and aquatic habitats;

(3) Establish minimum construction/alteration and post-development stormwater management standards and design criteria for the regulation and control of stormwater runoff quantity and quality; establish minimum design criteria for the protection of properties and aquatic resources downstream from land development and land conversion activities from damages due to increases in volume, velocity, frequency, duration, and peak flow rate of stormwater runoff; establish minimum design criteria for measures to minimize nonpoint source pollution from stormwater runoff which would otherwise degrade water quality;

(4) Establish design and application criteria for the construction and use of structural stormwater control facilities that can be used to meet the minimum construction/alteration and post-development stormwater management standards;

(5) Encourage the use of nonstructural stormwater management, stormwater better site design practices or "low-impact development practices," such as reducing impervious cover and the preservation of greenspace and other natural areas, to the maximum extent practicable; coordinate site design plans, which include greenspace, with the Town's greenspace protection plan;

(6) Establish provisions for the long-term responsibility for and maintenance of

structural stormwater control facilities and nonstructural stormwater management practices to ensure that they continue to function as designed, are maintained, and pose no threat to public safety;

(7) Establish provisions to ensure there is an adequate funding mechanism, including surety, for the proper review, inspection and long-term maintenance of stormwater facilities implemented as part of this bylaw;

(8) Establish administrative procedures for the submission, review, approval or disapproval of stormwater management plans, and for the inspection of approved active projects, and long-term follow up; establish certain administrative procedures and fees for the submission, review, approval or disapproval of stormwater plans, and the inspection of approved projects.

C. Nothing in this bylaw is intended to replace the requirements of either the Town of Topsfield Floodplain Zoning Bylaw, the Town of Topsfield General Wetlands Protection Bylaw,[1] or any other bylaw that may be adopted by the Town of Topsfield. Any activity subject to the provisions of the above-cited bylaws must comply with the specifications of each.

§ 220-3. Definitions.

The following definitions shall apply in the interpretation and implementation of this bylaw. Additional definitions may be adopted by separate regulation.

ALTER — Any activity which will measurably change the ability of a ground surface area to absorb water or will change existing surface drainage patterns. "Alter" may be similarly represented as "alteration of drainage characteristics" and "conducting land disturbance activities."

BEST MANAGEMENT PRACTICE (BMP) — Structural, nonstructural and managerial techniques that are recognized to be the most effective and practical means to prevent and/or reduce increases in stormwater volumes and flows, reduce point source and nonpoint source pollution, and promote stormwater quality and protection of the environment. Structural BMPs are devices that are engineered and constructed to provide temporary storage and treatment of stormwater runoff. Nonstructural BMPs use natural measures to reduce pollution levels, do not require extensive construction efforts and/or promote pollutant reduction by eliminating the pollutant source.

BETTER SITE DESIGN — Site design approaches and techniques that can reduce a site's impact on the watershed through the use of nonstructural stormwater management practices. Better site design includes conserving and protecting natural areas and green space, reducing impervious cover, and using natural features for stormwater management.

COMMON PLAN OF DEVELOPMENT — A contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan.**[Added 5-5-2015 ATM by Art. 39]**

HOTSPOT — Land uses or activities with higher potential pollutant loadings, inclusive of auto salvage yards, auto fueling facilities, fleet storage yards, commercial parking lots

1. **Editor's Note: See Ch. 250, Wetlands.**

with high-intensity use, road salt storage areas, commercial nurseries and landscaping, outdoor storage and loading areas of hazardous substances or marinas.

MASSACHUSETTS STORMWATER MANAGEMENT POLICY — The policy issued by the Department of Environmental Protection, and as amended, that coordinates the requirements prescribed by state regulations promulgated under the authority of the Massachusetts Wetlands Protection Act, MGL c. 131, § 40 and the Massachusetts Clean Waters Act, MGL c. 21, §§ 23 through 56. The policy addresses stormwater impacts through implementation of performance standards to reduce or prevent pollutants from reaching water bodies and control the quantity of runoff from a site.

NEW DEVELOPMENT — Any construction or land disturbance of a parcel of land that is currently in a natural vegetated state and does not contain alteration by man-made activities.

NONPOINT SOURCE POLLUTION — Pollution from many diffuse sources caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into water resource areas.

PERSON — Any individual, group of individuals, association, partnership, corporation, company, business organization, trust, estate, the commonwealth or political subdivision thereof to the extent subject to Town bylaws, administrative agency, public or quasi-public corporation or body, the Town of Topsfield, and any other legal entity, its legal representatives, agents or assigns.

POORLY DRAINED SOILS — "Poorly drained soils" shall have the meaning as contained in the list of definitions set forth in the glossary under the heading of "drainage class" in the Soil Survey of Essex County, Massachusetts - Northern Part prepared by the United States Department of Agriculture, Natural Resources Conservation Service - Donald Fuller, editor, first printed 1981 and following editions. Poorly drained soils shall include all such soils listed as "moderately poorly drained," "poorly drained" and "very poorly drained" as well as soils that contain a fragipan layer in the section entitled "Soil Series and Morphology" beginning on page 75 and ending on page 101 of the Soil Survey of Essex County, Massachusetts - Northern Part.**[Amended 5-8-2021 ATM by Art. 33]**

POST-DEVELOPMENT — The conditions that reasonably may be expected or anticipated to exist after completion of the land development activity on a specific site or tract of land. "Post-development" refers to the phase of a new development or redevelopment project after completion, and does not refer to the construction phase of a project.

PRE-DEVELOPMENT — The conditions that exist at the time that plans for the land development of a tract of land are submitted to the Planning Board. Where phased development or plan approval occurs (preliminary grading, roads and utilities, etc.), the existing conditions at the time prior to the first plan submission shall establish pre-development conditions.

RECHARGE — The replenishment of underground water reserves.

REDEVELOPMENT — Any construction, alteration, or improvement of land that has been subject to previous development.

SLOPE — The vertical rise divided by the horizontal distance and expressed as a

fraction or percentage, e.g. 1/5 or 20%.

STORMWATER AUTHORITY — The Town of Topsfield Planning Board or its authorized agent(s). The Topsfield Planning Board or its authorized agent(s) are responsible for coordinating the review, approval and permit process as defined in this bylaw. Other boards and/or departments of the Town of Topsfield, including (but not limited to) the Conservation Commission, Board of Health and Highway Department, may participate in the review process as defined in the Stormwater Regulations adopted by the Planning Board.[2]

STORMWATER MANAGEMENT PERMIT (SMP) — A permit issued by the Planning Board, after review of an application, plans, calculations and other supporting documents, which is designed to protect the environment of the Town from the deleterious effects of uncontrolled and untreated stormwater runoff.

§ 220-4. Authority.

This bylaw is adopted under authority granted by the Home Rule Amendment of the Massachusetts Constitution, the Home Rule statutes, and pursuant to the regulations of the federal Clean Water Act found at 40 CFR 122.34, and as authorized by the residents of the Town of Topsfield at Town Meeting, dated May 3, 2005, and as amended at the May 1, 2012, Annual Town Meeting.

§ 220-5. Administration.

A. The Planning Board shall administer, implement and enforce this bylaw. Any powers granted to or duties imposed upon the Planning Board may be delegated in writing by the Planning Board to its employees or agents.

B. Stormwater Regulations.[3] The Planning Board may adopt, and periodically amend, rules and regulations relating to the terms, conditions, definitions, enforcement, fees (including application, inspection and/or consultant fees), procedures and administration of this Stormwater Management Bylaw by majority vote of the Planning Board, after conducting a public hearing to receive comments on any proposed rules and regulations, or revisions thereto. Such hearing dates shall be advertised in a newspaper of general local circulation, at least 14 days prior to the hearing date. The Planning Board may promulgate rules and regulations to effectuate the purposes of this bylaw. Failure by the Planning Board to promulgate such rules and regulations or a legal declaration of their invalidity by a court shall not act to suspend or invalidate the effect of this bylaw.

C. Stormwater Management Manual. The Planning Board will utilize the policy, criteria and information, including specifications and standards, of the latest edition of the Massachusetts Stormwater Management Policy, for execution of the provisions of this bylaw. This policy includes a list of acceptable stormwater treatment practices, including the specific design criteria for each stormwater practice. The policy may be updated and expanded periodically, based on improvements in engineering, science, monitoring, and local maintenance experience. Unless specifically altered in the Stormwater Regulations, stormwater

2. **Editor's Note: See Ch. 364, Stormwater and Erosion Control Regulations.**

3. **Editor's Note: See Ch. 364, Stormwater and Erosion Control Regulations.**

management practices that are designed, constructed, and maintained in accordance with these design and sizing criteria will be presumed to be protective of Massachusetts's water quality standards.

D. Actions by the Planning Board. The Planning Board may take any of the following actions as a result of an application for a stormwater management permit as more specifically defined as part of Stormwater Regulations promulgated as a result of this bylaw: approval, approval with conditions, disapproval or disapproval without prejudice.

E. Appeals of action by the Planning Board. A decision of the Planning Board shall be final. A decision by the Planning Board made under this bylaw shall be reviewable in the court.

§ 220-6. Permit required. [Amended 5-5-2015 ATM by Art. 39]

A. Applicability. No person shall alter land within the Town of Topsfield, including without limitations any new development or redevelopment, other activity that will alter the drainage characteristics of a parcel of land, or any activity that may result in stormwater flowing from the parcel under development onto an adjacent parcel of land, without obtaining a stormwater management permit, unless exempt pursuant to Subsection B of this section. In addition, any alteration or redevelopment of a hotspot, or conversion of land to a hotspot, shall require a stormwater management permit and shall not be subject to the exemptions set forth in Subsection B of this section.

B. Exemptions. The following activities shall be exempt from the requirement to obtain a stormwater management permit. The exemptions in Subsection B(1) and (2) below shall not be applied to projects entirely or in any part on poorly drained soils, or for projects consisting of the installation of any drain system designed to transport stormwater or groundwater beyond the boundaries of the property on which it is located. The exemptions in Subsection B(1) and (2) shall also not apply to an activity that is part of a common plan of development that, considered as a whole, would alter an area greater than the area permitted by Subsection B(1) and (2) below. In applying the exemptions in Subsection B(1) and (2) below, the area subject to alteration pursuant to such exemptions may not exceed, in the aggregate, 7,500 square feet.

(1) Any activity that will alter an area of 7,500 square feet or less of land where the existing or proposed slopes are both less than 15%;

(2) Any activity that will alter an area of 4,000 square feet or less of land where the existing or proposed slopes are between 15% and 25%, inclusive;

(3) Normal maintenance and improvement of land in agricultural use as defined by the Wetlands Protection Act regulation, 310 CMR 10.04 and MGL c. 40A, § 3;

(4) Maintenance of existing landscaping, gardens or lawn areas associated with a single-family dwelling; construction of patios, walkways, driveways less than the minimum square foot thresholds, swimming pools below the minimum square foot thresholds or replacement of wells or septic systems on lots having

an existing dwelling;

(5) Repair or replacement of an existing roof of a single-family or multifamily dwelling;

(6) The construction of any fence that will not alter existing terrain or drainage patterns;

(7) Construction of utilities (gas, water, electric, telephone, etc.) other than drainage, which will not alter terrain, ground cover, or drainage patterns, the reconstruction of or resurfacing of any public way; the construction and associated grading of a street that has been approved by the Planning Board;

(8) For the removal of earth products undertaken in connection with a sand, gravel or similar enterprise where such activity is allowed by zoning;

(9) Emergency repairs to any utilities (gas, water, electric, telephone, etc.), stormwater management facility or practice that poses a threat to public health or safety, or as deemed necessary by the Planning Board;

(10) Any work or projects for which all necessary approvals and permits have been issued before the effective date of this bylaw.

§ 220-7. Procedures.

Permit procedures and requirements shall be defined and included as part of any rules and regulations promulgated as permitted under § 220-5 of this bylaw.[4]

§ 220-8. Enforcement.

The Stormwater Coordinator, the Planning Board or an authorized agent of the Planning Board shall enforce this bylaw, regulations, orders, violation notices, and enforcement orders, and may pursue all civil and criminal remedies for such violations. Enforcement shall be further defined and included as part of any Stormwater Regulations promulgated as permitted under § 220-5 of this bylaw.[5] This bylaw may also be enforced by the Planning Board, its agent or any police officer of the Town of Topsfield, by any available means in law or equity, including but not limited to enforcement by noncriminal disposition pursuant to MGL c. 40, § 21D. Each day a violation exists shall constitute a separate violation. When enforced through noncriminal disposition, unless otherwise specifically provided for by bylaw, rule or regulation, the penalties shall be as follows:

A. First violation: $25.

B. Second violation: $50.

C. Third violation: $100.

D. Fourth and subsequent violations: $200.

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4. **Editor's Note: See Ch. 364, Stormwater and Erosion Control Regulations.**

5. **Editor's Note: See Ch. 364, Stormwater and Erosion Control Regulations.**

§ 220-9. Severability.

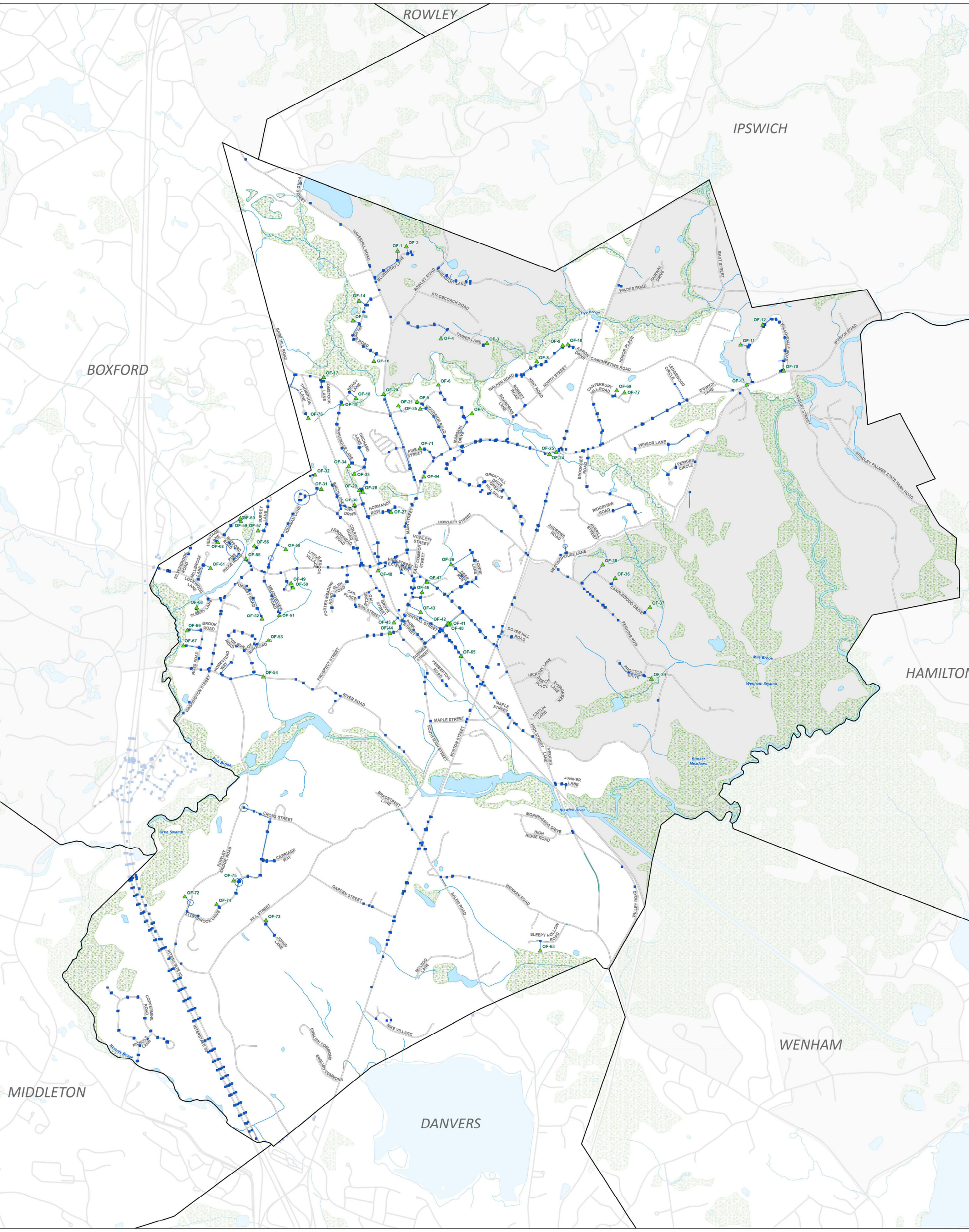
The invalidity of any section, provision, paragraph, sentence or clause of this bylaw shall not invalidate any section, provision, paragraph, sentence or clause thereof, nor shall it invalidate any permit or determination that previously has been issued.

Appendix C

Stormwater System Mapping

Mapping Status

Requirement Summary	Status
Phase I – Must be Done by July 1, 2020	
1. Outfalls and receiving waters	Complete
2. Open channel conveyances	Not started
3. Interconnections with other MS4s	Ongoing
4. Municipally owned structural BMPs	Complete
5. Waterbody names and impairments	Complete
6. Initial catchment delineations by topography	Complete (updates ongoing)
Phase II – Must be Complete by July 1, 2028	
1. Outfalls with spatial accuracy +/-30 feet	Complete
2. Pipe connectivity	Not started
3. Manholes	Not started
4. Catch basins	Complete (updates ongoing)
5. Refined catchment delineations	Not started
6. Municipal sanitary system	Not Applicable
7. Municipal combined sewer system	Not Applicable



Legend

- Outfall
- Catch Basin
- Swale
- Drainage Pipe
- Roads
- Lake, Pond, Reservoir
- Wetland, Marsh, Swamp
- Stream, Brook
- Non-Urban Area

N W E S

0 0.25 0.5 0.75 1
Miles

Figure 2

Stormwater Infrastructure Map

Topsfield, MA

Comprehensive Environmental Incorporated

Data Sources: MassGIS, Town of Topsfield, CEI

Appendix D

Regulatory Assessments

LID, GI, AND IA REGULATORY ASSESSMENT

To: Kevin Harutunian, Town Administrator, Town of Topsfield

From: Nick Cristofori, P.E., Comprehensive Environmental Inc.

Date: October 2022

Subject: Review of Topsfield's Regulations for LID, GI, and Impervious Cover Creation

Under the Environmental Protection Agency's (EPA's) 2016 National Pollutant Discharge and Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, regulated communities such as Topsfield are required to complete an assessment of existing town regulations as they pertain to Low Impact Development (LID), green infrastructures (GI), and the creation of impervious area (IA) under permit sections 2.3.6.b and 2.3.6.c. In summary, communities must complete the following:

- Develop a report assessing current street design and parking lot guidelines and other local requirements that affect the creation of impervious cover to determine if changes to design standards for streets and parking lots can be made to support low impact development options.
- Develop a report assessing existing local regulations to determine the feasibility of making, at a minimum, the following practices allowable when appropriate site conditions exist: green roofs; infiltration practices such as rain gardens, planter gardens, pervious pavements, and other designs to manage stormwater using landscaping and structured soils; and water harvesting devices such as rain barrels and cisterns.

This memorandum serves as a report assessing any barriers to implementing LID and green infrastructure, opportunities for reducing mandatory creation of impervious area and recommended regulatory changes to be made.

As part of preparation of this memo, CEI reviewed the following regulations:

- Zoning Bylaw (May 2019)
- Subdivision Regulations (April 2009)
- Stormwater Management and Erosion Control Bylaws (May 2012)

Recommendations

The following items are provided as recommendations and next steps:

- Table 1 (attached) provides a detailed assessment and recommended regulatory changes that should be considered when updating relevant sections of the town's regulatory mechanisms.
- Regulatory review and permitting processes such as Site Plan Review, Subdivision, Wetlands, and/or any other similar processes should be updated to specifically reference the stormwater regulatory mechanisms adopted to meet MS4 regulations for projects that

disturb one or more acres. This should include the construction and post-construction stormwater requirements including requirements for treating stormwater from new development and redevelopment, so that project proponents are aware of the additional requirements under MS4 regulations.

- Changes should be made as part of the next major regulatory update undertaken by the town for each relevant section, or more suitable timeframe as determined by the Planning Board and/or other regulatory board/department.
- This memorandum should be provided to the Planning Board and local transportation board, if applicable, as recommended by the permit.

If you have any further questions or would like additional information, please feel free to contact me at 800.725.2550 x303 or ncristofori@ceiengineers.com. Thank you.

Nick Cristofori, P.E.
Principal, Project Manager

Attachments:

- Table 1: Recommendations for Updating Existing Regulations Pertaining to LID, Green Infrastructure and Impervious Cover Creation

Table 1: Recommendations for Updating Existing Regulations Pertaining to LID, Green Infrastructure and Impervious Cover Creation

Factors	Conventional	Better	Best	Community's Zoning	Community's Subdivision Rules & Regulations	Community's Site Plan Review	Community's Stormwater/LID Bylaw/Regulations
GOAL 1: PROTECT NATURAL RESOURCES AND OPEN SPACE							
Soils managed for revegetation	Not addressed	Limitations on removal from site, and/or requirements for stabilization and revegetation	Prohibit removal of topsoil from site. Require prep of soils compacted during construction	(Not applicable)	Requires where topsoil is stripped from the site to be replaced in accordance with Article 5, Section 1.4.g	Requires the site plan to prevent "pollution of surface or groundwater, erosion of soil, and excessive run-off"	(Not applicable)
Limit clearing, lawn size, require retention or planting of native vegetation/naturalized areas	Not addressed or general qualitative statement not tied to other design standards	Encourage minimization of clearing/ grubbing	Require minimization of clearing/grubbing with specific standards	(Not applicable)	Requires erosion control measures that includes proposing land grading and permanent vegetation cover	Requires the applicant to propose development into the existing landscape through design features such as retention of open space	(Not applicable)
Require native vegetation and trees	Require or recommend invasives	Not addressed, or mixture of required plantings of native and nonnative	Require at least 75% native plantings	(Not applicable)	Requires the plan to protect existing vegetation	Requires the minimization of the area over which existing vegetation is removed and when tree removal is required, special attention shall be given to plant replacement trees	(Not applicable)
GOAL 2: PROMOTE EFFICIENT, COMPACT DEVELOPMENT PATTERNS AND INFILL							
Lot size	Required minimum lot sizes	OSRD/NRPZ preferred. Special permit with incentives to utilize	Flexible with OSRD/NRPZ by right, preferred option	(Not applicable)	ORA District: Minimum lot frontage = 200 ft; Minimum lot depth = 200 feet. See Table of Dimensional and Density Requirements	(Not applicable)	(Not applicable)
Housing density	Multi-family housing not allowed, or only in/adjacent to commercial and industrial uses	Multi-family and cluster developments allowed by special permit	Multi-family housing allowed by right in most residential areas; cluster developments encouraged with density bonuses for LID features and no maximum lot coverage	(Not applicable)	Maximum building area % for ORA district = 15% and minimum open space = 50%	(Not applicable)	(Not applicable)
Setbacks	Require minimum front, side, and rear setbacks	Minimize requirements, allow flexibility	Clear standards that minimize and in some instances eliminate setbacks	(Not applicable)	Requires that at each of a through lot, there shall be a setback depth required; equal to the front yard depth required for the district	(Not applicable)	(Not applicable)

Factors	Conventional	Better	Best	Community's Zoning	Community's Subdivision Rules & Regulations	Community's Site Plan Review	Community's Stormwater/LID Bylaw/Regulations
Frontages	Require minimum frontage for each lot/unit	Minimize requirements especially on curved streets and cul-de-sacs	No minimums in some instances, tied into other standards like OSRD design and shared driveways	(Not applicable)	ORA and IRA District frontage = 200 feet; CR, BV, BHN District frontage = 100 feet; BH and BP District frontage = 350 feet	(Not applicable)	(Not applicable)
Common driveways	Often not allowed, or strict limitations	Allow for 2-3 residential units	Allow for up to 4 residential units, preferably constructed with permeable pavers or pavement	(Not applicable)	No more than 3 lots are permitted to share a common driveway	(Not applicable)	(Not applicable)
GOAL 3: SMART DESIGNS THAT REDUCE OVERALL IMPERVIOUSNESS							
Impervious cover limits and infiltration rates	Not usually addressed in zoning and subdivision regulations for rural/suburban residential	Require no net increase in site run-off from pre- to post-development	Impervious cover limits tailored to the community and district type (i.e. <10% total impervious cover in rural districts, but higher in urban and redevelopment districts); post-development infiltration should be equal to or greater than pre-development. Following best practice may also help communities comply with MS4 permit requirements.	(Not applicable)	(Not applicable)	(Not applicable)	Requires all drives and parking that do not allow infiltration of groundwater be graded with bituminous or other material
Street location	Numeric and geometric standards based primarily on vehicular travel and safety, with basic pedestrian requirements (e.g. sidewalks)	Flexibility in applying standards, to reduce area of impact, grading, avoid key natural features	OSRD design preferred by-right. Require locating streets to minimize grading and road length, avoid important natural features	(Not applicable)	Requires all streets in the subdivision be designed to provide safe vehicular travel in addition to considering the attractiveness to obtain the maximum livability and amenity	(Not applicable)	(Not applicable)
Road width	Major and minor categories, 24-30'	Wide, medium, narrow categories. 22-24' max, plus 2' shoulders	Wide, medium, narrow, and alley categories. 20-24' widest for 2 travel lanes, 18-20' low traffic residential neighborhood, plus 2' shoulders. Allow alleys and other low traffic or secondary emergency access and all shoulders to use alternative, permeable materials	(Not applicable)	Minor Street = 50 feet	(Not applicable)	(Not applicable)
Road ROW width	50-75', fully cleared and graded	40-50', some flexibility in extent of clearing	20-50' depending on road type	(Not applicable)	Minor Street = 50 feet; Collector Street = 60 feet	(Not applicable)	(Not applicable)
Access Options	No common drives allowed, dead end allowed with limit on length and number of units	Allow dead end with limit on length and number of units. Allow common drives up to 2-3 units	Allow one way loop streets. Allow common drives up to 4 units, and alleys and rear-loading garages where suitable.	(Not applicable)	No more than 3 lots are permitted to share a common driveway	(Not applicable)	(Not applicable)

Factors	Conventional	Better	Best	Community's Zoning	Community's Subdivision Rules & Regulations	Community's Site Plan Review	Community's Stormwater/LID Bylaw/Regulations
Dead Ends/Cul-de-sacs	120 ft or more minimum turnaround	Minimize end radii – 35 ft	Allow hammerhead turnaround	(Not applicable)	Dead-end streets have a minimum turnaround radius at roadway edge of 55 feet	(Not applicable)	(Not applicable)
Cul-de-sacs	Full pavement standard	Encourage center landscaping with bioretention	Require center landscaping with bioretention	(Not applicable)	Cul-de-sac without an island = 55 feet Cul-de-sac with an island =110 feet	(Not applicable)	(Not applicable)
Curbing	Curbing required full length both sides of road	Allow curb breaks or curb flush with pavement to enable water to flow to vegetated LID features	Open drainage with roadside swales and no curbs preferred	(Not applicable)	Bituminous concrete berm shall be required to conform to the standard specifications and shall be installed along both edges of all roadways in Type II subdivisions	(Not applicable)	(Not applicable)
Roadside Swales	Allowed as an option	Preferred over closed drainage	Preferred, with criteria for proper design. Adoption of technical specifications and design templates for green infrastructure recommended	(Not applicable)	(Not applicable)	(Not applicable)	(Not applicable)
Utilities	Off sets required contributing to wide road ROWs	Not specified, flexible	Allow under road, sidewalks or immediately adjacent to roads to enable placement of roadside swales	(Not applicable)	Underground distribution systems shall be provided for all utility systems both public and private, including water, sanitary sewerage, drainage, electrical, telephone, television and any similar such systems	(Not applicable)	(Not applicable)
Sidewalks	Concrete or bituminous	Some flexibility in material and design	Prefer permeable pavement or permeable pavers	(Not applicable)	Requires sidewalks be constructed on both sides of the roadway on Collector Streets with bituminous concrete	(Not applicable)	(Not applicable)
Sidewalk location	Required both sides of road	Allow on only 1 side of road especially in low density neighborhoods	Prefer siting with land contours and for best pedestrian utility (e.g. connect with common areas and shared open spaces) – not necessarily immediately parallel to road	(Not applicable)	Sidewalks shall be constructed on both sides for Collector Streets and one side on Minor Streets. When sidewalks are deleted, grass strips shall be extended in their place	(Not applicable)	(Not applicable)
Sidewalk drainage	Drains to road closed drainage system	Not addressed	Disconnect drainage from road system – e.g. adjacent green strips or within vegetated areas that can absorb sheet flow	(Not applicable)	Sidewalks designed to conform to construction and drainage structures	(Not applicable)	(Not applicable)

Factors	Conventional	Better	Best	Community's Zoning	Community's Subdivision Rules & Regulations	Community's Site Plan Review	Community's Stormwater/LID Bylaw/Regulations
GOAL 4: ADOPT GREEN INFRASTRUCTURE STORMWATER MANAGEMENT PROVISIONS							
Rooftop runoff	Prohibit directing clean roof runoff into closed municipal drainage systems	Allow clean roof runoff to be directed to landscaped or naturally vegetated areas capable of absorbing without erosion, or infiltration	Require directing clean roof runoff to landscaped or naturally vegetated areas capable of absorbing, or infiltration	(Not applicable)	Stormwater runoff from all roof drains shall be conveyed into infiltration trenches, dry wells, rain gardens or similar BMPs to facilitate groundwater recharge and protect water quality	(Not applicable)	(Not applicable)
Overall stormwater design; piping and surficial retention vs. LID	Conventional stormwater system design standards	Encourage LID features and BMPs; design standards often not specified	LID design standard encouraging infiltration, allowing surficial ponding of retained runoff for up to 72 hours; systems designed for larger volume storms, accounting for future precipitation predictions; credit for green roofs towards stormwater requirements. Following best practice may also help communities comply with MS4 permit requirements	(Not applicable)	(Not applicable)	Requires all developments or construction in riverfront or buffer zones be designed to be in conformance with LID practices	Requires a drainage map showing pre and post construction watershed boundaries, drainage area and stormwater flow paths and applicants are encouraged to use low impact techniques such as bio-retention cells and vegetated filter strips
Site Plan/Design Requirements	LID not addressed	Encourage use of LID features in site design - such as reduced imperviousness, maintaining natural hydrology, preserving open space, and rainwater reuse	Include bioretention and other vegetated LID features in site landscaping/open space requirements. Following best practice may also help communities comply with MS4 permit requirements. See section 2.3.5 of the MS4 permit for more information	(Not applicable)	(Not applicable)	(Not applicable)	Applicants are encouraged to use low impact techniques such as bio-retention cells and vegetated filter strips
Allow easy siting of LID features (bioretention, swales, etc.)	Often not addressed, may require waivers from subdivision standards	Encouraged along road ROW	Allowed on lots, common open space, or road ROW, easement recorded. For commercial development, allow an increase in floor area ratio or other developmental incentives for green roofs	(Not applicable)	(Not applicable)	(Not applicable)	(Not applicable)
Permeable paving	Often not addressed, may require waivers from subdivision standards	Allowed on private residential lots for parking, patios, etc.	Allowed for residential drives, parking stalls, spillover parking spaces, emergency access ways (with proper engineering support for emergency vehicles) Two track design allowed for driveways and secondary emergency access ways (where required)	(Not applicable)	(Not applicable)	Encourages the use of pervious pavement materials to be used in construction	(Not applicable)

Factors	Conventional	Better	Best	Community's Zoning	Community's Subdivision Rules & Regulations	Community's Site Plan Review	Community's Stormwater/LID Bylaw/Regulations
Stormwater management O&M plan	Typically only addressed if municipality has a stormwater or LID bylaw, or for areas subject to wetlands permitting	Required	Required, contents specified in alignment with current MassDEP Stormwater Handbook. Following best practice may also help communities comply with MS4 permit requirements	(Not applicable)	(Not applicable)	(Not applicable)	Adopted the Stormwater Management with Operation and Maintenance Plans are required for all projects. Stormwater management easements and changes to the O & M plans are required
Construction Erosion and Sedimentation Plan, and stormwater control	Basic general requirements	Required, contents specified - the site design process should include soil erosion and sedimentation control measures	Goes beyond minimum NPDES requirements. Requires minimization of site disturbance, reduction of construction waste, control measures not removed until proof of soil stabilization or reestablishment of vegetation. Written procedures for site inspection and enforcement included. Following best practice may also help communities comply with MS4 permit requirements. See section 2.3.5 of the MS4 permit for more information	(Not applicable)	(Not applicable)	Stormwater Management Bylaw under General Bylaws that comply with MS4 and requires the minimization of site disturbance and the regulations needed to meet	Requires minimization of site disturbance, reduction of construction waste, control measures not removed until proof of soil stabilization or reestablishment of vegetation. Comply with MS4 permit and regulations/requirements
Stormwater discharge detection & elimination	Not addressed	Discharges and connections noted and/or limits set on quantity and quality	Illicit discharges and connections are prohibited and enforced. Following best practice may also help communities comply with MS4 permit requirements. Find more information in section 2.3.4.a of the MS4 permit	(Not applicable)	(Not applicable)	(Not applicable)	All stormwater runoff generated from land development and land use conversion activities shall not discharge untreated stormwater runoff directly to a wetland, local water body, municipal drainage system, or abutting property, without adequate treatment

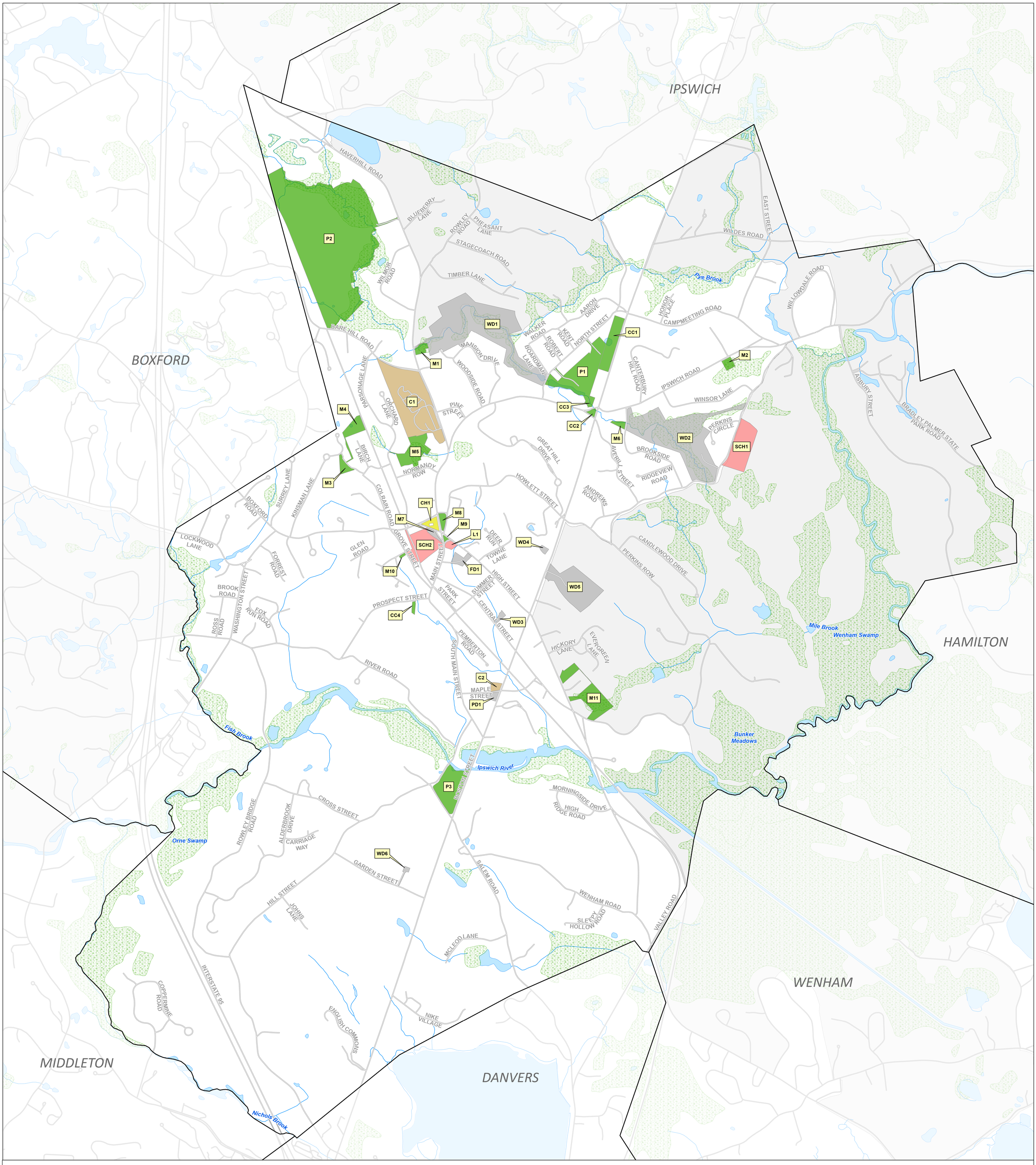
Factors	Conventional	Better	Best	Community's Zoning	Community's Subdivision Rules & Regulations	Community's Site Plan Review	Community's Stormwater/LID Bylaw/Regulations
Post- construction stormwater management and drainage patterns	Not addressed	Allow LID	Resemble pre-existing conditions of volume, velocity, quality and location, as nearly as possible, requiring LID to the max extent feasible. Retain vol of runoff >1in. per sq.ft. of impervious surface and/or remove 90% TSS post-construction & 50% TP generated on the site for new development, or >0.8in. per sq.ft and/or remove 80% TSS and 50% of TP load for redevelopment. Following best practice may also help communities comply with MS4 permit requirements.	(Not applicable)	(Not applicable)	(Not applicable)	(Not applicable)
As-built surveys	Not addressed	Recommended	Required, with written instructions for process; electronic submittal allowed	(Not applicable)	(Not applicable)	(Not applicable)	Requires at completion of the project the permittee shall submit as-built record drawings of all structural stormwater controls and treatment best management practices required for the site
Intra-departmental communication and coordination	Not addressed	Informally or loosely occurring	Required for plan review and/or permit approvals	(Not applicable)	(Not applicable)	(Not applicable)	A project may fall within the jurisdiction of the Conservation Commission, the Town Boards, and different departments (Highway, Engineering, etc.)
Enforcement	No	Yes	Yes, with fines. Same entity should oversee permit approvals and enforcement	(Not applicable)	(Not applicable)	(Not applicable)	The Planning Board shall administer, implement, and enforce the regulations
GOAL 5: ENCOURAGE EFFICIENT PARKING							
Parking	Specific minimums set based on projected maximum use times	Encourage minimum # needed to serve routine use (e.g. 2/residential unit with any additional/visitors parking behind in driveway or on street).	Establish Maximum Parking spaces allowed. Do not require more than 2/residence. Allow tenants separate, optional lease agreements for parking.	(Not applicable)	(Not applicable)	Minimum parking requirements for two or more bedrooms is 2 spaces.	(Not applicable)

Factors	Conventional	Better	Best	Community's Zoning	Community's Subdivision Rules & Regulations	Community's Site Plan Review	Community's Stormwater/LID Bylaw/Regulations
Commercial Parking	Specific minimums set based on projected maximum use times adding all on-site uses together	Some flexibility to reduce minimums based on street or other available nearby parking or transit	Allowed shared parking for uses with different peak demand times. Provide model agreements/deed restrictions. Reduce parking requirements near transit. Limit parking stall size (9ftx18ft max), with up to 30% smaller for compact cars	(Not applicable)	(Not applicable)	(Not applicable)	(Not applicable)
LID in Parking Areas	Often not addressed, may require waivers e.g. for planting islands to drain down rather than built up surrounded by curbs	Allow LID/bioretention within parking areas.	Require landscaping within parking areas, as LID/bioretention, at a minimum of 10% of the interior area landscaped and a minimum of 25 square feet for island planting areas.	(Not applicable)	(Not applicable)	(Not applicable)	(Not applicable)

Appendix E

Inventory and Ranking of Town-Owned Property

					Municipal Infrastructure										Parks and Open Space						Buildings and Facilities						Vehicle Maintenance and Storage				Spill Prevention,			Construction	
SOP ID:					MI1	MI2	MI3	MI4	MI5	MI6	MI7	MI8	MI9	MI10	PO1	PO2	PO3	PO4	PO5	PO6	BF1	BF2	BF3	BF4	BF5	BF6	VM1	VM2	VM3	VM4	SR1	SR2	SR3	CM1	CM2
Site Name	Address	Map ID	Map Tile Number	Contact	Street Sweeping	Catch Basin Cleaning & Inspection	Outfall Inspection & Maintenance	Stormwater & Water Line Maintenance	Asphalt Cleaning & Repair	BMP Inspection & Maintenance	Oil/Water Separator	Floor Drains	Snow Stockpiling/Removal	Winter Road Maintenance	Landscape Design & Management	Lawn & Grounds Maintenance	Pet Waste & Litter	Storage & Use of Pesticides & Herbicides	Storage & Use of Fertilizers	Waterfowl Management	Building Washing & Repair	Solid Waste Management	Material Loading/ Unloading	Material Handling & Storage	Painting	Sand and Salt Storage	Vehicle & Equipment Storage & Maintenance	Vehicle & Equipment Washing	Vehicle & Equipment Fueling	Parts Cleaning	Spill Response	Spill Reporting	Emergency Contact Information	Erosion & Sedimentation Control	Construction Site Inspection
MUNICIPAL BUILDINGS																																			
Topsfield Town Hall	8 West Commons St	M7	E4																																
Water Department	10 North St	WD1	C4, C5, D5																																
Water Department	250 Perkins Row	WD2	D6, D7																																
Water Department	78 Central St	WD3	E4																																
Water Department	288R Boston St	WD4	E5																																
Water Department	279 Boston St	WD5	E5																																
Water Department	13 Garden St	WD6	G3																																
Police Department	210 Boston St	PD1	F4																																
Fire Department	27 High St	FD1	E4																																
SCHOOLS AND COMMUNITY BUILDINGS																																			
Steward Elementary School	277 Perkins Row	SCH1	D7																																
Proctor Elementary School	60 Main St	SCH2	E3, E4																																
Topsfield Town Library	1 South Commons St	L1	E4																																
Parks or Open Spaces																																			
Town Common	83 Main St	M8	E4																																
Town Common	65 Main St	M9	E4																																
Conservation Commission	386 Boston St	CC1	C5, C6																																
Conservation Commission	362 Boston St	CC2	D5																																
Conservation Commission	144 Ipswich Rd	CC3	D5																																
Conservation Commission	12 Prospect St	CC4	E4																																
Klock Park	17 North St	P1	C5, D5																																
Pye Brook Park	124 Haverhill Rd	P2	B3, C3																																
Park	148 Boston St	P3	G4																																
vacant lot	51 Haverhill Rd	M1	C4																																
vacant lot	191 Ipswich Rd	M2	C7																																
vacant lot	58 Colrain Rd	M3	D3																																
vacant lot	59R Colrain Rd	M4	D3																																
vacant lot	11 Normandy Row	M5	D3, D4																																
vacant lot	11 Brookside Rd	M6	D5, D6																																
vacant lot	32 Grove St	M10	E3																																
vacant lot	138 High St	M11	F5																																
Cemeteries																																			
Pine Grove Cemetery	8 Haverhill Rd	C1	C3, D3, D4																																
Maple Street Cemetery	216 Boston St	C2	F4																																
Other																																			
Congregational Church of Topsfield (the land around the building)	80 Main St	CH1	E4																																



Legend

Municipal Properties:
- Cemeteries
- Municipal Buildings
- Parks and Open Spaces
- Schools and Community Buildings
- Other

- Lake, Pond, Reservoir
- Wetland, Marsh, Swamp
- Stream, Brook
- Non-Urban Area

N W E S

0 0.25 0.5 0.75 1
Miles

Municipal Properties Map

Topsfield, MA

Comprehensive Environmental Incorporated

2/8/2023

Data Sources: MassGIS, Town of Topsfield, CEI

MUNICIPAL PROPERTY BMP RETROFITS

To:	Heidi Gaffney, Conservation Administrator – Town of Topsfield, MA
From:	Nick Cristofori, P.E., Comprehensive Environmental Inc.
Date:	October 26, 2022
Subject:	Municipal Property BMP Retrofits

Permit Requirements and Project Background

Under the Environmental Protection Agency's (EPA's) 2016 National Pollutant Discharge and Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, as amended (Permit), the Town of Topsfield is required to complete an inventory and priority ranking of Town-owned properties and existing stormwater infrastructure that could be retrofitted with stormwater Best Management Practices (BMPs) designed to reduce the frequency, volume and pollutant loads of stormwater discharges to its MS4 through the mitigation of impervious area. At a minimum, Topsfield must consider municipal property with significant impervious area that could be mitigated, existing street right-of-ways, outfalls and conventional stormwater conveyances and controls that could be readily modified or retrofitted.

The potential for retrofitting particular properties must consider factors such as maintenance access; subsurface geology; depth to water table; proximity to aquifers and subsurface infrastructure including sanitary sewers and septic systems; and opportunities for public use and education. Sites must be priority ranked based on factors such as schedules for planned capital improvements to storm and sanitary sewer infrastructure and paving projects as available; current storm sewer level of service (if known); and control of discharges to impaired or critical receiving waters, first or second order streams, public swimming beaches, drinking water supply sources and shellfish growing areas.

Topsfield must maintain a minimum of five sites for retrofits within its inventory, until such time as when it has less than five sites remaining for improvements. Beginning with the fifth year MS4 annual report and in each subsequent annual report, Topsfield must report on those permittee-owned properties and infrastructure inventoried that have been retrofitted with BMPs to mitigate impervious area and associated water quality impacts.

This memorandum outlines activities completed by Comprehensive Environmental Inc. (CEI) to assist the Town of Topsfield with meeting the above Permit requirements, with a focus on potential retrofit opportunities on developed municipal parcels. Analysis of open space and undeveloped land available to mitigate stormwater runoff from nearby areas should be evaluated under a future effort.

Municipal Parcel Retrofits

Desktop and Field Analysis

32 Town-owned facilities were identified within the MS4 regulated area with impervious cover such as parking lots and rooftops as required by the permit which were advanced for additional

desktop and field analysis. CEI first developed a series of parcel maps for each facility to be used for recording existing conditions and field notes. Parcel maps typically showed an aerial view of each facility, along with property lines, topography data, available drainage information, and other relevant information. Noah Parent of CEI conducted field assessments of all 32 facilities in October 2022. The goal was to evaluate opportunities to reduce pollutant loads discharging to the MS4 or surface water bodies from the site through reduction or treatment of stormwater runoff from impervious surfaces.

A map of all 32 facilities is provided as **Figure 1** at the end of this memorandum. A summary of the existing conditions for each site is included as **Table 1**, with proposed retrofit conditions provided as **Table 2** the end of this memorandum.

Proposed BMP Selection

Proposed conceptual BMPs have been selected based largely on available space, soil types within the area, and proximity to wetland areas. For planning, pollutant removal, and cost estimating purposes, locations with larger areas available for implementation were assigned BMPs with larger footprints such as infiltration basins, extended detention basins, or constructed wetlands, whereas smaller areas were assigned to rain gardens, trenches, or swales. Implementation areas with soils classified primarily as HSG C or D were assigned non-infiltrating BMP types such as extended detention basins. Areas located in close proximity to wetlands are assumed to have relatively high groundwater, and thus were assigned BMP types such as constructed wetlands.

For the purposes of this initial screening effort, BMP selection focused on surface BMPs that could be installed in existing available spaces with little disturbance to existing paved surfaces, as a typical surface BMP is less expensive on a pounds of pollutant removed than a subsurface system installed below a parking lot or ball field. More expensive underground infiltration BMPs (e.g., subsurface infiltration) will be considered for proposed redevelopment projects where demolition, reconstruction and/or repaving are proposed to minimize the costs of installation. The use of subsurface infiltration BMPs would significantly increase treatment costs, as they can cost up to 4-10 times more than surface BMPs. Other BMPs that disturb pavement, including leaching catch basins and porous pavement, can likely be implemented at a wide variety of site, however, were not comprehensively assessed as part of this project will also be evaluated during redevelopment projects. Actual BMP types and sizes are expected to be refined as part of future designs.

BMP Unit Costs

Costs for BMP design and construction were estimated based on a memorandum from EPA titled "Methodology for developing cost estimates for Opti-Tool" (**Attachment A**). This memorandum built on multiple previous studies dating as far back as 2010 to estimate total implementation costs for multiple types of stormwater BMPs on a dollars per cubic foot of constructed volume in 2016 dollars, which also assumed that 35% of the construction cost would go towards engineering design and other contingencies. For the purposes of this memorandum, 2016 dollars were then converted to 2022 dollars by adding 18% to the total cost in order to account for inflation over the preceding six years.

Additionally, the Opti-Tool memorandum notes that cost adjustment factors may be incorporated to more accurately account for BMP site constraints associated with installation in urban environments as follows:

- Undeveloped areas: 1.0;
- Partially developed areas: 1.5;
- Developed areas: 2.0; and
- Highly urban setting: 3.0.

Based on current development conditions, a cost adjustment factor of 1.5 was applied to all potential BMPs. A summary of costing data is provided in **Table 3** at the end of this memorandum.

Actual engineering costs depend on many factors, and engineering for larger projects generally consist of a lower total percent of the construction cost, with the inverse being true for smaller projects (e.g., a $250,000 construction project may have a $50,000 engineering cost or 20% of construction, whereas a $50,000 construction project may have a $25,000 engineering cost or 50% of construction). Costs outlined in this memorandum are for guidance and comparison purposes only, and future design phases will further refine costs associated with all BMPs.

Pollutant Removal and Cost Summary

Based on calculations from the BATT calculator, implementation of the top five stormwater BMPs outlined in **Table 4** will remove a total of 11.2 pounds of phosphorus and 83.4 pounds of nitrogen for a total engineering and construction cost of approximately $459,000 at an average cost of $41,000 per pound of phosphorus removed and $5,500 per pound of phosphorus removed. Pre-conceptual designs for five sites have been prepared and are included as **Attachment B**. Implementation of all recommended BMPs will remove a total of 22.5 pounds of phosphorus and 161.4 pounds of nitrogen for a total cost of approximately $985,000.

Roadway Improvement Projects

Roadway improvement projects such as pavement resurfacing, reclamation, and/or roadway widening serve as an opportunity for the Town to coordinate drainage improvements with roadway improvements. It also provides an opportunity to incorporate water quality BMPs, however, such opportunities are often restricted to areas located within, or immediately adjacent to, the roadway. Example roadway intersection improvements for Town to consideration are provided in **Attachment C**, however, other alternative designs may also be considered depending on site-specific conditions. Implementation of such BMPs requires evaluation on a case-by-case basis in consideration of the size of the ROW, soil type, surrounding drainage infrastructure and location of other utilities.

Recommendations and Next Steps

As the Town is not subject to any nitrogen or phosphorus requirements of the permit, Topsfield is not currently required to design or construct any stormwater BMPs at this time. Should the Town wish to construct optional BMPs, it is recommended that the Town consider advancing design of BMPs at the facilities outlined in **Table 4** below. As noted above, these locations were identified to be of high priority as they have good opportunities for retrofit and have good public education

opportunities. Pre-conceptual designs for each of these sites have been prepared and are included as Attachment C.

Table 4 – Top BMP Locations

Location		Proposed BMP(s)		TP Reduction		TN Reduction	
Name	**Address**	**Type**	**Construction & Engineering**	**Lbs / Year**	**Dollars / Pound**	**Lbs / Year**	**Dollars / Pound**
Intersection of Averill St., Boston St., and Ipswich Rd.	362 Boston Street	Infiltration Basin	$79,600	3.2	$18,400	25.2	$2,300
Proctor Elementary School	60 Main Street	Infiltration Island, Infiltration Basin (2)	$95,400	2.6	$27,200	20.3	$3,500
Steward Elementary School	277 Perkins Row	Infiltration Basin	$79,600	2.0	$29,500	15.3	$3,900
Public Works Facility	279 Boston Street	Constructed Wetland	$134,900	1.2	$83,300	5.7	$17,500
Topsfield Town Library	1 South Common Street	Infiltration Basin	$69,600	2.2	$23,400	16.9	$3,000

The Town should also consider investigating, and implementing where feasible, water quality treatment BMPs as part of drainage improvements during roadway improvement projects. The cost and amount of phosphorus removed from these systems will vary based on the size of the BMP and contributing drainage area.

If you have any further questions or would like additional information, please feel free to contact me at 800.725.2550 x303 or ncristofori@ceiengineeres.com. Thank you.

Nick Cristofori, P.E.
Principal, Project Manager

Attachments:

- Table 1: Summary of Existing Conditions
- Table 2: Proposed Improvements
- Table 3: BMP Costing Information
- Figure 1: Municipal Properties visited
- Attachment A: Memorandum report on Methodology for developing cost estimates for Opti-Tool; February 20, 2016
- Attachment B: Pre-Conceptual Designs for Top Locations
- Attachment C: Example Roadway and Intersection BMP Improvements

Table 1 - Summary of Existing Conditions

Description	Address	Town ID	CEI Map ID	Total Parcel Area (acres)	Total Impervious Area (acres)	Existing Conditions Description	Direct or Near-Direct Discharge	BMPs Present?	Soil Type	Hydric Soil Group	Soil Area (acres)
Wooded Lot	51 Haverhill Road	M1	17-63	1.61	0.00	A vacant, wooded property, off of Haverhill Road (MA-97). This property contains a portion of Pye Brook. A catch basin and associated outfall were observed across the street from the parcel. An upgradient drainage network was observed to discharge on the private parcel directly south of the site.	Yes	No	Freetown muck	B/D	0.79
									Hinckley loamy sand	A	0.00
									Walpole sandy loam	B/D	0.81
Water Department	10 North Street	WD1	18-37	60.30	0.15	A large wooded parcel containing a large section of Pye Brook and associated wetland areas. Multiple water department buildings exist on the southeastern portion of the parcel, off of North Street.	Yes	No	Canton fine sandy loam	A	0.14
									Freetown muck	B/D	14.13
									Hinckley and Windsor soils	A	10.94
									Hinckley loamy sand	A	17.86
									Merrimac fine sandy loam	A	0.40
									Saco variant silt loam	B/D	12.91
									Sudbury fine sandy loam	B/D	0.13
									Wareham loamy sand	A/D	1.05
									Water	N/A	0.57
									Windsor loamy sand	A	2.17
Klock Park	17 North Street	P1	18-60	21.62	0.98	This parcel contains Klock Park, accessible from North Street. The park consists of multiple soccer fields, softball fields and two parking areas. No drainage structures were observed withing the parcel. The northern parking lot pavement was in rough condition, causing sheet flow to exit the lot in two locations.	Yes	No	Canton fine sandy loam	B/D	0.47
									Deerfield loamy fine sand	A	3.60
									Freetown muck	B/D	0.40
									Hinckley and Windsor soils	A	0.20
									Hinckley loamy sand	A	0.16
									Wareham loamy sand	A/D	2.14
									Water	N/A	1.67
									Windsor loamy sand	A	12.98
Conservation Commission	386 Boston Street	CC1	19-3	8.69	0.29	A long and narrow wooded parcel, west of Boston Street (US Highway 1). This parcel contains wetland areas and is north of Klock Park. Two catch basins were observed adjacent to the parcel, with outfalls discharging directly to the parcel.	Yes	No	Canton fine sandy loam	A	6.49
									Freetown muck	B/D	0.50
									Udorthents	A	1.00
									Windsor loamy sand	A	0.70
Wooded Lot	191 Ipswich Road	M2	20-57	1.56	0.00	A vacant and wooded parcel, south of Ipswich Road.	Yes	No	Freetown muck	B/D	1.16
									Windsor loamy sand	A	0.41
Wooded Lot	58 Colrain Road	M3	24-16	2.14	0.01	A triangular shaped vacant and wooded parcel. This parcel is located at the end of Colrain Road and south of Kinsman Circle.	No	No	Canton fine sandy loam	B	2.14
Wooded Lot	59 R Colrain Road	M4	24-20	4.45	0.00	A vacant and wooded parcel, north of Birch Lane. The Topsfield Linear Common Rail trail abuts the property to the east.	No	Yes	Canton fine sandy loam	B	0.21
									Freetown muck	B/D	1.69
									Hinckley loamy sand	A	1.98
									Sudbury fine sandy loam	B	0.57
Pine Grove Cemetery	8 Haverhill Road	C1	24-77	38.53	2.77	This parcel contains Pine Grove Cemetery, as well as maintenance buildings, large wooded areas and wetlands. The majority of the site is extremely steep and not conductive to BMPs. A flat are was located off of Haverhill Road (MA-97). A drainage line with catch basins was observed running down the roadway.	No	No	Hinckley loamy sand	A	1.49
									Merrimac fine sandy loam	A	2.71
									Paxton fine sandy loam	C	23.47
									Sudbury fine sandy loam	B	2.19
									Woodbridge fine sandy loam	C/D	8.67

Description	Address	Town ID	CEI Map ID	Total Parcel Area (acres)	Total Impervious Area (acres)	Existing Conditions Description	Direct or Near-Direct Discharge	BMPs Present?	Soil Type	Hydric Soil Group	Soil Area (acres)
Wooded Lot	11 Normandy Row	M5	24-80	9.38	0.01	A vacant and wooded parcel, north of Normandy Row. This parcel is mostly wooded with some wetland areas. Multiple catch basins and associated outfall were observed adjacent to the parcel.	Yes	No	Canton fine sandy loam	B	0.05
									Freetown muck	B/D	1.45
									Scarboro mucky fine sandy loam	A/D	4.33
									Sudbury fine sandy loam	B	3.56
Intersection of Averill St., Boston St., and Ipswich Rd.	362 Boston Street	CC2	26-1	0.67	0.04	A cleared, triangular shaped lot between Ipswich Road, Averill Street, and Boston Street. Drainage enters the parcel from the western corner and is directed to a pooled area of Mile Brook, before crossing under Boston Road.	No	No	Hinckley loamy sand	A	0.66
									Urban land	N/A	0.01
Conservation Commission	114 Ipswich Road	CC3	26-10	0.81	0.00	A vacant and wooded lot, north of Ipswich Road. Mile Brook cuts through the parcel.	Yes	No	Hinckley loamy sand	A	0.27
									Urban land	N/A	0.11
									Wareham loamy sand	A/D	0.43
Wooded Lot	11 Brookside Road	M6	26-56	1.02	0.00	A vacant and wooded lot, west of Brookside Road. Mile Brook cuts through the parcel.	Yes	No	Freetown muck	B/D	0.80
									Hinckley and Windsor soils	A	0.22
Steward Elementary School	277 Perkins Row	SCH1	27-44	14.13	3.79	This parcel contains the Steward Elementary School and abuts the Mass Audubon's Ipswich River Wildlife Sanctuary to the east. Multiple leaching catch basins were observed in the parking area west of the school building. It appears that the drainage flows to existing manholes southeast of the school, a final outfall was not located.	No	Yes	Freetown muck	B/D	0.06
									Merrimac fine sandy loam	A	5.96
									Udorthents	A	8.11
Congregational Church of Topsfield	80 Main Street	CH1	32-119	1.70	0.18	A triangular shaped lot containing the Congregational Church of Topsfield. This lot is located between Main Street, Washington Street and High Street Extension. Multiple drainage structures were observed in the area, flow direction could not be identified. Existing pipe network flows directly through the parcel.	No	No	Sudbury fine sandy loam	B	1.70
Topsfield Town Hall	8 West Common Street	M7	32-121	0.96	0.42	This parcel consists of the Town Hall and associated landscaped areas and parking lot.	No	Yes	Sudbury fine sandy loam	B	0.96
Proctor Elementary School	60 Main Street	SCH2	33-1	11.32	3.60	This parcel contains the Proctor Elementary School, multiple sports fields, and parking areas. The parcel is relatively flat. The paved areas south and west of the school building drain via sheet and gutter flow towards Grove Street.	No	No	Canton fine sandy loam	A	1.74
									Scarboro mucky fine sandy loam	A/D	0.00
									Sudbury fine sandy loam	B	6.09
									Urban land	N/A	3.50
Town Common	83 Main Street	M8	33-2	1.31	0.02	A grassed town common with flag pole and gazebo. Sparse trees line the exterior of the parcel. Two catch basins were observed near the intersection of N. Common Street and Howlett Street, outfall location is unknown.	No	No	Sudbury fine sandy loam	B	1.31
Town Common	65 Main Street	M9	33-37	0.29	0.00	A grassed town common with flag pole and memorial area.	No	No	Sudbury fine sandy loam	B	0.29

Description	Address	Town ID	CEI Map ID	Total Parcel Area (acres)	Total Impervious Area (acres)	Existing Conditions Description	Direct or Near-Direct Discharge	BMPs Present?	Soil Type	Hydric Soil Group	Soil Area (acres)
Topsfield Town Library	1 South Common Street	L1	33-38	1.04	0.48	A small parcel containing the town library landscaped areas and parking lot, accessible from High Street. Multiple drainage structures observed on site but connectivity and direction are unknown.	No	No	Scarboro mucky fine sandy loam	A/D	0.34
									Sudbury fine sandy loam	B	0.69
Water Department	250 Perkins Row	WD2	35-4	50.68	0.45	A large parcel containing Mile Brook and associated pond/wetland areas. A water department building exists on the parcel and is accessed from Perkins Row. Drainage structures were observed near the intersection of Ipswich and Brookside Road. An outfall was not located but most likely exists on the parcel.	Yes	No	Deerfield loamy fine sand	A	0.09
									Freetown muck	B/D	36.18
									Hinckley and Windsor soils	A	4.45
									Hinckley loamy sand	A	3.99
									Merrimac fine sandy loam	A	1.78
									Pits	N/A	4.20
Wooded Lot	32 Grove Street	M10	40-18	0.26	0.01	A small vacant and wooded parcel at the corner of Grove Street and Gail Street.	No	No	Canton fine sandy loam	B	0.21
									Saco variant silt loam	B/D	0.04
									Sudbury fine sandy loam	B	0.00
Conservation Commission	12 Prospect Street	CC4	40-91	0.59	0.00	A small vacant and wooded parcel south of Prospect Street. A drainage line with catch basins was observed running past the parcel, an outfall location was not located.	Yes	No	Paxton fine sandy loam	C	0.02
									Saco variant silt loam	B/D	0.34
									Woodbridge fine sandy loam	C/D	0.24
Water Department	78 Central Street	WD3	41-118	0.84	0.00	A vacant and wooded parcel east of Central street. This property contains an unnamed stream.	Yes	No	Merrimac fine sandy loam	A	0.27
									Swansea muck	B/D	0.58
Fire Department	27 High Street	FD1	41-60	2.29	1.28	Parcel containing multiple fire department buildings and a paved access road. Drainage currently flows northeast towards High Street.	Yes	No	Hinckley loamy sand	A	1.86
									Scarboro mucky fine sandy loam	A/D	0.34
									Sudbury fine sandy loam	B	0.10
Water Department	288 R Boston Street	WD4	41-89	0.67	0.07	A small wooded parcel containing a water tower.	No	No	Paxton fine sandy loam	C	0.67
Public Works Facility	279 Boston Street	WD5	41-91	20.42	2.78	A large parcel containing the water department headquarters and other maintenance buildings. The eastern portion of the parcel is wooded. Drainage from the western portion of the parcel flows toward Boston Street, no structures observed on site.	No	No	Paxton fine sandy loam	C	17.42
									Ridgebury and Leicester fine sandy loams	D	2.98
									Woodbridge fine sandy loam	C/D	0.02
Maple Street Cemetery	216 Boston Street	C2	49-37	1.20	0.02	This parcel contains the Maple Street Cemetery and sparse trees.	No	No	Deerfield loamy fine sand	A	1.20
Police Department	210 Boston Street	PD1	49-38	1.09	0.30	This parcel contains the town police station, landscaped areas and parking lot.	No	No	Amostown fine sandy loam	C/D	0.16
									Canton fine sandy loam	B	0.57
									Deerfield loamy fine sand	A	0.30
									Udorthents	A	0.06
Wooded Lot	138 High Street	M11	50-4	12.74	0.00	A large vacant and wooded lot with wetlands. This parcel is accessible from High Street and Perkins Row.	Yes	No	Charlton fine sandy loam	B	2.50
									Paxton fine sandy loam	C	0.68
									Ridgebury and Leicester fine sandy loams	D	1.83
									Scarboro mucky fine sandy loam	A/D	6.71
									Woodbridge fine sandy loam	C/D	1.03

Description	Address	Town ID	CEI Map ID	Total Parcel Area (acres)	Total Impervious Area (acres)	Existing Conditions Description	Direct or Near-Direct Discharge	BMPs Present?	Soil Type	Hydric Soil Group	Soil Area (acres)
Pye Brook Park	124 Haverhill Road	P2	5-2	146.48	3.07	Pye Brook Park consists of multiple baseball and softball fields, football and soccer fields, a disc golf course, wooded areas and open grass areas. The park is accessible from Bare Hill Road and Haverhill Road.	Yes	Yes	Freetown muck	B/D	50.19
									Hinckley and Windsor soils	A	2.24
									Hinckley loamy sand	A	5.36
									Merrimac fine sandy loam	A	0.09
									Pits	N/A	79.65
									Udorthents	A	5.79
									Water	N/A	0.39
									Windsor loamy sand	A	2.78
Park	148 Boston Street	P3	64-6	13.61	0.00	This parcel consists of a large open field between Boston Street and Salem Road.	Yes	No	Limerick and Rumney soils	B/D	1.11
									Paxton fine sandy loam	C	9.33
									Water	N/A	0.00
									Woodbridge fine sandy loam	C/D	3.17
Water Department	13 Garden Street	WD6	69-10	0.78	0.10	This wooded parcel contains a water tower and is accessible from Garden Street.	No	No	Paxton fine sandy loam	C	0.78

1. All soils data obtained from GIS sources.

Table 2 - Proposed Improvements

					Area for Treatment		Pollutant Loading[1]			Proposed BMP(s)		Pollutant Reduction Estimates[2]			BMP Implementation Costs[3]				Dollars per Pound of Removal		
Description	Address	Town ID	CEI Map ID	Recommendations and Conclusions	Total (acres)	Impervious (Acres)	Impervious Area TP Load (lbs/yr)	Impervious Area TN Load (lbs/yr)	Impervious Area TSS Load (lbs/yr)	Proposed BMP(s)	Estimated Size	TP Reduction (lbs/yr)	TN Reduction (lbs/yr)	TSS Reduction (lbs/yr)	Unit Cost for Construction (per cf/lf/ea)	Estimated Construction Costs	Estimated Engineering Costs	Total BMP Cost (Design & Construction)	TP Reduction ($$/lb)	TN Reduction ($$/lb)	TSS Reduction ($$/lb)
Intersection of Averill St., Boston St., and Ipswich Rd.	362 Boston Street	26-1	CC2	Proposed infiltration basin at the end of an existing drainage system along Ipswich Road and Averill Street. This basin would allow for storage and treatment of stormwater prior to its discharge into Mile Brook.	4.1	2.5	3.4	25.4	3,700	Infiltration Basin	60' x 40' x 3' Deep	3.2	25.2	3,700	$8.18	$58,900	$20,700	$79,600	$18,400	$2,300	$20
Proctor Elementary School	60 Main Street	33-1	SCH2	A proposed series of BMPs, made up of an infiltration island and two infiltration basins, to treat runoff originating from the southern parking lot.	3.5	2.0	2.7	20.3	2,960	Infiltration Island, Infiltration Basin (2)	130' x 8' x 2' Deep 45' x 20' x 2' Deep 95' x 25' x 2' Deep	2.6	20.3	2,960	$8.18	$70,600	$24,800	$95,400	$27,200	$3,500	$20
Steward Elementary School	277 Perkins Row	27-44	SCH1	Proposed infiltration basin south of the school, to store and treat all runoff from the parking areas. It is recommended that all leaching catch basins on site be maintained regularly.	2.21	1.5	2.0	15.3	2,220	Infiltration Basin	60' x 40' x 3' Deep	2.0	15.3	2,220	$8.18	$58,900	$20,700	$79,600	$29,500	$3,900	$40
Public Works Facility	279 Boston Street	41-91	WD5	Propose the installation of a constructed wetland to capture and treat the stormwater runoff from the impervious areas on the western portion of the site. Also recommend installing an earthen berm along the edge of the stockpile area.	2.7	1.4	1.9	14.2	2,072	Constructed Wetland	80' x 35' x 4' Deep	1.2	5.7	1,782	$8.92	$99,900	$35,000	$134,900	$83,300	$17,500	$40
Topsfield Town Library	1 South Common Street	33-38	L1	Could not determine if existing BMPs exist on site, if so, recommend routine maintenance. Proposed infiltration basin southeast of the building to capture and treat stormwater runoff.	1.67	1.66	2.2	16.9	2,457	Infiltration Basin	70' x 30' x 3' Deep	2.2	16.9	2,457	$8.18	$51,500	$18,100	$69,600	$23,400	$3,000	$40
Wooded Lot	51 Haverhill Road	17-63	M1	Proposed constructed wetland to store and treat stormwater from catch basins at the intersection of Haverhill Road and Coventry Lane.	11.2	3.5	4.7	35.6	5,180	Constructed Wetland	60' x 40' x 3' Deep	2.0	9.7	3,454	$8.92	$64,200	$22,500	$86,700	$32,100	$6,600	$20
Pine Grove Cemetery	8 Haverhill Road	24-77	C1	Proposed infiltration basin along Haverhill Road to intercept stormwater within the existing drainage system.	8.7	2.6	3.5	26.4	3,848	Infiltration Basin	80' x 25' x 3' Deep	3.3	25.9	3,848	$8.18	$49,100	$17,200	$66,300	$14,900	$1,900	$10
Wooded Lot	11 Normandy Row	24-80	M5	A proposed series of three bioretention swales to treat runoff from four catch basins along Parsonage Lane.	3.4	1.6	2.1	16.3	2,368	Bioretention Basin (3)	40' x 10' x 2' Deep (3)	0.8	3.8	2,164	$20.27	$48,600	$17,100	$65,700	$60,800	$12,800	$20
Conservation Commission	386 Boston Street	19-3	CC1	Proposed installation of two small plunge pool/forebay style BMPs to reduce pollutant runoff from two catch basins along Boston Street.	1.3	0.8	1.1	8.1	1,184	Plunge Pool/Forebay	20' x 20' x 3' Deep	0.9	7.7	1,161	$8.18	$9,800	$3,500	$13,300	$10,900	$1,300	$10
					1.1	0.5	0.7	5.1	740	Plunge Pool/Forebay	20' x 20' x 3' Deep	0.6	4.9	740	$8.18	$9,800	$3,500	$13,300	$16,300	$2,000	$10
Conservation Commission	12 Prospect Street	40-91	CC4	Proposed installation of a water quality swale with check dams to capture and treat water from multiple catch basins along Prospect Street.	2.2	1.3	1.7	13.2	1,924	Water Quality Swale	150' x 10' x 2' Deep	0.2	1.2	1,367	$11.04	$33,100	$11,600	$44,700	$165,600	$27,600	$20
Water Department	250 Perkins Road	35-4	WD2	Proposed constructed wetland near the intersection of Ipswich Road and Brookside Road to treat stormwater captured from multiple catch basins along Ipswich Road.	3.2	1.2	1.6	12.2	1,776	Constructed Wetland	60' x 40' x 3' Deep	0.9	4.6	1,490	$8.92	$64,200	$22,500	$86,700	$71,300	$14,000	$40
Klock Park	17 North Street	18-60	P1	Proposed regrade of northern parking lot to allow runoff to enter a proposed infiltration basin.	4.7	0.7	0.9	7.1	1,036	Infiltration Basin	50' x 30' x 3' Deep	0.9	7.1	1,036	$8.18	$36,800	$12,900	$49,700	$40,900	$5,200	$40
Congregational Church of Topsfield	80 Main Street	32-119	CH1	Proposed infiltration basin west of the church near the intersection of Washington Street and High Street Extension. This basin would intersect an existing drainage pipe and allow for storage and treatment.	1.5	0.7	0.9	7.1	1,036	Infiltration Basin	60' x 30' x 3' Deep	0.9	7.1	1,036	$8.18	$44,200	$15,500	$59,700	$49,100	$6,200	$40
Fire Department	27 High Street	41-60	FD1	Proposed regrade and repave of rear parking lot to promote drainage away from the building and to new infiltration basin.	0.3	0.3	0.4	3.1	444	Infiltration Basin	30' x 20' x 3' Deep	0.4	3.0	444	$8.18	$14,700	$5,200	$19,900	$36,800	$4,900	$30
Town Common	83 Main Street	33-2	M8	Proposed infiltration basin within the town common at the intersection of North Common Street and Howlett Street.	0.5	0.3	0.4	3.1	444	Infiltration Basin	30' x 20' x 3' Deep	0.4	3.0	444	$8.18	$14,700	$5,200	$19,900	$36,800	$4,900	$30
Wooded Lot	59 R Colrain Road	24-20	M4	Potential for existing BMPs to exist on site, if so, recommend routine maintenance to restore proper function.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Topsfield Town Hall	8 West Common Street	32-121	M7	Potential for existing BMPs to exist on site, if so, recommend routine maintenance to restore proper function.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pye Brook Park	124 Haverhill Road	5-2	P2	Potential for existing BMPs to exist on site, if so, recommend routine maintenance to restore proper function.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Department	10 North Street	18-37	WD1	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wooded Lot	191 Ipswich Road	20-57	M2	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wooded Lot	58 Colrain Road	24-16	M3	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Conservation Commission	114 Ipswich Road	26-10	CC3	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wooded Lot	11 Brookside Road	26-56	M6	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

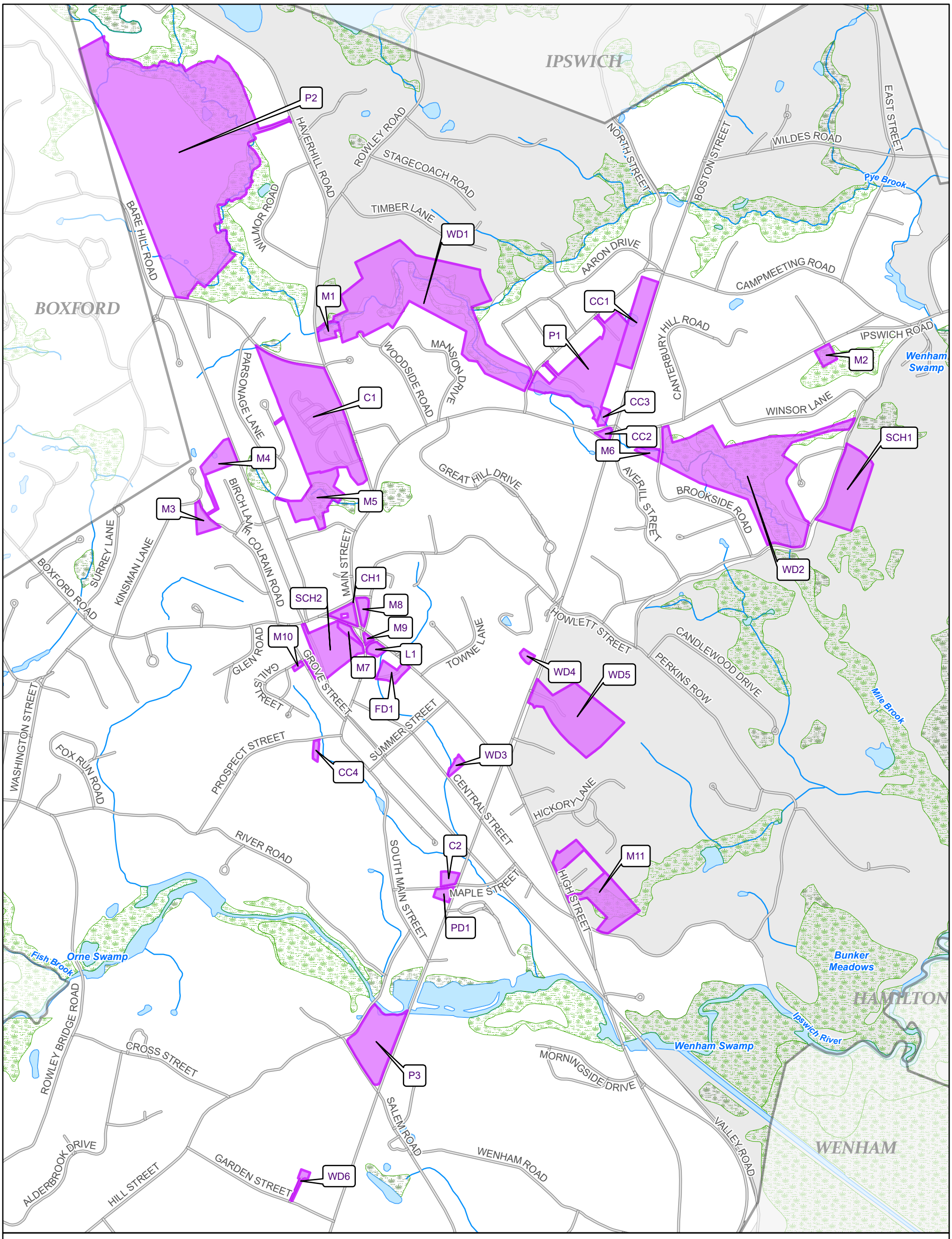
Description	Address	Town ID	CEI Map ID	Recommendations and Conclusions	Area for Treatment		Pollutant Loading[1]			Proposed BMP(s)		Pollutant Reduction Estimates[2]			BMP Implementation Costs[3]				Dollars per Pound of Removal		
					Total (acres)	Impervious (Acres)	Impervious Area TP Load (lbs/yr)	Impervious Area TN Load (lbs/yr)	Impervious Area TSS Load (lbs/yr)	Proposed BMP(s)	Estimated Size	TP Reduction (lbs/yr)	TN Reduction (lbs/yr)	TSS Reduction (lbs/yr)	Unit Cost for Construction (per cf/lf/ea)	Estimated Construction Costs	Estimated Engineering Costs	Total BMP Cost (Design & Construction)	TP Reduction ($$/lb)	TN Reduction ($$/lb)	TSS Reduction ($$/lb)
Town Common	65 Main Street	33-37	M9	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wooded Lot	32 Grove Street	40-18	M10	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Department	78 Central Street	41-118	WD3	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Department	288 R Boston Street	41-89	WD4	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Maple Street Cemetery	216 Boston Street	49-37	C2	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Police Department	210 Boston Street	49-38	PD1	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wooded Lot	138 High Street	50-4	M11	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Park	148 Boston Street	64-6	P3	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Department	13 Garden Street	69-10	WD6	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
											Totals	**22.5**	**161.4**	**30,303**	**-**	**$729,000**	**$256,000**	**$985,000**	**$43,800**	**$1,600**	**$30**

1. Pollutant loading calculated for impervious areas only using the land use loading rates provided in the BATT calculator for "Highway". Rates are as follows, in pounds per acre per year: 1.34 pounds of Total Phosphorus; 10.17 pounds of Total Nitrogen; 1,480.13 pounds of Total Suspended Solids
2. Pollutant reduction estimates calculated through EPA's BATT calculator
3. Information on BMP costing is attached as Attachment A.

Table 3 - BMP Costing Information

Stormwater BMP Type	Unit	OptiTool BMP Estimates, 2016[1,2]	OptiTool BMP Estimates, 2022[3]	Adjusted BMP Estimate, 2022[4]	Adjusted Construction Estimate[4]	Adjusted Engineering/ Contingency Estimate[5]
Biorentention / Rain Garden	per CF	$15.46	$18.24	$27.36	$20.27	$7.09
Constructed Wetlands	per CF	$6.80	$8.02	$12.04	$8.92	$3.12
Dry Detention Basin	per CF	$6.80	$8.02	$12.04	$8.92	$3.12
Gravel Wetland	per CF	$8.78	$10.36	$15.54	$11.51	$4.03
Infiltration Basin	per CF	$6.24	$7.36	$11.04	$8.18	$2.86
Infiltration Trench	per CF	$12.49	$14.74	$22.11	$16.38	$5.73
Porous Pavement	per CF	$5.32	$6.28	$9.42	$6.98	$2.44
Sand Filter	per CF	$17.94	$21.17	$31.75	$23.52	$8.23
Wet Detention Basin	per CF	$6.80	$8.02	$12.04	$8.92	$3.12
Subsurface Infiltration/Detention System (aka Infiltration Chamber)	per CF	$67.85	$80.06	$120.09	$88.96	$31.14

1. Memorandum on Methodology for developing cost estimates for Opti-Tool is provided as Attachment A.
2. Total includes cost of construction, engineering, and contingencies.
3. 2022 Estimate assumes a 18% markup from 2016 Estimate due to inflation.
4. Adjustment factor of 1.5 is applied to account for construction in developed areas.
5. Engineering/Contingency Estimate is 35% of the Construction Estimate.



Legend

- Roads
- Urbanized Area Mask
- Non-Urban Area
- Lake, Reservoir
- Wetland, Marsh
- Stream, Brook

N W E S

0 1

Miles

BMP Retrofit Site Inspection Map Topsfield, MA

Comprehensive Environmental Incorporated

Data Sources: MassGIS, Town of Topsfield, CEI

MUNICIPAL PROPERTY BMP RETROFITS

Attachment A:
BMP costing table and memorandum report on
Methodology for developing cost estimates for Opti-Tool;
February 20, 2016

Table 1 - Summary of Existing Conditions

Description	Address	Town ID	CEI Map ID	Total Parcel Area (acres)	Total Impervious Area (acres)	Existing Conditions Description	Direct or Near-Direct Discharge	BMPs Present?	Soil Type	Hydric Soil Group	Soil Area (acres)
Wooded Lot	51 Haverhill Road	M1	17-63	1.61	0.00	A vacant, wooded property, off of Haverhill Road (MA-97). This property contains a portion of Pye Brook. A catch basin and associated outfall were observed across the street from the parcel. An upgradient drainage network was observed to discharge on the private parcel directly south of the site.	Yes	No	Freetown muck	B/D	0.79
									Hinckley loamy sand	A	0.00
									Walpole sandy loam	B/D	0.81
Water Department	10 North Street	WD1	18-37	60.30	0.15	A large wooded parcel containing a large section of Pye Brook and associated wetland areas. Multiple water department buildings exist on the southeastern portion of the parcel, off of North Street.	Yes	No	Canton fine sandy loam	A	0.14
									Freetown muck	B/D	14.13
									Hinckley and Windsor soils	A	10.94
									Hinckley loamy sand	A	17.86
									Merrimac fine sandy loam	A	0.40
									Saco variant silt loam	B/D	12.91
									Sudbury fine sandy loam	B/D	0.13
									Wareham loamy sand	A/D	1.05
									Water	N/A	0.57
									Windsor loamy sand	A	2.17
Klock Park	17 North Street	P1	18-60	21.62	0.98	This parcel contains Klock Park, accessible from North Street. The park consists of multiple soccer fields, softball fields and two parking areas. No drainage structures were observed withing the parcel. The northern parking lot pavement was in rough condition, causing sheet flow to exit the lot in two locations.	Yes	No	Canton fine sandy loam	B/D	0.47
									Deerfield loamy fine sand	A	3.60
									Freetown muck	B/D	0.40
									Hinckley and Windsor soils	A	0.20
									Hinckley loamy sand	A	0.16
									Wareham loamy sand	A/D	2.14
									Water	N/A	1.67
									Windsor loamy sand	A	12.98
Conservation Commission	386 Boston Street	CC1	19-3	8.69	0.29	A long and narrow wooded parcel, west of Boston Street (US Highway 1). This parcel contains wetland areas and is north of Klock Park. Two catch basins were observed adjacent to the parcel, with outfalls discharging directly to the parcel.	Yes	No	Canton fine sandy loam	A	6.49
									Freetown muck	B/D	0.50
									Udorthents	A	1.00
									Windsor loamy sand	A	0.70
Wooded Lot	191 Ipswich Road	M2	20-57	1.56	0.00	A vacant and wooded parcel, south of Ipswich Road.	Yes	No	Freetown muck	B/D	1.16
									Windsor loamy sand	A	0.41
Wooded Lot	58 Colrain Road	M3	24-16	2.14	0.01	A triangular shaped vacant and wooded parcel. This parcel is located at the end of Colrain Road and south of Kinsman Circle.	No	No	Canton fine sandy loam	B	2.14
Wooded Lot	59 R Colrain Road	M4	24-20	4.45	0.00	A vacant and wooded parcel, north of Birch Lane. The Topsfield Linear Common Rail trail abuts the property to the east.	No	Yes	Canton fine sandy loam	B	0.21
									Freetown muck	B/D	1.69
									Hinckley loamy sand	A	1.98
									Sudbury fine sandy loam	B	0.57
Pine Grove Cemetery	8 Haverhill Road	C1	24-77	38.53	2.77	This parcel contains Pine Grove Cemetery, as well as maintenance buildings, large wooded areas and wetlands. The majority of the site is extremely steep and not conductive to BMPs. A flat are was located off of Haverhill Road (MA-97). A drainage line with catch basins was observed running down the roadway.	No	No	Hinckley loamy sand	A	1.49
									Merrimac fine sandy loam	A	2.71
									Paxton fine sandy loam	C	23.47
									Sudbury fine sandy loam	B	2.19
									Woodbridge fine sandy loam	C/D	8.67

Description	Address	Town ID	CEI Map ID	Total Parcel Area (acres)	Total Impervious Area (acres)	Existing Conditions Description	Direct or Near-Direct Discharge	BMPs Present?	Soil Type	Hydric Soil Group	Soil Area (acres)
Wooded Lot	11 Normandy Row	M5	24-80	9.38	0.01	A vacant and wooded parcel, north of Normandy Row. This parcel is mostly wooded with some wetland areas. Multiple catch basins and associated outfall were observed adjacent to the parcel.	Yes	No	Canton fine sandy loam	B	0.05
									Freetown muck	B/D	1.45
									Scarboro mucky fine sandy loam	A/D	4.33
									Sudbury fine sandy loam	B	3.56
Intersection of Averill St., Boston St., and Ipswich Rd.	362 Boston Street	CC2	26-1	0.67	0.04	A cleared, triangular shaped lot between Ipswich Road, Averill Street, and Boston Street. Drainage enters the parcel from the western corner and is directed to a pooled area of Mile Brook, before crossing under Boston Road.	No	No	Hinckley loamy sand	A	0.66
									Urban land	N/A	0.01
Conservation Commission	114 Ipswich Road	CC3	26-10	0.81	0.00	A vacant and wooded lot, north of Ipswich Road. Mile Brook cuts through the parcel.	Yes	No	Hinckley loamy sand	A	0.27
									Urban land	N/A	0.11
									Wareham loamy sand	A/D	0.43
Wooded Lot	11 Brookside Road	M6	26-56	1.02	0.00	A vacant and wooded lot, west of Brookside Road. Mile Brook cuts through the parcel.	Yes	No	Freetown muck	B/D	0.80
									Hinckley and Windsor soils	A	0.22
Steward Elementary School	277 Perkins Row	SCH1	27-44	14.13	3.79	This parcel contains the Steward Elementary School and abuts the Mass Audubon's Ipswich River Wildlife Sanctuary to the east. Multiple leaching catch basins were observed in the parking area west of the school building. It appears that the drainage flows to existing manholes southeast of the school, a final outfall was not located.	No	Yes	Freetown muck	B/D	0.06
									Merrimac fine sandy loam	A	5.96
									Udorthents	A	8.11
Congregational Church of Topsfield	80 Main Street	CH1	32-119	1.70	0.18	A triangular shaped lot containing the Congregational Church of Topsfield. This lot is located between Main Street, Washington Street and High Street Extension. Multiple drainage structures were observed in the area, flow direction could not be identified. Existing pipe network flows directly through the parcel.	No	No	Sudbury fine sandy loam	B	1.70
Topsfield Town Hall	8 West Common Street	M7	32-121	0.96	0.42	This parcel consists of the Town Hall and associated landscaped areas and parking lot.	No	Yes	Sudbury fine sandy loam	B	0.96
Proctor Elementary School	60 Main Street	SCH2	33-1	11.32	3.60	This parcel contains the Proctor Elementary School, multiple sports fields, and parking areas. The parcel is relatively flat. The paved areas south and west of the school building drain via sheet and gutter flow towards Grove Street.	No	No	Canton fine sandy loam	A	1.74
									Scarboro mucky fine sandy loam	A/D	0.00
									Sudbury fine sandy loam	B	6.09
									Urban land	N/A	3.50
Town Common	83 Main Street	M8	33-2	1.31	0.02	A grassed town common with flag pole and gazebo. Sparse trees line the exterior of the parcel. Two catch basins were observed near the intersection of N. Common Street and Howlett Street, outfall location is unknown.	No	No	Sudbury fine sandy loam	B	1.31
Town Common	65 Main Street	M9	33-37	0.29	0.00	A grassed town common with flag pole and memorial area.	No	No	Sudbury fine sandy loam	B	0.29

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Topsfield Town Library	1 South Common Street	L1	33-38	1.04	0.48	A small parcel containing the town library landscaped areas and parking lot, accessible from High Street. Multiple drainage structures observed on site but connectivity and direction are unknown.	No	No	Scarboro mucky fine sandy loam	A/D	0.34
									Sudbury fine sandy loam	B	0.69
Water Department	250 Perkins Row	WD2	35-4	50.68	0.45	A large parcel containing Mile Brook and associated pond/wetland areas. A water department building exists on the parcel and is accessed from Perkins Row. Drainage structures were observed near the intersection of Ipswich and Brookside Road. An outfall was not located but most likely exists on the parcel.	Yes	No	Deerfield loamy fine sand	A	0.09
									Freetown muck	B/D	36.18
									Hinckley and Windsor soils	A	4.45
									Hinckley loamy sand	A	3.99
									Merrimac fine sandy loam	A	1.78
									Pits	N/A	4.20
Wooded Lot	32 Grove Street	M10	40-18	0.26	0.01	A small vacant and wooded parcel at the corner of Grove Street and Gail Street.	No	No	Canton fine sandy loam	B	0.21
									Saco variant silt loam	B/D	0.04
									Sudbury fine sandy loam	B	0.00
Conservation Commission	12 Prospect Street	CC4	40-91	0.59	0.00	A small vacant and wooded parcel south of Prospect Street. A drainage line with catch basins was observed running past the parcel, an outfall location was not located.	Yes	No	Paxton fine sandy loam	C	0.02
									Saco variant silt loam	B/D	0.34
									Woodbridge fine sandy loam	C/D	0.24
Water Department	78 Central Street	WD3	41-118	0.84	0.00	A vacant and wooded parcel east of Central street. This property contains an unnamed stream.	Yes	No	Merrimac fine sandy loam	A	0.27
									Swansea muck	B/D	0.58
Fire Department	27 High Street	FD1	41-60	2.29	1.28	Parcel containing multiple fire department buildings and a paved access road. Drainage currently flows northeast towards High Street.	Yes	No	Hinckley loamy sand	A	1.86
									Scarboro mucky fine sandy loam	A/D	0.34
									Sudbury fine sandy loam	B	0.10
Water Department	288 R Boston Street	WD4	41-89	0.67	0.07	A small wooded parcel containing a water tower.	No	No	Paxton fine sandy loam	C	0.67
Public Works Facility	279 Boston Street	WD5	41-91	20.42	2.78	A large parcel containing the water department headquarters and other maintenance buildings. The eastern portion of the parcel is wooded. Drainage from the western portion of the parcel flows toward Boston Street, no structures observed on site.	No	No	Paxton fine sandy loam	C	17.42
									Ridgebury and Leicester fine sandy loams	D	2.98
									Woodbridge fine sandy loam	C/D	0.02
Maple Street Cemetery	216 Boston Street	C2	49-37	1.20	0.02	This parcel contains the Maple Street Cemetery and sparse trees.	No	No	Deerfield loamy fine sand	A	1.20
Police Department	210 Boston Street	PD1	49-38	1.09	0.30	This parcel contains the town police station, landscaped areas and parking lot.	No	No	Amostown fine sandy loam	C/D	0.16
									Canton fine sandy loam	B	0.57
									Deerfield loamy fine sand	A	0.30
									Udorthents	A	0.06
Wooded Lot	138 High Street	M11	50-4	12.74	0.00	A large vacant and wooded lot with wetlands. This parcel is accessible from High Street and Perkins Row.	Yes	No	Charlton fine sandy loam	B	2.50
									Paxton fine sandy loam	C	0.68
									Ridgebury and Leicester fine sandy loams	D	1.83
									Scarboro mucky fine sandy loam	A/D	6.71
									Woodbridge fine sandy loam	C/D	1.03

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Pye Brook Park	124 Haverhill Road	P2	5-2	146.48	3.07	Pye Brook Park consists of multiple baseball and softball fields, football and soccer fields, a disc golf course, wooded areas and open grass areas. The park is accessible from Bare Hill Road and Haverhill Road.	Yes	Yes	Freetown muck	B/D	50.19
									Hinckley and Windsor soils	A	2.24
									Hinckley loamy sand	A	5.36
									Merrimac fine sandy loam	A	0.09
									Pits	N/A	79.65
									Udorthents	A	5.79
									Water	N/A	0.39
									Windsor loamy sand	A	2.78
Park	148 Boston Street	P3	64-6	13.61	0.00	This parcel consists of a large open field between Boston Street and Salem Road.	Yes	No	Limerick and Rumney soils	B/D	1.11
									Paxton fine sandy loam	C	9.33
									Water	N/A	0.00
									Woodbridge fine sandy loam	C/D	3.17
Water Department	13 Garden Street	WD6	69-10	0.78	0.10	This wooded parcel contains a water tower and is accessible from Garden Street.	No	No	Paxton fine sandy loam	C	0.78

1. All soils data obtained from GIS sources.

MUNICIPAL PROPERTY BMP RETROFITS

Attachment B:
Pre-Conceptual Designs for Top Five Locations

Table 2 - Proposed Improvements

					Area for Treatment		Pollutant Loading[1]			Proposed BMP(s)		Pollutant Reduction Estimates[2]			BMP Implementation Costs[3]				Dollars per Pound of Removal		
Description	Address	Town ID	CEI Map ID	Recommendations and Conclusions	Total (acres)	Impervious (Acres)	Impervious Area TP Load (lbs/yr)	Impervious Area TN Load (lbs/yr)	Impervious Area TSS Load (lbs/yr)	Proposed BMP(s)	Estimated Size	TP Reduction (lbs/yr)	TN Reduction (lbs/yr)	TSS Reduction (lbs/yr)	Unit Cost for Construction (per cf/lf/ea)	Estimated Construction Costs	Estimated Engineering Costs	Total BMP Cost (Design & Construction)	TP Reduction ($$/lb)	TN Reduction ($$/lb)	TSS Reduction ($$/lb)
Intersection of Averill St., Boston St., and Ipswich Rd.	362 Boston Street	26-1	CC2	Proposed infiltration basin at the end of an existing drainage system along Ipswich Road and Averill Street. This basin would allow for storage and treatment of stormwater prior to its discharge into Mile Brook.	4.1	2.5	3.4	25.4	3,700	Infiltration Basin	60' x 40' x 3' Deep	3.2	25.2	3,700	$8.18	$58,900	$20,700	$79,600	$18,400	$2,300	$20
Proctor Elementary School	60 Main Street	33-1	SCH2	A proposed series of BMPs, made up of an infiltration island and two infiltration basins, to treat runoff originating from the southern parking lot.	3.5	2.0	2.7	20.3	2,960	Infiltration Island, Infiltration Basin (2)	130' x 8' x 2' Deep 45' x 20' x 2' Deep 95' x 25' x 2' Deep	2.6	20.3	2,960	$8.18	$70,600	$24,800	$95,400	$27,200	$3,500	$20
Steward Elementary School	277 Perkins Row	27-44	SCH1	Proposed infiltration basin south of the school, to store and treat all runoff from the parking areas. It is recommended that all leaching catch basins on site be maintained regularly.	2.21	1.5	2.0	15.3	2,220	Infiltration Basin	60' x 40' x 3' Deep	2.0	15.3	2,220	$8.18	$58,900	$20,700	$79,600	$29,500	$3,900	$40
Public Works Facility	279 Boston Street	41-91	WD5	Propose the installation of a constructed wetland to capture and treat the stormwater runoff from the impervious areas on the western portion of the site. Also recommend installing an earthen berm along the edge of the stockpile area.	2.7	1.4	1.9	14.2	2,072	Constructed Wetland	80' x 35' x 4' Deep	1.2	5.7	1,782	$8.92	$99,900	$35,000	$134,900	$83,300	$17,500	$40
Topsfield Town Library	1 South Common Street	33-38	L1	Could not determine if existing BMPs exist on site, if so, recommend routine maintenance. Proposed infiltration basin southeast of the building to capture and treat stormwater runoff.	1.67	1.66	2.2	16.9	2,457	Infiltration Basin	70' x 30' x 3' Deep	2.2	16.9	2,457	$8.18	$51,500	$18,100	$69,600	$23,400	$3,000	$40
Wooded Lot	51 Haverhill Road	17-63	M1	Proposed constructed wetland to store and treat stormwater from catch basins at the intersection of Haverhill Road and Coventry Lane.	11.2	3.5	4.7	35.6	5,180	Constructed Wetland	60' x 40' x 3' Deep	2.0	9.7	3,454	$8.92	$64,200	$22,500	$86,700	$32,100	$6,600	$20
Pine Grove Cemetery	8 Haverhill Road	24-77	C1	Proposed infiltration basin along Haverhill Road to intercept stormwater within the existing drainage system.	8.7	2.6	3.5	26.4	3,848	Infiltration Basin	80' x 25' x 3' Deep	3.3	25.9	3,848	$8.18	$49,100	$17,200	$66,300	$14,900	$1,900	$10
Wooded Lot	11 Normandy Row	24-80	M5	A proposed series of three bioretention swales to treat runoff from four catch basins along Parsonage Lane.	3.4	1.6	2.1	16.3	2,368	Bioretention Basin (3)	40' x 10' x 2' Deep (3)	0.8	3.8	2,164	$20.27	$48,600	$17,100	$65,700	$60,800	$12,800	$20
Conservation Commission	386 Boston Street	19-3	CC1	Proposed installation of two small plunge pool/forebay style BMPs to reduce pollutant runoff from two catch basins along Boston Street.	1.3	0.8	1.1	8.1	1,184	Plunge Pool/Forebay	20' x 20' x 3' Deep	0.9	7.7	1,161	$8.18	$9,800	$3,500	$13,300	$10,900	$1,300	$10
					1.1	0.5	0.7	5.1	740	Plunge Pool/Forebay	20' x 20' x 3' Deep	0.6	4.9	740	$8.18	$9,800	$3,500	$13,300	$16,300	$2,000	$10
Conservation Commission	12 Prospect Street	40-91	CC4	Proposed installation of a water quality swale with check dams to capture and treat water from multiple catch basins along Prospect Street.	2.2	1.3	1.7	13.2	1,924	Water Quality Swale	150' x 10' x 2' Deep	0.2	1.2	1,367	$11.04	$33,100	$11,600	$44,700	$165,600	$27,600	$20
Water Department	250 Perkins Road	35-4	WD2	Proposed constructed wetland near the intersection of Ipswich Road and Brookside Road to treat stormwater captured from multiple catch basins along Ipswich Road.	3.2	1.2	1.6	12.2	1,776	Constructed Wetland	60' x 40' x 3' Deep	0.9	4.6	1,490	$8.92	$64,200	$22,500	$86,700	$71,300	$14,000	$40
Klock Park	17 North Street	18-60	P1	Proposed regrade of northern parking lot to allow runoff to enter a proposed infiltration basin.	4.7	0.7	0.9	7.1	1,036	Infiltration Basin	50' x 30' x 3' Deep	0.9	7.1	1,036	$8.18	$36,800	$12,900	$49,700	$40,900	$5,200	$40
Congregational Church of Topsfield	80 Main Street	32-119	CH1	Proposed infiltration basin west of the church near the intersection of Washington Street and High Street Extension. This basin would intersect an existing drainage pipe and allow for storage and treatment.	1.5	0.7	0.9	7.1	1,036	Infiltration Basin	60' x 30' x 3' Deep	0.9	7.1	1,036	$8.18	$44,200	$15,500	$59,700	$49,100	$6,200	$40
Fire Department	27 High Street	41-60	FD1	Proposed regrade and repave of rear parking lot to promote drainage away from the building and to new infiltration basin.	0.3	0.3	0.4	3.1	444	Infiltration Basin	30' x 20' x 3' Deep	0.4	3.0	444	$8.18	$14,700	$5,200	$19,900	$36,800	$4,900	$30
Town Common	83 Main Street	33-2	M8	Proposed infiltration basin within the town common at the intersection of North Common Street and Howlett Street.	0.5	0.3	0.4	3.1	444	Infiltration Basin	30' x 20' x 3' Deep	0.4	3.0	444	$8.18	$14,700	$5,200	$19,900	$36,800	$4,900	$30
Wooded Lot	59 R Colrain Road	24-20	M4	Potential for existing BMPs to exist on site, if so, recommend routine maintenance to restore proper function.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Topsfield Town Hall	8 West Common Street	32-121	M7	Potential for existing BMPs to exist on site, if so, recommend routine maintenance to restore proper function.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pye Brook Park	124 Haverhill Road	5-2	P2	Potential for existing BMPs to exist on site, if so, recommend routine maintenance to restore proper function.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Department	10 North Street	18-37	WD1	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wooded Lot	191 Ipswich Road	20-57	M2	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wooded Lot	58 Colrain Road	24-16	M3	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Conservation Commission	114 Ipswich Road	26-10	CC3	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wooded Lot	11 Brookside Road	26-56	M6	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Description	Address	Town ID	CEI Map ID	Recommendations and Conclusions	Area for Treatment		Pollutant Loading[1]			Proposed BMP(s)		Pollutant Reduction Estimates[2]			BMP Implementation Costs[3]				Dollars per Pound of Removal		
					Total (acres)	Impervious (Acres)	Impervious Area TP Load (lbs/yr)	Impervious Area TN Load (lbs/yr)	Impervious Area TSS Load (lbs/yr)	Proposed BMP(s)	Estimated Size	TP Reduction (lbs/yr)	TN Reduction (lbs/yr)	TSS Reduction (lbs/yr)	Unit Cost for Construction (per cf/lf/ea)	Estimated Construction Costs	Estimated Engineering Costs	Total BMP Cost (Design & Construction)	TP Reduction ($$/lb)	TN Reduction ($$/lb)	TSS Reduction ($$/lb)
Town Common	65 Main Street	33-37	M9	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wooded Lot	32 Grove Street	40-18	M10	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Department	78 Central Street	41-118	WD3	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Department	288 R Boston Street	41-89	WD4	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Maple Street Cemetery	216 Boston Street	49-37	C2	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Police Department	210 Boston Street	49-38	PD1	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wooded Lot	138 High Street	50-4	M11	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Park	148 Boston Street	64-6	P3	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Department	13 Garden Street	69-10	WD6	No recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
											Totals	**22.5**	**161.4**	**30,303**	**-**	**$729,000**	**$256,000**	**$985,000**	**$43,800**	**$1,600**	**$30**

1. Pollutant loading calculated for impervious areas only using the land use loading rates provided in the BATT calculator for "Highway". Rates are as follows, in pounds per acre per year: 1.34 pounds of Total Phosphorus; 10.17 pounds of Total Nitrogen; 1,480.13 pounds of Total Suspended Solids
2. Pollutant reduction estimates calculated through EPA's BATT calculator
3. Information on BMP costing is attached as Attachment A.

MUNICIPAL PROPERTY BMP RETROFITS

Attachment C:
Example Roadway and Intersection BMP Improvements

Table 3 - BMP Costing Information

Stormwater BMP Type	Unit	OptiTool BMP Estimates, 2016[1,2]	OptiTool BMP Estimates, 2022[3]	Adjusted BMP Estimate, 2022[4]	Adjusted Construction Estimate[4]	Adjusted Engineering/ Contingency Estimate[5]
Biorentention / Rain Garden	per CF	$15.46	$18.24	$27.36	$20.27	$7.09
Constructed Wetlands	per CF	$6.80	$8.02	$12.04	$8.92	$3.12
Dry Detention Basin	per CF	$6.80	$8.02	$12.04	$8.92	$3.12
Gravel Wetland	per CF	$8.78	$10.36	$15.54	$11.51	$4.03
Infiltration Basin	per CF	$6.24	$7.36	$11.04	$8.18	$2.86
Infiltration Trench	per CF	$12.49	$14.74	$22.11	$16.38	$5.73
Porous Pavement	per CF	$5.32	$6.28	$9.42	$6.98	$2.44
Sand Filter	per CF	$17.94	$21.17	$31.75	$23.52	$8.23
Wet Detention Basin	per CF	$6.80	$8.02	$12.04	$8.92	$3.12
Subsurface Infiltration/Detention System (aka Infiltration Chamber)	per CF	$67.85	$80.06	$120.09	$88.96	$31.14

1. Memorandum on Methodology for developing cost estimates for Opti-Tool is provided as Attachment A.
2. Total includes cost of construction, engineering, and contingencies.
3. 2022 Estimate assumes a 18% markup from 2016 Estimate due to inflation.
4. Adjustment factor of 1.5 is applied to account for construction in developed areas.
5. Engineering/Contingency Estimate is 35% of the Construction Estimate.

Appendix F

Street Sweeping Optimization Plan

MI-1, Street Sweeping

Street sweeping is performed to remove sediments from streets and parking lots before it is washed into catch basins and waterways.

Procedures and Practices

- Sweep all Town-owned streets within the urbanized area with the exception of high-speed limited access highways at least once per year in the spring.
- For areas subject to nitrogen and phosphorus TMDL and impaired waters requirements, sweep streets once in the spring and once in the fall.
- If required, sweep priority areas such as those with construction sites or areas subject to heavier sanding and/or traffic volumes multiple times a year to minimize sediment accumulation.
- Sweep all Town parking lots in spring after snow melts.
- If possible, notify residents and businesses of street sweeping schedule and requirements such as restricted parking and removal of objects that could obstruct sweeping operations.
- Lightly spray water on streets before sweeping to minimize airborne dust.
- Avoid pushing materials into or around storm drains and catch basins.
- 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.
- After sweeping is finished, properly dispose of sweeper wastes (see below). Never dispose sweep debris into the storm drain systems, catch basins, or waterways.
- Never store street sweepings in areas where stormwater could transport fine materials to the storm drain system or a waterbody.
- If possible, clean catch basins after streets are swept.

Prior to the Start of the Sweeping Season (Spring)

- Train employees on the proper maintenance and operation of equipment and on the proper storage and disposal of street sweepings.
- Ensure all sweeping equipment is in good working order and conduct maintenance as needed (see Equipment Maintenance Section).
- Ensure road crews are familiar with sweeping routes to efficiently cover the entire municipality.

Prior to Leaving the Facility for Sweeping

- Speak with supervisor to determine special circumstances (i.e. rain, priority areas) and to confirm sweeping route.
- Inspect all vehicles. Check fluid levels and fill to proper levels. Ensure lights are in working order. Document any repairs.

Street Sweeping

- Operate all sweepers according to the manufacturer's recommended settings, standards, and procedures.
- While sweeping, drive between the optimal speed limit.
- If spills occur or illegal discharges are seen, report to your supervisor.
- Do not perform sweeping during heavy rainfall.

Upon Return to the Facility

- Provide daily progress reports on the number of miles and names of roads swept to supervisor.
- Wash vehicle following the Vehicles and Equipment Washing SOP (VM-2).
- Before parking any truck or equipment after use, check all fluid levels. Note any minor repairs conducted and other repairs that may be needed. Follow the Vehicle and Equipment Maintenance SOP (VM-1).

Storage, Disposal and Reuse

Storage

- Store separately from catch basin cleaning materials.
- Store street sweepings on an impermeable surface away from areas that receive stormwater runoff.
- Cover street sweeping piles with tarps to prevent rainwater from generating contaminated stormwater.
- Any Town employee handling the street sweepings should wear appropriate personal protective equipment, such as a dust mask, safety goggles, long-sleeved shirts and long pants at all times.

Reuse

Street sweepings may also be used as fill in public ways or as an additive to compost without prior approval from MassDEP provided certain conditions are met:

- Not been collected from Urban Center Roads (defined as local roads in central commercial and retail business districts and industrial and manufacturing areas).
- Used under the road surface or as fill along the side of the road within the public way.
- Not used in residential areas.
- Kept above the level of the groundwater.
- Not used in designated "No Salt Areas".
- Not used within the 100 foot buffer zone of a wetland or within wetland resource areas including bordering vegetative wetlands and riverfront areas.
- Not used within 500 feet of a ground or surface drinking water supply.

Inspection and Maintenance

- Inspect sweepers before sweeping to ensure they are in good working order. Maintain and adjust as necessary.
- Inspect tarp to ensure pile is covered and no tears.

- Inspect erosion controls weekly and after major storms to ensure they are free of tears and sediment buildup. Repair as needed.
- Immediately abate any nuisance conditions (i.e., noise, dust, odor).
- Train employees on proper street sweeping procedures.

Recordkeeping and Reporting

- Use attached Street Sweeping Log to document street sweeping activities.
- Town employees should record:
    - Miles of roadway swept.
    - Tons or cubic yards of street sweeping materials generated.
    - Tons or cubic yards of street sweeping materials disposed of.
    - Tons or cubic yards of street sweeping materials reused as fill.

Street Sweeping Log

Date:_________________ **Precipitation in the last three days?** **Yes** **No**

Weather Today:____

Supervisor/Crew Leader:_______________________________________

Street Swept (Name)	Miles	Observed Potential Sources of Pollution	Volume or Mass of Material Removed	Comments
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		

Total Sediment Accumulated from Route (as weighed at landfill):_______________ tons

* Provide additional comments to describe the observations made for the category. Comments should also identify issues that hinder street sweeping progress (i.e., parked cars, obstructions).

BOXFORD
IPSWICH
HAMILTON
WENHAM
MIDDLETON
DANVERS
BEVERLY
HAVERHILL ROAD
ROWLEY ROAD
STAGECOACH ROAD
TIMBER LANE
Pye Brook
BARE HILL ROAD
PARSONAGE LANE
WOODSIDE ROAD
GREAT HILL DRIVE
NORTH STREET
BOSTON STREET
EAST STREET
WILDES ROAD
WILLOWDALE ROAD
CAMPMEETING ROAD
IPSWICH ROAD
WINSOR LANE
AVERILL STREET
BROOKSIDE ROAD
PERKINS ROW
HOWLETT STREET
ASBURY STREET
BRADLEY PALMER STATE PARK ROAD
KINSMAN LANE
COLRAIN ROAD
MAIN STREET
WASHINGTON STREET
LOCKWOOD LANE
GROVE STREET
TOWNE LANE
ROSS ROAD
FOX RUN ROAD
PROSPECT STREET
RIVER ROAD
Mile Brook
Wenham Swamp
HICKORY LANE
CENTRAL STREET
SOUTH MAIN STREET
MAPLE STREET
Fish Brook
Ipswich River
CROSS STREET
HIGH RIDGE ROAD
HIGH STREET
VALLEY ROAD
GARDEN STREET
WENHAM ROAD
SALEM ROAD
ALDERBROOK DRIVE
HILL STREET
MCLEOD LANE
INTERSTATE 95
Orne Swamp
ROWLEY BRIDGE ROAD
CORPORATE ROAD
NIKE VILLAGE
CENGLISH COMMONS

Street Sweeping Once a Year- within Urbanized Area (UA)

The Town of Topsfield does not contain any Phosphorus, Nitrogen or TSS impaired waterbodies.

Streets located in MS4 catchment areas are required to be swept once per year.

Street sections located in MS4 outfall catchments: 14 lane miles

Legend

- Outfall
- Outfall Catchment
- Urbanized Area
- 303(d) Impaired Stream
- 303(d) Impaired Waterbody
- Lake, Pond, Reservoir
- Wetland, Marsh, Swamp
- Stream, Brook

Street Sweeping Frequency:

- 1x/year (optional) Within UA
- 1x/year (required) Within Catchment & UA

N W E S

0 0.25 0.5 0.75 1

Miles

Street Sweeping Map

Sweeping per Phase II Requirements

Topsfield, MA

Comprehensive Environmental Incorporated

Data Sources: MassGIS, Town of Topsfield, CEI

4/6/2023

Appendix G

Catch Basin Optimization Plan

MI-2, Catch Basin Cleaning & Inspection

Catch basin cleaning (CBC) is performed to remove sediments from structures before it is washed into waterways. For additional information, see the Town's Catch Basin Cleaning Optimization Plan.

Procedures and Practices

1. If possible, notify residents and businesses of catch basin cleaning schedule to restrict parking that could obstruct catch basin cleaning operations.
2. Work upstream to downstream when cleaning catch basins within a drainage network.
3. Clean sediment and trash off grate before removing grate.
4. Inspect the outside of the grate and inside of the catch basin to determine cleaning needs and for structural integrity.
5. Either manually use a shovel to remove accumulated sediments, use a bucket loader to remove accumulated sediments, or use a high pressure washer to clean any remaining material out of the catch basin while capturing the slurry with a vacuum.
6. If necessary, after the catch basin is cleaned, use the rodder of a vacuum truck to clean downstream pipe and pull back sediment that might have entered downstream pipe.
7. After cleaning is finished, properly dispose of collected sediments (see below).
8. Collect and dispose of fluids during catch basin cleaning. Do not discharge fluids to a wetland or waterway.
9. If any suspected illicit discharges are observed or suspected, notify your supervisor.
10. At the end of each day, document location and number of catch basins cleaned, amount of waste collected, and disposal method for all screenings.

Storage and Disposal

Storage

- Store separately from street sweeping materials.
- Store materials on an impermeable surface away from areas that receive stormwater runoff.
- Cover piles with tarps to prevent rainwater from generating contaminated stormwater.
- Any Town employee handling the street sweepings should wear appropriate personal protective equipment, such as a dust mask, safety goggles, long-sleeved shirts and long pants at all times.

Disposal

Catch basin cleanings must be disposed of at landfills as daily cover. Sampling of the catch basin cleaning materials is not required unless there is evidence that cleanings were contaminated by a spill or other means. No reuse is allowed without first obtaining a Beneficial Use Determination (BUD) from MassDEP

SOP. MI-2 Catch Basin Cleaning & Inspection

Inspection and Maintenance

- Clean catch basins to maintain sediment levels in sumps at less than 50% full.
- If catch basins are more than 50% full for two consecutive cleaning events, catch basins should either be cleaned more often or the contributing area should be investigated for sediment sources.
- Inspect catch basins for structural integrity and evidence of illicit discharges during cleaning.
- Inspect tarp to ensure pile is covered and no tears.
- Immediately abate any nuisance conditions (i.e., noise, dust, odor).
- Train employees on proper CBC procedures.

Recordkeeping and Reporting

- Use attached Catch Basin Inspection Form when inspecting catch basins. Town employees should record:
    - Number of catch basins inspected.
    - Number of catch basins cleaned.
    - Log of catch basins cleaned or inspected.
    - Tons or cubic yards of catch basin cleaning materials generated.
- Use attached Catch Basin Maintenance/Repair Log to document CBC activities.

Catch Basin Inspection Procedures

Option 1: Inspection during Cleaning

1. Clean sediment and trash off of grate.
2. Remove grate.
3. Fill out **Catch Basin Inspection Form** with basin-specific information:
    - **Before cleaning**:
        - Do a visual inspection of outside of grate.
        - Do a visual inspection of the inside of the catch basin to determine cleaning needs and structural issues.
        - Measure depth from rim of catch basin to top of sediment.
        - Measure depth from rim of catch basin to the top of the outlet pipe.
        - Take photo of catch basin.
    - **Clean catch basin**:
        - For manual removal, place removed material in a location protected from potential runoff and place cleanings in a vehicle for transport to designated disposal area.
        - OR use a high-powered vac truck to remove sediment.
    - **After cleaning**:
        - Measure depth from rim to bottom of catch basin.
        - Measure depth of sum (outlet pipe to bottom of catch basin).
        - Note if the catch basin is more than 50% full with sediment.
        - Note if the catch basin requires maintenance or it there are pollutants present.
        - Take photo of catch basin.
4. If any illicit discharges are observed or suspected, notify supervisor.

Option 2: Interim Inspection between Cleaning Cycles

1. Clean sediment and trash off grate.
2. Remove grate.
3. Fill out **Catch Basin Inspection Form** with basin-specific information:
    - Do a visual inspection of outside of grate.
    - Do a visual inspection of the inside of the catch basin to determine cleaning needs and structural issues.
    - Measure depth from rim of catch basin to top of sediment.
    - Using sump depth collected during previous cleaning, note if the catch basin is more than 50% full with sediment.
    - Note if the catch basin requires maintenance or if there are pollutants present.
4. If any illicit discharges are observed or suspected, notify supervisor.

Catch Basin Inspection Form

Inspection Information			
Catch Basin ID			
Street Location		GPS Location	
Inspector's Name			
Date of Inspection		Time of Inspection	
Weather (circle)	Dry Light Rain Heavy Rain Snow		

Catch Basin Information

Location	**Surface Type**	**Grate**
☐ Road/Curb ☐ Alley ☐ Ditch ☐ Parking Lot ☐ Driveway ☐ Sidewalk Other:_____	☐ Asphalt ☐ Gravel ☐ Concrete ☐ Grass/Dirt Other:_____	____inches x ____ inches Material: _____ Shape:

Catch Basin Condition

CB Damage: No Yes	Comment:

	Materials (circle)					**Condition (circle)**			
Grate	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent
Frame	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent
Chimney	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent
Walls	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent
Trap/Hood	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent
Sump	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent

Sediment Depth and IDDE (inches)

A. Depth from Rim to Top of Sediment: _____ B. Depth from Rim to Bottom of Basin (after vac): _____ C. Sump Depth: _____ D. Depth of Sediment (B-A): _____ E. More than 50% Full of Sediment? (D/C): _____ **CB Cleaned?** No Yes **Suspected illicit discharge?** No Yes	Check those Present: __Sanitary Waste/Smell __Excessive Sediment __Oil Sheen __Floatables/Trash __Pet Waste: Other:_____ Potential Source: _____

Catch Basin Maintenance/Repair Log

Structure ID	Location (Street Name, Approximate Address)	Inspection Date	Problem(s) Identified, Comments	Date of Maint/Repair	Type of Maintenance/Repair, Comments

Appendix H

List of Stormwater BMPs and Inspection/Maintenance Records

Appendix I

Annual Reports

Year 1 Annual Report
Massachusetts Small MS4 General Permit
Reporting Period: May 1, 2018-June 30, 2019

Please DO NOT attach any documents to this form. Instead, attach all requested documents to an email when submitting the form

Unless otherwise noted, all fields are required to be filled out. If a field is left blank, it will be assumed the requirement or task has not been completed.

Part I: Contact Information

Name of Municipality or Organization: Town of Topsfield

EPA NPDES Permit Number: MAR041227

Primary MS4 Program Manager Contact Information

Name: David Bond Title: Highway Superintendent

Street Address Line 1: DPW Facility

Street Address Line 2: 279 Boston Street

City: Topsfield State: MA Zip Code: 01983

Email: dbond@topsfield-ma.gov Phone Number: (978) 887-1542

Fax Number: na

Stormwater Management Program (SWMP) Information

SWMP Location (web address): https://www.topsfield-ma.gov/sites/topsfieldma/files/uploads/phase_ii_stormwater_management_plan.pdf

Date SWMP was Last Updated: August 2008

If the SWMP is not available on the web please provide the physical address and an explanation of why it is not posted on the web:

Part II: Self Assessment

First, in the box below, select the impairment(s) and/or TMDL(s) that are applicable to your MS4.

Impairment(s)

☒ Bacteria/Pathogens ☐ Chloride ☐ Nitrogen ☐ Phosphorus
☐ Solids/ Oil/ Grease (Hydrocarbons)/ Metals

TMDL(s)

In State: ☐ Assabet River Phosphorus ☐ Bacteria and Pathogen ☐ Cape Cod Nitrogen
☐ Charles River Watershed Phosphorus ☐ Lake and Pond Phosphorus

Out of State: ☐ Bacteria/Pathogens ☐ Metals ☐ Nitrogen ☐ Phosphorus

Clear Impairments and TMDLs

Next, check off all requirements below that have been completed. ***By checking each box you are certifying that you have completed that permit requirement fully.*** *If you have not completed a requirement leave the box unchecked. Additional information will be requested in later sections.*

Year 1 Requirements

☒ Develop and begin public education and outreach program

☐ Identify and develop inventory of all known locations where SSOs have discharged to the MS4 in the last 5 years

- ○ The SSO inventory is attached to the email submission
- ○ The SSO inventory can be found at the following website:

No SSOs in Topsfield.

☐ Develop written IDDE plan including a procedure for screening and sampling outfalls

☒ IDDE ordinance complete

☐ Identify each outfall and interconnection discharging from MS4, classify into the relevant category, and priority rank each catchment for investigation

- ○ The priority ranking of outfalls/interconnections is attached to the email submission
- ○ The priority ranking of outfalls/interconnections can be found at the following website:

Many of the outfalls have been mapped. None have been prioritized.

☒ Construction/ Erosion and Sediment Control (ESC) ordinance complete

☐ Develop written procedures for site inspections and enforcement of sediment and erosion control measures

☐ Develop written procedures for site plan review

☒ Keep a log of catch basins cleaned or inspected

☐ Complete inspection of all stormwater treatment structures

Annual Requirements

- ☐ Annual opportunity for public participation in review and implementation of SWMP
- ☐ Comply with State Public Notice requirements
- ☐ Keep records relating to the permit available for 5 years and make available to the public
- ☒ Properly store and dispose of catch basin cleanings and street sweepings so they do not discharge to receiving waters
- ☐ Annual training to employees involved in IDDE program
- ☒ All curbed roadways have been swept a minimum of one time per year

Bacteria/ Pathogens (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)

Annual Requirements

*Public Education and Outreach**

- ☐ Annual message encouraging the proper management of pet waste, including noting any existing ordinances where appropriate
- ☐ Permittee or its agents disseminate educational material to dog owners at the time of issuance or renewal of dog license, or other appropriate time
- ☐ Provide information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria

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

Use the box below to input additional details on any unchecked boxes above or any additional information you would like to share as part of your self assessment:

Part III: Receiving Waters/Impaired Waters/TMDL

Have you made any changes to your lists of receiving waters, outfalls, or impairments since the NOI was submitted?

Yes ☒ No ☐

If yes, describe below, including any relevant impairments or TMDLs:

After the NOI was submitted, the reviewers added 2 new impaired river segments: Fish Brook (CAT 5) and Mile Brook (CAT 3). Topsfield has mapped all of the outlets into all sections of the full list of impaired streams and will include these in the updated SWMP. See web map at: https://www.topsfield-ma.gov/sites/topsfieldma/files/uploads/drainsystemaug2018.pdf

Part IV: Minimum Control Measures

Please fill out all of the metrics below. If applicable, include in the description who completed the task if completed by a third party.

MCM1: Public Education

Number of educational messages completed during the reporting period: 7

Below, report on the educational messages completed during the first year. For the measurable goal(s) please describe the method/measures used to assess the overall effectiveness of the educational program.

BMP:Rain Garden Brochure

Message Description and Distribution Method:

Informational brochure on the function and importance of Rain Gardens and stormwater filtration. Construction instructions and plant suggestions also included.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition & Stormwater coordinator

Measurable Goal(s):

500 made available in town hall. Distributed by Salem Sound Coastwatch and Ipswich River Watershed Association at many community events. PDF available for download at www.greenscapes.org/resources-brochures/

Message Date(s): Nov 2018

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

BMP:LID Workshop

Message Description and Distribution Method:

Workshop/Seminar reintroduced the basics of low impact development and its importance. MS4 requirements, as they relate to LID were discussed and Fred Civian (MassDEP) provided tips for designing and passing municipal ordinances to promote LID.

Targeted Audience: Developers via Topsfield Stormwater coordinator

Responsible Department/Parties: Greenscapes North Shore Coalition

Measurable Goal(s):

Attended by 35. Presentation PDF and "Tip Sheet" sent to municipal contacts and was temporarily available

on Greenscapes website.

Message Date(s): January 17, 2019

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

BMP:Keeping Water Clean School Program

Message Description and Distribution Method:

Program engages 5th grade students in several activities designed to raise their stormwater and water conservation awareness. Students learn about what a watershed is, what stormwater, groundwater and wastewater are, how they can negatively or positively impact these water systems, along with more details about each system and how it should be protected/maintained.

Targeted Audience: Residents

Responsible Department/Parties: Conservation Commission

Measurable Goal(s):

Conducted at all 5th grade classes in Topsfield.

Message Date(s): April 2019

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

BMP:Yard Waste Management

Message Description and Distribution Method:

Social media post describing the best ways to properly dispose of leaf litter and yard waste, keeping your yard clean and our water resources safe. Composting leaves, leaving them on the lawn for nutrient deposition, or having them picked up by the town are described as good options.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition, Stormwater coordinator

Measurable Goal(s):

Sent to 70 municipal contacts for further dissemination, posted on partner social media platforms (Facebook &

Twitter) and available at www.greenscapes.org/resources-social-media/

Message Date(s): October 2018

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

BMP:Keep Drains Clean

Message Description and Distribution Method:

Social media post describing the importance of keeping storm drains clear of leaf debris and litter.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition, Stormwater coordinator

Measurable Goal(s):

Sent to 70 municipal contacts for further dissemination, posted on partner social media platforms (Facebook & Twitter) and available at www.greenscapes.org/resources-social-media/

Message Date(s): November 2018

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

BMP:Greenscapes Table Events

Message Description and Distribution Method:

Provided Greenscapes informational brochures at Town gatherings including Strawberry Festival and Grow Spring Expo.

Targeted Audience: Residents, Developers

Responsible Department/Parties: Greenscapes North Shore Coalition

Measurable Goal(s):

Communication with over 6,000 attendees.

Message Date(s): April 2019 and June 2019

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

BMP:New Greenscapes Guides

Message Description and Distribution Method:

A revised version of the comprehensive Greenscapes Guide. A new 24 page magazine (PDF) outlining the importance of small-scale stormwater management and sustainable landscaping. Project ideas, plant suggestions and best practices included.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition

Measurable Goal(s):

Promoted by Conservation Commission and Planning Board staff.

Message Date(s): June 2019

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

Add an Educational Message

MCM2: Public Participation

Describe the opportunity provided for public involvement in the development of the Stormwater Management Program (SWMP) during the reporting period:

Members of the Road Commissioners and the Stormwater Committee reviewed the NOI for comments prior to submission.

Was this opportunity different than what was proposed in your NOI? Yes ☐ No ☒

Describe any other public involvement or participation opportunities conducted during the reporting period:

MCM3: Illicit Discharge Detection and Elimination (IDDE)

Sanitary Sewer Overflows (SSOs)

Below, report on the number of SSOs identified in the MS4 system and removed during this reporting period.

Number of SSOs identified: 0

Number of SSOs removed: 0

Below, report on the total number of SSOs identified in the MS4 system and removed to date. At a minimum, report SSOs identified since 2013.

Total number of SSOs identified: 0

Total number of SSOs removed: 0

MS4 System Mapping

Describe the status of your MS4 map, including any progress made during the reporting period:

Mapping of Topsfield's drainage system began in 1997 with a comprehensive survey of all surface drainage structures. That GIS project has been maintained to the present. In the fall of 2018, Topsfield completed its mapping of all, public record, underground drain pipes and associated outlets. It was this inventory that was used to identify the outlets to impaired surface waters. https://www.topsfield-ma.gov/sites/topsfieldma/files/uploads/drainsystemaug2018.pdf

Screening of Outfalls/Interconnections

If conducted, please submit any outfall monitoring results from this reporting period. Outfall monitoring results should include the date, outfall/interconnection identifier, location, weather conditions at time of sampling, precipitation in previous 48 hours, field screening parameter results, and results from all analyses.

◉ The outfall screening data is attached to the email submission

○ The outfall screening data can be found at the following website:

Below, report on the number of outfalls/interconnections screened during this reporting period.

Number of outfalls screened: 0

Below, report on the percent of total outfalls/ interconnections screened to date.

Percent of total outfalls screened: 0

Catchment Investigations

If conducted, please submit all data collected during this reporting period as part of the dry and wet weather investigations. Also include the presence or absence of System Vulnerability Factors for each catchment.

- (•) The catchment investigation data is attached to the email submission
- ( ) The catchment investigation data can be found at the following website:

Below, report on the number of catchment investigations completed during this reporting period.

Number of catchment investigations completed this reporting period: 5

Below, report on the percent of catchments investigated to date.

Percent of total catchments investigated: 40%

Optional: Provide any additional information for clarity regarding the catchment investigations below:

The Howlett Brook catchment has been divided into 4 segments to isolate potential contributions of E coli. As our NOI presumes, some of the potential pollution may be coming from non-point sources like horse farms and not from illicit discharge into an drain system.

IDDE Progress

If illicit discharges were found, please submit a document describing work conducted over this reporting period, and cumulative to date, including location source; description of the discharge; method of discovery; date of discovery; and date of elimination, mitigation, or enforcement OR planned corrective measures and schedule of removal.

- ( ) The illicit discharge removal report is attached to the email submission
- ( ) The illicit discharge removal report can be found at the following website:

Below, report on the number of illicit discharges identified and removed, along with the volume of sewage removed during this reporting period.

Number of illicit discharges identified: 0

Number of illicit discharges removed: 0

Estimated volume of sewage removed: 0 gallons

Below, report on the total number of illicit discharges identified and removed to date. At a minimum, report on the number of illicit discharges identified and removed since the effective date of the permit.

Total number of illicit discharges identified: 0

Total number of illicit discharges removed: 0

Optional: Provide any additional information for clarity regarding illicit discharges identified, removed, or planned to be removed below:

Topsfield has been very proactive in identifying illicit discharges in Town. The Town has conducted video monitoring of underground culverts to identify illegal hookups and where found they have been disconnected from the storm drain system. Therefore, it is easy to say we have not found any IDs during this reporting period.

Employee Training

Describe the frequency and type of employee training conducted during the reporting period:

There has been no employee training conducted during this reporting period.

MCM4: Construction Site Stormwater Runoff Control

Below, report on the construction site plan reviews, inspections, and enforcement actions completed during this reporting period.

Number of site plan reviews completed: 4

Number of inspections completed: 20

Number of enforcement actions taken: 0

MCM5: Post-Construction Stormwater Management in New Development and Redevelopment

Ordinance Development

Describe the status of the post-construction ordinance required to be complete in year 2 of the permit term:

Post-development criteria is complete and included within the Topsfield Stormwater & Erosion Control Regulations adopted in March of 2013.

As-built Drawings

Describe the status of the measures the MS4 has utilized to require the submission of as-built drawings and ensure long term operation and maintenance of completed construction sites required to be complete in year 2 of the permit term:

As-built plan criteria is complete and included within the Topsfield Stormwater & Erosion Control Regulations adopted in March of 2013.

Street Design and Parking Lots Report

Describe the status of the street design and parking lots assessment due in year 4 of the permit term, including any planned or completed changes to local regulations and guidelines:

Topsfield received a grant to study downtown parking. This grant was received by the Selectmen and will be conducted with assistance from MAPC.

Green Infrastructure Report

Describe the status of the green infrastructure report due in year 4 of the permit term, including the findings and progress towards making the practice allowable:

The Planning Board has adopted "Low Impact Development Guidelines" in February, 2010.

Retrofit Properties Inventory

Describe the status of the inventory, due in year 4 of the permit term, of permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas and report on any properties that have been modified or retrofitted:

Not addressed in the reporting period.

MCM6: Good Housekeeping

Catch Basin Cleaning

Describe the status of the catch basin cleaning optimization plan:

The catch basin cleaning plan is informal. A long time employee of the Town has been cleaning the catch basi

If complete, attach the catch basin cleaning optimization plan or the schedule to gather information to develop the optimization plan:

○ The catch basin cleaning optimization plan or schedule is attached to the email submission

○ The catch basin cleaning optimization plan or schedule can be found at the following website:

Below, report on the number of catch basins inspected and cleaned, along with the total volume of material removed from the catch basins during this reporting period.

Number of catch basins inspected: < 50%

Number of catch basins cleaned: < 50%

Total volume or mass of material removed from all catch basins: not tracked [UNITS]

Below, report on the total number of catch basins in the MS4 system, if known.

Total number of catch basins: 1145

If applicable:

Report on the actions taken if a catch basin sump is more than 50% full during two consecutive routine inspections/cleaning events:

Unknown.

Street Sweeping

Describe the status of the written procedures for sweeping streets and municipal-owned lots:

Streets are swept once per year. There is no written procedure.

Report on street sweeping completed during the reporting period using one of the three metrics below.

◉ Number of miles cleaned: 50

○ Volume of material removed: [UNITS]

○ Weight of material removed: [UNITS]

If applicable:

For rural uncurbed roadways with no catch basins, describe the progress of the inspection, documentation, and targeted sweeping plan:

All streets are swept once per year including uncurbed roadways.

Winter Road Maintenance

Describe the status of the written procedures for winter road maintenance including the storage of salt and sand:

All road salt and sand is stored in a covered garage on the grounds of the DPW garage.

Inventory of Permittee-Owned Properties

Describe the status of the inventory, due in year 2 of the permit term, of permittee-owned properties, including parks and open spaces, buildings and facilities, and vehicles and equipment, and include any updates:

There has been no attempt to consolidate an inventory of Town-owned properties and associated vehicle/ equipment storage during the reporting period. This is an easy goal to attain because of the Town's comprehensive GIS program. (Once begun, half done.)

O&M Procedures for Parks and Open Spaces, Buildings and Facilities, and Vehicles and Equipment

Describe the status of the operation and maintenance procedures, due in year 2 of the permit term, of permittee-owned properties (parks and open spaces, buildings and facilities, vehicles and equipment) and include maintenance activities associated with each:

Not addressed in this reporting period.

Stormwater Pollution Prevention Plan (SWPPP)

Describe the status of any SWPPP, due in year 2 of the permit term, for permittee-owned or operated facilities including maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater:

Not addressed in this reporting period.

Below, report on the number of site inspections for facilities that require a SWPPP completed during this reporting period.

Number of site inspections completed: 0

Describe any corrective actions taken at a facility with a SWPPP:

None

O&M Procedures for Stormwater Treatment Structures

Describe the status of the written procedure for stormwater treatment structure maintenance:

None

Additional Information

Monitoring or Study Results

Results from any other stormwater or receiving water quality monitoring or studies conducted during the reporting period not otherwise mentioned above, where the data is being used to inform permit compliance or permit effectiveness must be attached.

- ○ Not applicable
- ◉ The results from additional reports or studies are attached to the email submission
- ○ The results from additional reports or studies can be found at the following website(s):

If such monitoring or studies were conducted on your behalf or if monitoring or studies conducted by other entities were reported to you, a brief description of the type of information gathered or received shall be described below:

As part of a long-term dissolved oxygen study of Great Wenham Swamp (began 2010) and the Ipswich River section MA92-06, Biodiversity Consulting LLC did sampling from the confluence of Idlewild Brook and the Ipswich River to Asbury Street. Results were very poor. Dissolved oxygen was less than 1 ppm for the entire section. Water was very turbid and there was no indication of fish.

Additional Information

Optional: Enter any additional information relevant to your stormwater management program implementation during the reporting period. Include any BMP modifications made by the MS4 if not already discussed above:

Activities Planned for Next Reporting Period

Please confirm that your SWMP has been, or will be, updated to comply with all applicable permit requirements including but not limited to the year 2 requirements summarized below. (Note: impaired waters and TMDL requirements are not listed below)

Yes, I agree ☒

- Complete system mapping Phase I

- Begin investigations of catchments associated with Problem Outfalls
- Develop or modify an ordinance or other regulatory mechanism for post-construction stormwater runoff from new development and redevelopment
- Establish and implement written procedures to require the submission of as-built drawings no later than two years after the completion of construction projects
- Develop, if not already developed, written operations and maintenance procedures
- Develop an inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment; review annually and update as necessary
- Establish a written program detailing the activities and procedures the permittee will implement so that the MS4 infrastructure is maintained in a timely manner
- Develop and implement a written SWPPP for maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater
- Enclose or cover storage piles of salt or piles containing salt used for deicing or other purposes
- Develop, if not already developed, written procedures for sweeping streets and municipal-owned lots
- Develop, if not already developed, written procedures for winter road maintenance including storage of salt and sand
- Develop, if not already developed, a schedule for catch basin cleaning
- Develop, if not already developed, a written procedure for stormwater treatment structure maintenance
- Develop a written catchment investigation procedure *(18 months)*

Annual Requirements

- Annual report submitted and available to the public
- Annual opportunity for public participation in review and implementation of SWMP
- Keep records relating to the permit available for 5 years and make available to the public
- Properly store and dispose of catch basin cleanings and street sweepings so they do not discharge to receiving waters
- Annual training to employees involved in IDDE program
- Update inventory of all known locations where SSOs have discharged to the MS4 in the last 5 years
- Continue public education and outreach program
- Update outfall and interconnection inventory and priority ranking and include data collected in connection with the dry weather screening and other relevant inspections conducted
- Implement IDDE program
- Review site plans of construction sites as part of the construction stormwater runoff control program
- Conduct site inspection of construction sites as necessary
- Inspect and maintain stormwater treatment structures
- Log catch basins cleaned or inspected
- Sweep all uncurbed streets at least annually

Provide any additional details on activities planned for permit year 2 below:

Complete new SWMP that was due on July 1, 2019.

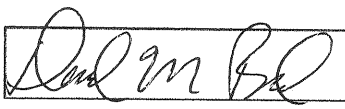
Part V: Certification of Small MS4 Annual Report 2019

40 CFR 144.32(d) Certification

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

Name: DAVID M. BOND

Title: HIGHWAY SUPT
STORMWATER COORDINATOR

Signature: 

Date: 9-15-19

[Signatory may be a duly authorized representative]

Year 2 Annual Report
Massachusetts Small MS4 General Permit
Reporting Period: July 1, 2019-June 30, 2020

Please DO NOT attach any documents to this form. Instead, attach all requested documents to an email when submitting the form

Unless otherwise noted, all fields are required to be filled out. If a field is left blank, it will be assumed the requirement or task has not been completed. Please ONLY report on activities between July 1, 2019 and June 30, 2020 unless otherwise requested.

Part I: Contact Information

Name of Municipality or Organization: Topsfield

EPA NPDES Permit Number: MAR041227

Primary MS4 Program Manager Contact Information

Name: David Bond | Title: Stormwater Coordinator

Street Address Line 1: Town Hall

Street Address Line 2: 8 West Common Street

City: Topsfield | State: MA | Zip Code: 01983

Email: topsfield505@gmail.com | Phone Number: 978-887-1504

Stormwater Management Program (SWMP) Information

SWMP Location (web address): https://www.topsfield-ma.gov/sites/g/files/vyhlif5086/f/uploads/topsfield_stormwater_management_plan_jsm_2019.pdf

Date SWMP was Last Updated: August 2019

If the SWMP is not available on the web please provide the physical address:

Part II: Self-Assessment

First, in the box below, select the impairment(s) and/or TMDL(s) that are applicable to your MS4. Make sure you are referring to the most recent EPA approved Section 303(d) Impaired Waters List which can be found here: https://www.epa.gov/tmdl/region-1-impaired-waters-and-303d-lists-state

Impairment(s)

☒ Bacteria/Pathogens ☐ Chloride ☐ Nitrogen ☐ Phosphorus
☐ Solids/ Oil/ Grease (Hydrocarbons)/ Metals

TMDL(s)

In State: ☐ Assabet River Phosphorus ☐ Bacteria and Pathogen ☐ Cape Cod Nitrogen
☐ Charles River Watershed Phosphorus ☐ Lake and Pond Phosphorus

Out of State: ☐ Bacteria/Pathogens ☐ Metals ☐ Nitrogen ☐ Phosphorus

Clear Impairments and TMDLs

Next, check off all requirements below that have been completed. ***By checking each box you are certifying that you have completed that permit requirement fully.*** *If you have not completed a requirement leave the box unchecked. Additional information will be requested in later sections.*

Year 2 Requirements

☒ Completed Phase I of system mapping

☐ Developed a written catchment investigation procedure and added the procedure to the SWMP

☐ Developed written procedures to require the submission of as-built drawings and ensure the long term operation and maintenance of completed construction sites and added these procedures to the SWMP

☒ Enclosed or covered storage piles of salt or piles containing salt used for deicing or other purposes

☐ Developed written operations and maintenance procedures for parks and open space, buildings and facilities, and vehicles and equipment and added these procedures to the SWMP

☐ Developed an inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment and added this inventory to the SWMP

☐ Completed a written program for MS4 infrastructure maintenance to reduce the discharge of pollutants

☐ Developed written SWPPPs, included in the SWMP, for all of the following permittee owned or operated facilities: maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater

Optional: If you would like to describe progress made on any incomplete requirements listed above, provide any additional information, and/or if any of the above year 2 requirements could not be completed due to the impacts of COVID-19, please identify the requirement that could not be completed, any actions taken to attempt to complete the requirement, and reason the requirement could not be completed below:

Annual Requirements

- ☐ Provided an opportunity for public participation in review and implementation of SWMP and complied with State Public Notice requirements
- ☐ Kept records relating to the permit available for 5 years and made available to the public
- ☐ The SSO inventory has been updated, including the status of mitigation and corrective measures implemented
  - ◉ This is not applicable because we do not have sanitary sewer
  - ○ This is not applicable because we did not find any new SSOs
  - ○ The updated SSO inventory is attached to the email submission
  - ○ The updated SSO inventory can be found at the following website:
- ☒ Properly stored and disposed of catch basin cleanings and street sweepings so they did not discharge to receiving waters
- ☐ Provided training to employees involved in IDDE program within the reporting period
- ☒ All curbed roadways were swept at least once within the reporting period
- ☐ Updated outfall and interconnection inventory and priority ranking as needed

Optional: If you would like to describe progress made on any incomplete requirements listed above, provide any additional information, and/or if any of the above annual requirements could not be completed due to the impacts of COVID-19, please identify the requirement that could not be completed, any actions taken to attempt to complete the requirement, and reason the requirement could not be completed below:

Training of employees has been a casual practice for years. Being a small town with a few staff, conducting how-to training is done by serendipitous get-togethers. With the hiring of new staff this past year who have a deeper appreciation of the formalities of MS4 requirements, we anticipate more structure in this process.

Bacteria/ Pathogens (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)

Annual Requirements

*Public Education and Outreach**

- ☐ Annual message was distributed encouraging the proper management of pet waste, including noting any existing ordinances where appropriate
- ☐ Permittee or its agents disseminated educational material to dog owners at the time of issuance or renewal of dog license, or other appropriate time
- ☐ Provided information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria

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

Optional: If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

This is one of the activities impacted by the Covid-19 shutdown.

Optional: Use the box below to provide any additional information you would like to share as part of your self-assessment:

We continue to conduct bacteria testing of Howlett Brook (MA92-17) at street crossings to isolate measurable changes in ecoli bacteria counts. Since there are so few storm-drain outlets contributing to this section of river, our contention is that the sources of bacteria are the two horse farms literally on the banks of the Brook. We have also found that a significant bacteria load begins before Howlett Brook and upstream of Haverhill Street on Pye Brook. That said, we are also finding some loading along Howlett Brook but nothing that can pinpoint a consistent source of pollution.

We also began bacteria and dissolved oxygen testing of Mile Brook (MA92-16). As well as dissolved oxygen testing of the Ipswich River (MA92-6&15). When we have conducted more sampling, we will issue a report. It bears repeating that we conducted a study of Wenham Swamp between 2010 and 2013 and found a naturally occurring depression of dissolved oxygen that accounts for the low reading of oxygen in the Ipswich River downstream of large floodplain swamps. It seems to fall on deaf ears. I just checked with Dave Armstrong at the USGS and he agrees with our 2013 report that the section of the Ipswich River which shows depressed dissolved oxygen is most likely a natural event.

Part III: Receiving Waters/Impaired Waters/TMDL

Have you made any changes to your lists of receiving waters, outfalls, or impairments since the NOI was submitted?

- (•) Yes
- ( ) No

If yes, describe below, including any relevant impairments or TMDLs:

Added a previously unknown drain system on Sleepy Hollow Drive and assessed outlet. It was partially buried and there was no flow.

Part IV: Minimum Control Measures

Please fill out all of the metrics below. If applicable, include in the description who completed the task if completed by a third party.

MCM1: Public Education

Number of educational messages completed **during this reporting period**: 2

*Below, report on the educational messages completed **during this reporting period**. For the measurable goal(s) please describe the method/measures used to assess the overall effectiveness of the educational program.*

BMP: Household Hazardous Waste Annual Pickup

Message Description and Distribution Method:

Conducted Hazardous Waste pickup last October with other towns in our region. We also promote through the Town website the recycling of waste oil which is delivered to Boxford for proper disposal.

Targeted Audience: Residents

Responsible Department/Parties: External Contractor

Measurable Goal(s):

Using data from the Boxford Recycling Committee, the organizers of the Hazardous Houshold Waste collection, it is estimated that Topsfield residents recycled 820 pounds of hazardous waste on October 26, 2019. We do not know how much water oil was recycled.

Message Date(s): All year long on Town web page.

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ◉

If yes, describe why the change was made:

BMP: Brochures from Greenscapes

Message Description and Distribution Method:

Preprinted informational brochures produced by Greenscapes were made available at teh Town Hall from the Conservation office.

Targeted Audience: Developers (construction) and Residents

Responsible Department/Parties: Conservation Committee

Measurable Goal(s):

Educate contractors and home owners about their influence on reducing non-point and point pollution to rivers and streams.

Message Date(s): June 2019 through February 2020. Offices closed in March due to Covid-19 mandates.

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ○

If yes, describe why the change was made:

Add an Educational Message

MCM2: Public Participation

Describe the opportunity provided for public involvement in the development of the Stormwater Management Program (SWMP) **during this reporting period**:

Posted most current SWMP on Town website. https://www.topsfield-ma.gov/sites/g/files/vyhlif5086/f/uploads/topsfield_stormwater_management_plan_jsm_2019.pdf

Was this opportunity different than what was proposed in your NOI? Yes ○ No ◉

Describe any other public involvement or participation opportunities conducted **during this reporting period**:

MCM3: Illicit Discharge Detection and Elimination (IDDE)

Sanitary Sewer Overflows (SSOs)

Check off the box below if the statement is true.

☒ This SSO section is NOT applicable because we DO NOT have sanitary sewer

*Below, report on the number of SSOs identified in the MS4 system and removed **during this reporting period**.*

Number of SSOs identified: 0

Number of SSOs removed: 0

MS4 System Mapping

Below, check all that apply.

The following elements of the Phase I map have been completed:

- ☒ Outfalls and receiving waters
- ☐ Open channel conveyances
- ☐ Interconnections
- ☐ Municipally-owned stormwater treatment structures
- ☒ Waterbodies identified by name and indication of all use impairments
- ☒ Initial catchment delineations

Optional: Describe any additional progress you made on your map during this reporting period or provide additional status information regarding your map:

We would like to map interconnections along Routes One and Ninety Five but we do not have access to their drainage plans. Are these state roads covered by our permit or something we do not need to worry about?

Screening of Outfalls/Interconnections

If conducted, please submit any outfall monitoring results from this reporting period. Outfall monitoring results should include the date, outfall/interconnection identifier, location, weather conditions at time of sampling, precipitation in previous 48 hours, field screening parameter results, and results from all analyses.

- ○ The outfall screening data is attached to the email submission
- ○ The outfall screening data can be found at the following website:

Below, report on the number of outfalls/interconnections screened ***during this reporting period.***

Number of outfalls screened: 0

Catchment Investigations

If conducted, please submit all data collected during this reporting period as part of the dry and wet weather investigations. Also include the presence or absence of System Vulnerability Factors for each catchment.

- ◉ The catchment investigation data is attached to the email submission
- ○ The catchment investigation data can be found at the following website:

Below, report on the number of catchment investigations completed ***during this reporting period.***

Number of catchment investigations completed this reporting period: 2

Below, report on the percent of catchments investigated ***to date.***

Percent of total catchments investigated: 100

Optional: Provide any additional information for clarity regarding the catchment investigations below:

We are assuming you are referring to our two impaired catchments, the Ipswich River and Howlett Brook. If so, than yes, we have investigated both of these catchments over this past year. Our testing results are according to segments of the stream at road crossings and not at individual outlets. Our monitoring data will be attached to the email. We are under the impression that SVFs are not required under our permit.

IDDE Progress

If illicit discharges were found, please submit a document describing work conducted over this reporting period, and cumulative to date, including location source; description of the discharge; method of discovery; date of discovery; and date of elimination, mitigation, or enforcement OR planned corrective measures and schedule of removal.

- ○ The illicit discharge removal report is attached to the email submission
- ○ The illicit discharge removal report can be found at the following website:

*Below, report on the number of illicit discharges identified and removed, along with the volume of sewage removed **during this reporting period.***

Number of illicit discharges identified: 0

Number of illicit discharges removed: 0

Estimated volume of sewage removed: 0 gallons/day

*Below, report on the total number of illicit discharges identified and removed to date. At a minimum, report on the number of illicit discharges identified and removed **since the effective date of the permit (July 1, 2018).***

Total number of illicit discharges identified: 0

Total number of illicit discharges removed: 0

Optional: Provide any additional information for clarity regarding illicit discharges identified, removed, or planned to be removed below:

None found.

Employee Training

Describe the frequency and type of employee training conducted **during the reporting period**:

Casual.

MCM4: Construction Site Stormwater Runoff Control

Below, report on the construction site plan reviews, inspections, and enforcement actions completed ***during this reporting period.***

Number of site plan reviews completed: 4

Number of inspections completed: 4

Number of enforcement actions taken: 0

Optional: Enter any additional information relevant to construction site plan reviews, inspections, and enforcement actions:

MCM5: Post-Construction Stormwater Management in New Development and Redevelopment

Ordinance or Regulatory Mechanism

Below, select the option that describes your ordinance or regulatory mechanism progress.

- (•) Bylaw, ordinance, or regulations are updated and adopted consistent with permit requirements
- ( ) Bylaw, ordinance, or regulations are updated consistent with permit requirements but are not yet adopted
- ( ) Bylaw, ordinance, or regulations have not been updated or adopted

As-built Drawings

Describe the measures the MS4 has utilized to require the submission of as-built drawings and ensure long term operation and maintenance of completed construction sites:

Street Design and Parking Lots Report

Describe the status of the street design and parking lots assessment due in year 4 of the permit term, including any planned or completed changes to local regulations and guidelines:

Green Infrastructure Report

Describe the status of the green infrastructure report due in year 4 of the permit term, including the findings and progress towards making the practice allowable:

Retrofit Properties Inventory

Describe the status of the inventory, due in year 4 of the permit term, of permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas and report on any properties that have been modified or retrofitted:

During the reconstruction of the Town Hall, perimeter drains and parking lot run-off was redirected into two new rain gardens to treat stormwater run-off from this property.

MCM6: Good Housekeeping

Catch Basin Cleaning

Below, report on the number of catch basins inspected and cleaned, along with the total volume of material removed from the catch basins ***during this reporting period****.*

Number of catch basins inspected: 458

Number of catch basins cleaned: 458

Total volume or mass of material removed from all catch basins: 76 cubic yards

Below, report on the total number of catch basins in the MS4 system.

Total number of catch basins: 910

If applicable:

Report on the actions taken if a catch basin sump is more than 50% full during two consecutive routine inspections/cleaning events:

Street Sweeping

Report on street sweeping completed ***during this reporting period*** *using one of the three metrics below.*

- (•) Number of miles cleaned: 59.9
- ( ) Volume of material removed: [Select Units]
- ( ) Weight of material removed: [Select Units]

O&M Procedures and Inventory of Permittee-Owned Properties

Below, check all that apply.

The following permittee-owned properties have been inventoried:

- ☐ Parks and open spaces
- ☐ Buildings and facilities
- ☐ Vehicles and equipment

The following O&M procedures for permittee-owned properties have been completed:

- ☐ Parks and open spaces
- ☐ Buildings and facilities
- ☐ Vehicles and equipment

Stormwater Pollution Prevention Plan (SWPPP)

Below, report on the number of site inspections for facilities that require a SWPPP completed ***during this reporting period.***

Number of site inspections completed: 0

Describe any corrective actions taken at a facility with a SWPPP:

Additional Information

Monitoring or Study Results

Results from any other stormwater or receiving water quality monitoring or studies conducted during the reporting period not otherwise mentioned above, where the data is being used to inform permit compliance or permit effectiveness must be attached.

- ( ) Not applicable
- ( ) The results from additional reports or studies are attached to the email submission
- ( ) The results from additional reports or studies can be found at the following website(s):

If such monitoring or studies were conducted on your behalf or if monitoring or studies conducted by other entities were reported to you, a brief description of the type of information gathered or received shall be described below:

Additional Information

Optional: Enter any additional information relevant to your stormwater management program implementation during the reporting period. Include any BMP modifications made by the MS4 if not already discussed above:

COVID-19 Impacts

Optional: If any of the above year 2 requirements could not be completed due to the impacts of COVID-19, please identify the requirement that could not be completed, any actions taken to attempt to complete the requirement, and reason the requirement could not be completed below:

Even though Topsfield subscribes to Greenscapes to handle its public education requirements, the materials and/or events generaly take place between February and June. Due to the closing of the schools and the Town Hall, these events and materials could not be conducted or distributed at that time.

Activities Planned for Next Reporting Period

Please confirm that your SWMP has been, or will be, updated to comply with all applicable permit requirements including but not limited to the year 3 requirements summarized below. (Note: impaired waters and TMDL requirements are not listed below)

Yes, I agree ☐

- Inspect all outfalls/ interconnections (excluding Problem and Excluded outfalls) for the presence of dry weather flow
- Complete follow-up ranking as dry weather screening becomes available

Annual Requirements

- Annual report submitted and available to the public
- Annual opportunity for public participation in review and implementation of SWMP
- Keep records relating to the permit available for 5 years and make available to the public
- Properly store and dispose of catch basin cleanings and street sweepings so they do not discharge to receiving waters
- Annual training to employees involved in IDDE program
- Update inventory of all known locations where SSOs have discharged to the MS4
- Continue public education and outreach program
- Update outfall and interconnection inventory and priority ranking and include data collected in

connection with the dry weather screening and other relevant inspections conducted
- Implement IDDE program
- Review site plans of construction sites as part of the construction stormwater runoff control program
- Conduct site inspection of construction sites as necessary
- Inspect and maintain stormwater treatment structures
- Log catch basins cleaned or inspected
- Sweep all uncurbed streets at least annually
- Continue investigations of catchments associated with Problem Outfalls
- Review inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment; update if necessary

Provide any additional details on activities planned for permit year 3 below:

Part V: Certification of Small MS4 Annual Report 2020

40 CFR 144.32(d) Certification

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

Name: DAVID M. BOND Title: STORMWATER COORDINATOR

Signature: David M. Bond Date: 9-22-20

[Signatory may be a duly authorized representative]

Year 3 Annual Report
Massachusetts Small MS4 General Permit
Reporting Period: July 1, 2020-June 30, 2021

Please DO NOT attach any documents to this form. Instead, attach all requested documents to an email when submitting the form

Unless otherwise noted, all fields are required to be filled out. If a field is left blank, it will be assumed the requirement or task has not been completed. Please ONLY report on activities between July 1, 2020 and June 30, 2021 unless otherwise requested.

Part I: Contact Information

Name of Municipality or Organization: Town of Topsfield

EPA NPDES Permit Number: MAR041227

Primary MS4 Program Manager Contact Information

Name: David Bond Title: Stormwater Coordinator

Street Address Line 1: Town Hall

Street Address Line 2: 8 West Common Street

City: Topsfield State: MA Zip Code: 01983

Email: topsfield505@gmail.com Phone Number: (978) 887-1504

Stormwater Management Program (SWMP) Information

SWMP Location (web address): http://topsfield-ma.gov/sites/g/files/vyhlif5086/f/uploads/topsfield_stormwater_management_plan_jsm_2019.pdf

Date SWMP was Last Updated: Jan 1, 2019

If the SWMP is not available on the web please provide the physical address:

Part II: Self-Assessment

First, in the box below, select the impairment(s) and/or TMDL(s) that are applicable to your MS4. Make sure you are referring to the most recent EPA approved Section 303(d) Impaired Waters List which can be found here: https://www.epa.gov/tmdl/region-1-impaired-waters-and-303d-lists-state

Impairment(s)

☒ Bacteria/Pathogens ☐ Chloride ☐ Nitrogen ☐ Phosphorus
☐ Solids/ Oil/ Grease (Hydrocarbons)/ Metals

TMDL(s)

In State: ☐ Assabet River Phosphorus ☐ Bacteria and Pathogen ☐ Cape Cod Nitrogen
☐ Charles River Watershed Phosphorus ☐ Lake and Pond Phosphorus

Out of State: ☐ Bacteria/Pathogens ☐ Metals ☐ Nitrogen ☐ Phosphorus

Clear Impairments and TMDLs

Next, check off all requirements below that have been completed. ***By checking each box you are certifying that you have completed that permit requirement fully.*** *If you have not completed a requirement leave the box unchecked. Additional information will be requested in later sections.*

Year 3 Requirements

☐ Inspected and screened all outfalls/interconnections (excluding Problem and Excluded outfalls)

☒ Updated outfall/interconnection priority ranking based on the information collected during the dry weather inspections as necessary

☐ Post-construction bylaw, ordinance, or other regulatory mechanism was updated and adopted consistent with permit requirements

Optional: If you would like to describe progress made on any incomplete requirements listed above, provide any additional information, and/or if any of the above year 3 requirements could not be completed due to the impacts of COVID-19, please identify the requirement that could not be completed, any actions taken to attempt to complete the requirement, and reason the requirement could not be completed below:

Topsfield did inspect and screen all mapped outfalls in the EPA Urbanized Area. There are some outfalls that have never been mapped or the surveys were never logged. Of the 77 mapped outlets in Town, 11 are not in the UA zone. 66 Outlets were inspected in 2021. By looking at areas in Town were there are catchbasins and no mapped outlet, it is estimated there may be another 14 outlets to be mapped and inspected. So, we did actually inspect all outlets excluding problem or excluded outfalls.

Annual Requirements

☐ Provided an opportunity for public participation in review and implementation of SWMP and complied with State Public Notice requirements

☐ Kept records relating to the permit available for 5 years and made available to the public

☒ The SSO inventory has been updated, including the status of mitigation and corrective measures implemented

- (•) This is not applicable because we do not have sanitary sewer
- ( ) This is not applicable because we did not find any new SSOs
- ( ) The updated SSO inventory is attached to the email submission
- ( ) The updated SSO inventory can be found at the following website:

☒ Properly stored and disposed of catch basin cleanings and street sweepings so they did not discharge to receiving waters

☒ Provided training to employees involved in IDDE program within the reporting period

☒ All curbed roadways were swept at least once within the reporting period

☒ Updated system map due in year 2 as necessary

☐ Enclosed all road salt storage piles or facilities and implemented winter road maintenance procedures to minimize the use of road salt

☐ Implemented SWPPPs for all permittee owned or operated maintenance garages, public works yards, transfer stations, and other waste handling facilities

☒ Updated inventory of all permittee owned facilities as necessary

☐ O&M programs for all permittee owned facilities have been completed and updated as necessary

☐ Implemented all maintenance procedures for permittee owned facilities in accordance with O&M programs

☒ Implemented program for MS4 infrastructure maintenance to reduce the discharge of pollutants

☐ Inspected all permittee owned treatment structures (excluding catch basins)

Optional: If you would like to describe progress made on any incomplete requirements listed above, provide any additional information, and/or if any of the above annual requirements could not be completed due to the impacts of COVID-19, please identify the requirement that could not be completed, any actions taken to attempt to complete the requirement, and reason the requirement could not be completed below:

Bacteria/ Pathogens (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)

Annual Requirements

*Public Education and Outreach**

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

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

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

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

Optional: If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

Visited stables within impaired water body watershed and discussed proper storage of horse manure to minimize leaching into Howlett Brook.

Optional: Use the box below to provide any additional information you would like to share as part of your self-assessment:

Part III: Receiving Waters/Impaired Waters/TMDL

Have you made any changes to your lists of receiving waters, outfalls, or impairments since the NOI was submitted?

- ○ Yes
- ◉ No

If yes, describe below, including any relevant impairments or TMDLs:

Part IV: Minimum Control Measures

Please fill out all of the metrics below. If applicable, include in the description who completed the task if completed by a third party.

MCM1: Public Education

Number of educational messages completed **during this reporting period**: 1

*Below, report on the educational messages completed **during this reporting period**. For the measurable goal(s) please describe the method/measures used to assess the overall effectiveness of the educational program.*

BMP:[Message name here]

Message Description and Distribution Method:

Flyer for dog owners to pick up after their dog.

Targeted Audience: Dog owners

Responsible Department/Parties: Town Manager/Mayor's Office

Measurable Goal(s):

Message Date(s): February 17, 2021

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ○ No ◉

If yes, describe why the change was made:

Add an Educational Message

MCM2: Public Participation

Describe the opportunity provided for public involvement in the development of the Stormwater Management Program (SWMP) **during this reporting period**:

None

Was this opportunity different than what was proposed in your NOI? Yes ○ No ○

Describe any other public involvement or participation opportunities conducted **during this reporting period**:

MCM3: Illicit Discharge Detection and Elimination (IDDE)

Sanitary Sewer Overflows (SSOs)

Check off the box below if the statement is true.

☒ This SSO section is NOT applicable because we DO NOT have sanitary sewer

*Below, report on the number of SSOs identified in the MS4 system and removed **during this reporting period**.*

Number of SSOs identified: 0

Number of SSOs removed: 0

MS4 System Mapping

Optional: Provide additional status information regarding your map:

Topsfield added database themes to the GIS layers tracking outfall inspections and catchbasin cleaning.

Screening of Outfalls/Interconnections

If conducted, please submit any outfall monitoring results from this reporting period. Outfall monitoring results should include the date, outfall/interconnection identifier, location, weather conditions at time of sampling, precipitation in previous 48 hours, field screening parameter results, and results from all analyses. Please also include the updated inventory and ranking of outfalls/interconnections based on monitoring results.

○ No outfalls were inspected

◉ The outfall screening data is attached to the email submission

○ The outfall screening data can be found at the following website:

*Below, report on the number of outfalls/interconnections screened **during this reporting period**.*

Number of outfalls screened: 66

*Below, report on the percent of outfalls/interconnections screened **to date**.*

Percent of outfalls screened: 100

Optional: Provide additional information regarding your outfall/interconnection screening:

Topsfield did inspect and screen all mapped outfalls in the EPA Urbanized Area. There are some outfalls that have never been mapped or the surveys were never logged. Of the 77 mapped outlets in Town, 11 are not in the UA zone. 66 Outlets were inspected in 2021. By looking at areas in Town were there are catchbasins and no mapped outlet, it is estimated there may be another 14 outlets to be mapped and inspected. So, we did actually inspect all outlets excluding problem or excluded outfalls.

Catchment Investigations

If conducted, please submit all data collected during this reporting period as part of the dry and wet weather investigations. Also include the presence or absence of System Vulnerability Factors for each catchment.

- (•) No catchment investigations were conducted
- ( ) The catchment investigation data is attached to the email submission
- ( ) The catchment investigation data can be found at the following website:

*Below, report on the number of catchment investigations completed **during this reporting period**.*

Number of catchment investigations completed this reporting period: 0

*Below, report on the percent of catchments investigated **to date.***

Percent of total catchments investigated: 0

Optional: Provide any additional information for clarity regarding the catchment investigations below:

Not sure what the difference is between a catchment, the area serviced by an outlet or a watershed.

IDDE Progress

If illicit discharges were found, please submit a document describing work conducted over this reporting period, and cumulative to date, including location source; description of the discharge; method of discovery; date of discovery; and date of elimination, mitigation, or enforcement OR planned corrective measures and schedule of removal.

- (•) No illicit discharges were found
- ( ) The illicit discharge removal report is attached to the email submission
- ( ) The illicit discharge removal report can be found at the following website:

At this point in time, it is premature to confirm that a private pipe entering the drainage system is discharging contaminated waters to the stormwater system. More investigation is required assess the quality of the water that is coming from the monitored catchments. There were 8 pipes discovered in the 166 catchbasins inspected this past year. 2 of those contribute water to an outfall that has elevated nutrient loading.

*Below, report on the number of illicit discharges identified and removed, along with the volume of sewage removed **during this reporting period.***

Number of illicit discharges identified: 0

Number of illicit discharges removed: 0

Estimated volume of sewage removed: 0 gallons/day

*Below, report on the total number of illicit discharges identified and removed to date. At a minimum, report on the number of illicit discharges identified and removed **since the effective date of the permit (July 1, 2018).***

Total number of illicit discharges identified: 0

Total number of illicit discharges removed: 0

Optional: Provide any additional information for clarity regarding illicit discharges identified, removed, or planned to be removed below:

The current DPW staff is aware of and is monitoring any pipes that are draining water into the storm drain system. These attachments are determined to be from groundwater infiltration in and around buildings. Staff will continue to monitor and they have been trained in determining quality of water.

Employee Training

Describe the frequency and type of employee training conducted **during this reporting period**:

Information was distributed to DPW staff on the indicators associated with contaminated water.

MCM4: Construction Site Stormwater Runoff Control

*Below, report on the construction site plan reviews, inspections, and enforcement actions completed **during this reporting period.***

Number of site plan reviews completed: 6

Number of inspections completed: 18

Number of enforcement actions taken: 0

Optional: Enter any additional information relevant to construction site plan reviews, inspections, and enforcement actions:

MCM5: Post-Construction Stormwater Management in New Development and Redevelopment

As-built Drawings

Below, report on the number of as-built drawings received ***during this reporting period.***

Number of as-built drawings received: 3

Optional: Enter any additional information relevant to the submission of as-built drawings:

Street Design and Parking Lots Report

Describe the status of the street design and parking lots assessment due in year 4 of the permit term, including any planned or completed changes to local regulations and guidelines:

Nothing done other than a brief discussion with staff that this is something they need to think about in FY2022.

Green Infrastructure Report

Describe the status of the green infrastructure report due in year 4 of the permit term, including the findings and progress towards making the practice allowable:

Retrofit Properties Inventory

Describe the status of the inventory, due in year 4 of the permit term, of permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas and report on any properties that have been modified or retrofitted:

MCM6: Good Housekeeping

Catch Basin Cleaning

Below, report on the number of catch basins inspected and cleaned, along with the total volume of material removed from the catch basins ***during this reporting period.***

Number of catch basins inspected: 166

Number of catch basins cleaned: 166

Total volume or mass of material removed from all catch basins: 149 tons

Below, report on the total number of catch basins in the MS4 system.

Total number of catch basins: 1,145

If applicable:

Report on the actions taken if a catch basin sump is more than 50% full during two consecutive routine inspections/cleaning events:

Street Sweeping

Report on street sweeping completed ***during this reporting period*** *using one of the three metrics below.*

- ○ Number of miles cleaned: 15
- ◉ Volume of material removed: 14 cubic yards
- ○ Weight of material removed: [Select Units]

Stormwater Pollution Prevention Plan (SWPPP)

Below, report on the number of site inspections for facilities that require a SWPPP completed ***during this reporting period.***

Number of site inspections completed: 0

Describe any corrective actions taken at a facility with a SWPPP:

Additional Information

Monitoring or Study Results

Results from any other stormwater or receiving water quality monitoring or studies conducted during the reporting period not otherwise mentioned above, where the data is being used to inform permit compliance or permit effectiveness must be attached.

- ○ Not applicable
- ◉ The results from additional reports or studies are attached to the email submission
- ○ The results from additional reports or studies can be found at the following website(s):

If such monitoring or studies were conducted on your behalf or if monitoring or studies conducted by other entities were reported to you, a brief description of the type of information gathered or received shall be described below:

Chloride testing in Pye Brook/Howlett Brook watershed. These are both contributiing water to Town well fields. Testing conducted by the Water Dept and the Stormwater coordinator. The results of the latter are attached.

Additional Information

Optional: Enter any additional information relevant to your stormwater management program implementation during the reporting period. Include any BMP modifications made by the MS4 if not already discussed above:

COVID-19 Impacts

Optional: If any of the above year 3 requirements could not be completed due to the impacts of COVID-19, please identify the requirement that could not be completed, any actions taken to attempt to complete the requirement, and reason the requirement could not be completed below:

None

Activities Planned for Next Reporting Period

Please confirm that your SWMP has been, or will be, updated to comply with all applicable permit requirements including but not limited to the year 4 requirements summarized below. (Note: impaired waters and TMDL requirements are not listed below)

Yes, I agree ☐

- Develop a report assessing current street design and parking lot guidelines and other local requirements within the municipality that affect the creation of impervious cover
- Develop a report assessing existing local regulations to determine the feasibility of making green infrastructure practices allowable when appropriate site conditions exist
- Identify a minimum of 5 permittee-owned properties that could potentially be modified or retrofitted with BMPs to reduce impervious areas

Annual Requirements

- Annual report submitted and available to the public
- Annual opportunity for public participation in review and implementation of SWMP
- Keep records relating to the permit available for 5 years and make available to the public
- Properly store and dispose of catch basin cleanings and street sweepings so they do not discharge to receiving waters
- Annual training to employees involved in IDDE program
- Update inventory of all known locations where SSOs have discharged to the MS4
- Continue public education and outreach program
- Update outfall and interconnection inventory and priority ranking and include data collected in connection with the dry weather screening and other relevant inspections conducted
- Implement IDDE program
- Review site plans of construction sites as part of the construction stormwater runoff control program
- Conduct site inspection of construction sites as necessary
- Inspect and maintain stormwater treatment structures
- Log catch basins cleaned or inspected
- Sweep all curbed streets at least annually
- Continue investigations of catchments associated with Problem Outfalls
- Implemented SWPPPs for all permittee owned or operated maintenance garages, public works yards, transfer stations, and other waste handling facilities
- Review inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment; update if necessary
- Review O&M programs for all permittee owned facilities; update if necessary
- Implement all maintenance procedures for permittee owned facilities in accordance with O&M programs
- Implement program for MS4 infrastructure maintenance to reduce the discharge of pollutants
- Enclose all road salt storage piles or facilities and implemented winter road maintenance procedures to minimize the use of road salt
- Review as-built drawings for new and redevelopment to ensure compliance with post construction bylaws, regulations, or regulatory mechanism consistent with permit requirements
- Inspect all permittee owned treatment structures (excluding catch basins)

Provide any additional details on activities planned for permit year 4 below:

Part V: Certification of Small MS4 Annual Report 2021

40 CFR 144.32(d) Certification

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

Name:	David Bond	Title:	Stormwater Coordinator
Signature:	David M. Bond	Date:	09/15/21

[Signatory may be a duly authorized representative]

Year 4 Annual Report
Massachusetts Small MS4 General Permit
Reporting Period: July 1, 2021-June 30, 2022

Please DO NOT attach any documents to this form. Instead, attach all requested documents to an email when submitting the form

Unless otherwise noted, all fields are required to be filled out. If a field is left blank, it will be assumed the requirement or task has not been completed. Please ONLY report on activities between July 1, 2021 and June 30, 2022 unless otherwise requested.

Part I: Contact Information

Name of Municipality or Organization: Town of Topsfield

EPA NPDES Permit Number: MAR041227

Primary MS4 Program Manager Contact Information

Name: Heidi Gaffney Title: Conservation Administrator

Street Address Line 1: 8 West Common Street

Street Address Line 2:

City: Topsfield State: MA Zip Code: 01983

Email: hgaffney@topsfield-ma.gov Phone Number: (978) 887-1510

Stormwater Management Program (SWMP) Information

SWMP Location (web address): https://topsfieldpublicworks.org/stormwater

Date SWMP was Last Updated: January 1, 2019

If the SWMP is not available on the web please provide the physical address:

Part II: Self-Assessment

First, in the box below, select the impairment(s) and/or TMDL(s) that are applicable to your MS4. Make sure you are referring to the most recent EPA approved Section 303(d) Impaired Waters List which can be found here: https://www.epa.gov/tmdl/region-1-impaired-waters-and-303d-lists-state

Impairment(s)

☒ Bacteria/Pathogens ☐ Chloride ☐ Nitrogen ☐ Phosphorus
☐ Solids/ Oil/ Grease (Hydrocarbons)/ Metals

TMDL(s)

In State: ☐ Assabet River Phosphorus ☐ Bacteria and Pathogen ☐ Cape Cod Nitrogen
☐ Charles River Watershed Phosphorus ☐ Lake and Pond Phosphorus

Out of State: ☐ Bacteria/Pathogens ☐ Metals ☐ Nitrogen ☐ Phosphorus

Clear Impairments and TMDLs

Next, check off all requirements below that have been completed. ***By checking each box you are certifying that you have completed that permit requirement fully.*** *If you have not completed a requirement leave the box unchecked. Additional information will be requested in later sections.*

Year 4 Requirements

☒ Developed a report assessing current street design and parking lot guidelines and other local requirements within the municipality that affect the creation of impervious cover, made it available as part of the SWMP, and:

- ○ No updates were recommended
- ◉ Updates were recommended. The anticipated date or date of completion for updates is/was: June 30, 2023

☒ Developed a report assessing local regulations to determine the feasibility of making green infrastructure practices allowable when appropriate site conditions exist, made it available as part of the SWMP, and:

- ○ No updates were recommended
- ◉ Updates were recommended. The anticipated date or date of completion for updates is/was: June 30, 2023

☐ Identified a minimum of 5 permittee-owned properties that could potentially be modified or retrofitted with BMPs to reduce impervious cover

Optional: If you would like to describe progress made on any incomplete requirements listed above, provide an update on previous incomplete milestones, or provide any additional details, please use the box below:

LID, GI, and Impervious Cover Regulatory Review - Members of the Greenscapes North Shore Coalition reviewed all municipal regulations related to impervious cover creation. The Greenscapes team used the MA Audubon bylaw review tool to evaluate all of the regulations in the context of green infrastructure feasibility and compiled a detailed report of their findings, which also includes recommended improvements for each

regulation reviewed. With guidance and input from municipal staff, timelines for implementation of recommended language were established on a case-by-case basis. In connection with the bylaw review efforts conducted by the Greenscapes Coalition, two educational webinars were also conducted. The first webinar was held at the onset of the review process and introduced the project scope while detailing the value of encouraging LID practices in municipal codes. This webinar yielded 70 attendees. The second webinar, held following the completion of the review process, was hosted by EPA's Soak Up the Rain and discussed the project results and lessons learned. This webinar had approximately 300 attendees. The full report and community specific recommendations can be found here:https://greenscapes.org/wp-content/uploads/2022/08/MS4-Grant-Report-FINAL_reduced.pdf

Permittee-Owned Property BMP Retrofits - The Town recently hired a consultant to assist with completing a comprehensive assessment of town-owned properties and develop recommendations for BMP improvements. Work is expected to be completed by the end of December, 2022.

Annual Requirements

- ☒ Provided an opportunity for public participation in review and implementation of SWMP and complied with State Public Notice requirements
- ☒ Kept records relating to the permit available for 5 years and made available to the public
- ☒ The SSO inventory has been updated, including the status of mitigation and corrective measures implemented
  - ◉ This is not applicable because we do not have sanitary sewer
  - ○ This is not applicable because we did not find any new SSOs
  - ○ The updated SSO inventory is attached to the email submission
  - ○ The updated SSO inventory can be found at the following website:
- ☒ Updated system map due in year 2 as necessary
- ☐ Provided training to employees involved in IDDE program within the reporting period
- ☒ Properly stored and disposed of catch basin cleanings and street sweepings so they did not discharge to receiving waters
- ☒ All curbed roadways were swept at least once within the reporting period
- ☒ Enclosed all road salt storage piles or facilities and implemented winter road maintenance procedures to minimize the use of road salt
- ☐ Implemented SWPPPs for all permittee owned or operated maintenance garages, public works yards, transfer stations, and other waste handling facilities
- ☒ Updated inventory of all permittee owned facilities as necessary
- ☐ O&M programs for all permittee owned facilities have been completed and updated as necessary
- ☐ Implemented all maintenance procedures for permittee owned facilities in accordance with O&M programs
- ☒ Implemented program for MS4 infrastructure maintenance to reduce the discharge of pollutants
- ☐ Inspected all permittee owned treatment structures (excluding catch basins)

Optional: If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

Training - Training was not completed in Permit Year 4, however, a consultant has been hired to provide a training session. It is expected that this will occur by the end of December, 2022.

SWPPPs - At this time, it does not appear that any SWPPPs are required, as the Highway Garage is located outside the regulated urbanized area. The Town is not aware of any other town-owned regulated facilities.

Operation and Maintenance Plan - A consultant has been hired to prepare an O&M Plan for town-owned facilities. It is expected that this will occur by the end of December, 2022.

BMP Inspections - A consultant has been hired to inspect town-owned structural stormwater BMPs. It is expected that this will occur by the end of December, 2022.

Bacteria/ Pathogens (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)

Annual Requirements

*Public Education and Outreach**

- ☒ Annual message was distributed encouraging the proper management of pet waste, including noting any existing ordinances where appropriate
- ☒ Permittee or its agents disseminated educational material to dog owners at the time of issuance or renewal of dog license, or other appropriate time
- ☒ Provided information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria

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

Optional: If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

Optional: Use the box below to provide any additional information you would like to share as part of your self-assessment:

Part III: Receiving Waters/Impaired Waters/TMDL

Have you made any changes to your lists of receiving waters, outfalls, or impairments since the NOI was submitted?

- (●) Yes
- ( ) No

If yes, describe below, including any relevant impairments or TMDLs:

The Town has determined it is subject to the following additional TMDL and Impaired Waters requirements: Fish Brook (MA92-14) bacteria impaired waters requirements. (Appendix H, Part III)

Part IV: Minimum Control Measures

Please fill out all of the metrics below. If applicable, include in the description who completed the task if completed by a third party.

MCM1: Public Education

Number of educational messages completed **during this reporting period**: 10

*Below, report on the educational messages completed **during this reporting period**. For the measurable goal(s) please describe the method/measures used to assess the overall effectiveness of the educational program.*

BMP: Elementary School Program - Keeping Water Clean

Message Description and Distribution Method:

Program engages 5th grade students in several activities designed to raise their stormwater and water conservation awareness. Students learn about what a watershed is, what stormwater, groundwater and wastewater are, how they can negatively or positively impact these water systems, along with more details about each system and how it should be protected/maintained.

Targeted Audience: Residents +

Responsible Department/Parties: Greenscapes Coalition

Measurable Goal(s):

2166 students
370 teachers and parents
30 schools

Message Date(s): September 2021 - June 2022

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ◉

If yes, describe why the change was made:

BMP: Video - "Fowl Water"

Message Description and Distribution Method:

The Think Blue Massachusetts "Fowl Water" video defines stormwater and explains the impact that pollution like trash, oil, cigarettes and dog poop can have on stormwater and our waterways. Video available at https://www.thinkbluemassachusetts.org/ , www.greenscapes.org/resources-videos/ and spread as an advertisement on Facebook, Instagram, & YouTube

Targeted Audience: Residents +

Responsible Department/Parties: Think Blue MA, Greenscapes Coalition

Measurable Goal(s):

237,249 impressions on Facebook/Instagram
351,249 impressions on YouTube

Message Date(s): May 31, 2022 - June 17th, 2022

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ○ No ○

If yes, describe why the change was made:

BMP: Workshop - Planning Tools to Promote Natural Resource Stewardship

Message Description and Distribution Method:

Hosted by members of the PIE-Rivers Partnership, this free virtual workshop discussed the latest trends in promoting LID and other forms of Green Infrastructure in North Shore communities.

Targeted Audience: Residents +

Responsible Department/Parties: PIE Rivers Partnership, Greenscapes Coalition

Measurable Goal(s):

82 Participants

Message Date(s): November 9, 2021

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ◉

If yes, describe why the change was made:

BMP: Print Material/Rack Card - Storm Drain Info

Message Description and Distribution Method:

The Greenscapes storm drain rack card, originally printed in 2016 was modified for easy office printing and distribution. The original can be found here: https://greenscapes.org/wp-content/uploads/2017/01/Greenscapes-Rack-Card-2014-final.pdf

Targeted Audience: Residents +

Responsible Department/Parties: Greenscapes Coalition, Municipal Staff

Measurable Goal(s):

Message Date(s): Sent to Greenscapes network January 24th, 2022

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ◉

If yes, describe why the change was made:

BMP: Public Lecture - Coastal Communities Talk Water

Message Description and Distribution Method:

This free community event at the Cabot Theater in Beverly MA, featured guest speakers from Salem Sound Coastwatch, the Ipswich River Watershed Association, Green Beverly, Sustainable Marblehead and the EPA, who covered various topics related to water quality, water quantity and general watershed stewardship. Printed materials were also being passed out by Greenscapes personnel.

Targeted Audience: Residents +

Responsible Department/Parties: Greenscapes Coalition

Measurable Goal(s):

150 Attendees

Message Date(s): March 10th, 2022

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ◉

If yes, describe why the change was made:

BMP: Printed Material (Magazine) - Greenscapes Guide

Message Description and Distribution Method:

The Greenscapes Guide, a 26 page magazine that covers sustainable landscaping tips, DIY stormwater management for homeowners and more, was distributed at every school program that Greenscapes conducted this school year.

Targeted Audience: Residents +

Responsible Department/Parties: Greenscapes Coalition

Measurable Goal(s):

3,000 guides distributed throughout the North Shore

Message Date(s): Various dates between September 2021 - June 2022

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ○

If yes, describe why the change was made:

BMP: In-Person Exhibit - Culture House

Message Description and Distribution Method:

Salem Sound Coastwatch, a contributing partner to the Greenscapes Coalition, was a resident exhibitor at Salem Culture House, a pilot project that created a community space in Salem's Old Town Hall. At the exhibit, SSCW staff ran two hands on activities that taught visitors about their connection to their watershed. Greenscapes materials were on display and passed out.

Targeted Audience: Residents +

Responsible Department/Parties: Greenscapes Coalition, Municipal Staff

Measurable Goal(s):

924 Attendees

Message Date(s): April 20th - April 23rd, 2022

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ◉

If yes, describe why the change was made:

BMP: Miscellaneous Social Media

Message Description and Distribution Method:

Social media content related to stormwater management, wastewater and groundwater protection, water conservation, pet waste, septic system maintenance and sustainable lawn care are always available on the Greenscapes social media pages and on the Greenscapes website. https://greenscapes.org/resources-socialmedia/

Targeted Audience: Residents +

Responsible Department/Parties: Greenscapes Coalition

Measurable Goal(s):

Message Date(s):

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ○ No ◉

If yes, describe why the change was made:

BMP: Miscellaneous Tabling Events

Message Description and Distribution Method:

Events attended by Greenscapes personnel where printed materials were passed out: Middleton Earth Day, Tri-Town Spring Expo, Boxford Applefest, Topsfield Strawberry Fest, Ipswich STEAM Showcase, Beverly Earth Day, Salem Farmer's Market, Earth Week at the Peabody Essex Museum

Targeted Audience: Residents +

Responsible Department/Parties: Greenscapes Coalition

Measurable Goal(s):

Message Date(s): Various dates between September 2021 - June 2022

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ◉

If yes, describe why the change was made:

BMP: Flyers Available at Town Hall

Message Description and Distribution Method:

Flyer for dog owners to pick up after their dog available at the Town Hall

Targeted Audience: Residents +

Responsible Department/Parties: Town Manager / Mayor's Office

Measurable Goal(s):

Make seasonal messages available at the Town Hall for residents to pick up.

Message Date(s): Continuous / Ongoing

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ○ No ◉

If yes, describe why the change was made:

Add an Educational Message

MCM2: Public Participation

Describe the opportunity provided for public involvement in the development of the Stormwater Management Program (SWMP) **during this reporting period**:

SWMP Plan for Download - The Town has posted the SWMP Plan and other relevant information on Town website along with contact information to allow for public comment.

Was this opportunity different than what was proposed in your NOI? Yes ○ No ◉

Describe any other public involvement or participation opportunities conducted **during this reporting period**:

MCM3: Illicit Discharge Detection and Elimination (IDDE)

Sanitary Sewer Overflows (SSOs)

Check off the box below if the statement is true.

☒ This SSO section is NOT applicable because we DO NOT have sanitary sewer

Below, report on the number of SSOs identified in the MS4 system and removed ***during this reporting period****.*

Number of SSOs identified: 0

Number of SSOs removed: 0

MS4 System Mapping

Optional: Provide additional status information regarding your map:

Screening of Outfalls/Interconnections

If conducted, please submit any outfall monitoring results from this reporting period. Outfall monitoring results should include the date, outfall/interconnection identifier, location, weather conditions at time of sampling, precipitation in previous 48 hours, field screening parameter results, and results from all analyses. Please also include the updated inventory and ranking of outfalls/interconnections based on monitoring results.

- (•) No outfalls were inspected
- ( ) The outfall screening data is attached to the email submission
- ( ) The outfall screening data can be found at the following website:

Below, report on the number of outfalls/interconnections screened ***during this reporting period****.*

Number of outfalls screened: 0

Below, report on the percent of outfalls/interconnections screened ***to date****.*

Percent of outfalls screened: 100

Optional: Provide additional information regarding your outfall/interconnection screening:

No new outfalls were screened during this reporting period. All mapped outfalls were previously screened during Permit Year 3.

Catchment Investigations

If conducted, please submit all data collected during this reporting period as part of the dry and wet weather investigations. Also include the presence or absence of System Vulnerability Factors for each catchment.

- (•) No catchment investigations were conducted
- ( ) The catchment investigation data is attached to the email submission
- ( ) The catchment investigation data can be found at the following website:

Below, report on the number of catchment investigations completed ***during this reporting period****.*

Number of catchment investigations completed this reporting period: 0

Below, report on the percent of catchments investigated ***to date.***

Percent of total catchments investigated: 0

Optional: Provide any additional information for clarity regarding the catchment investigations below:

IDDE Progress

If illicit discharges were found, please submit a document describing work conducted over this reporting period, and cumulative to date, including location source; description of the discharge; method of discovery; date of discovery; and date of elimination, mitigation, or enforcement OR planned corrective measures and schedule of removal.

- (•) No illicit discharges were found
- ( ) The illicit discharge removal report is attached to the email submission
- ( ) The illicit discharge removal report can be found at the following website:

Below, report on the number of illicit discharges identified and removed, along with the volume of sewage removed ***during this reporting period.***

Number of illicit discharges identified: 0

Number of illicit discharges removed: 0

Estimated volume of sewage removed: 0 gallons/day

Below, report on the total number of illicit discharges identified and removed to date. At a minimum, report on the number of illicit discharges identified and removed ***since the effective date of the permit (July 1, 2018)****.*

Total number of illicit discharges identified: 0

Total number of illicit discharges removed: 0

Optional: Provide any additional information for clarity regarding illicit discharges identified, removed, or planned to be removed below:

Employee Training

Describe the frequency and type of employee training conducted **during this reporting period**:

Training - Training was not completed in Permit Year 4, however, a consultant has been hired to provide a training session. It is expected that this will occur by the end of December, 2022.

MCM4: Construction Site Stormwater Runoff Control

*Below, report on the construction site plan reviews, inspections, and enforcement actions completed **during this reporting period**.*

Number of site plan reviews completed: 7

Number of inspections completed: 10

Number of enforcement actions taken: 0

Optional: Enter any additional information relevant to construction site plan reviews, inspections, and enforcement actions:

MCM5: Post-Construction Stormwater Management in New Development and Redevelopment

Ordinance or Regulatory Mechanism

Date update was completed (due in year 3):

As-built Drawings

*Below, report on the number of as-built drawings received **during this reporting period**.*

Number of as-built drawings received: 0

Optional: Enter any additional information relevant to the submission of as-built drawings:

Retrofit Properties Inventory

Below, list the permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas (at least 5):

The Town recently hired a consultant to assist with completing a comprehensive assessment of town-owned properties and develop recommendations for BMP improvements. Work is expected to be completed by the end of December, 2022.

MCM6: Good Housekeeping

Catch Basin Cleaning

Below, report on the number of catch basins inspected and cleaned, along with the total volume of material removed from the catch basins ***during this reporting period****.*

Number of catch basins inspected: 30

Number of catch basins cleaned: 0

Total volume or mass of material removed from all catch basins: 0 [Select Units]

Below, report on the total number of catch basins in the MS4 system.

Total number of catch basins: 1,071

If applicable:

Report on the actions taken if a catch basin sump is more than 50% full during two consecutive routine inspections/cleaning events:

Street Sweeping

Report on street sweeping completed ***during this reporting period*** *using one of the three metrics below.*

- ○ Number of miles cleaned: 30
- ○ Volume of material removed: [Select Units]
- ◉ Weight of material removed: 8 tons

Stormwater Pollution Prevention Plan (SWPPP)

Below, report on the number of site inspections for facilities that require a SWPPP completed ***during this reporting period****.*

Number of site inspections completed: 0

Describe any corrective actions taken at a facility with a SWPPP:

At this time, it does not appear that any SWPPPs are required, as the Highway Garage is located outside the regulated urbanized area. The Town is not aware of any other town-owned regulated facilities.

Additional Information

Monitoring or Study Results

Results from any other stormwater or receiving water quality monitoring or studies conducted during the reporting period not otherwise mentioned above, where the data is being used to inform permit compliance or permit effectiveness must be attached.

- (•) Not applicable
- ( ) The results from additional reports or studies are attached to the email submission
- ( ) The results from additional reports or studies can be found at the following website(s):

If such monitoring or studies were conducted on your behalf or if monitoring or studies conducted by other entities were reported to you, a brief description of the type of information gathered or received shall be described below:

Additional Information

Optional: Enter any additional information relevant to your stormwater management program implementation during the reporting period. Include any BMP modifications made by the MS4 if not already discussed above:

COVID-19 Impacts

Optional: If any of the above year 4 requirements could not be completed due to the impacts of COVID-19, please identify the requirement that could not be completed, any actions taken to attempt to complete the requirement, and reason the requirement could not be completed below:

Activities Planned for Next Reporting Period

Please confirm that your SWMP has been, or will be, updated to comply with all applicable permit requirements including but not limited to the year 5 requirements summarized below. (Note: impaired waters and TMDL requirements are not listed below)

Yes, I agree ☒

Annual Requirements

- Annual report submitted and available to the public
- Annual opportunity for public participation in review and implementation of SWMP
- Keep records relating to the permit available for 5 years and make available to the public
- Properly store and dispose of catch basin cleanings and street sweepings so they do not discharge to receiving waters
- Annual training to employees involved in IDDE program
- Update inventory of all known locations where SSOs have discharged to the MS4
- Continue public education and outreach program
- Update outfall and interconnection inventory and priority ranking and include data collected in connection with the dry weather screening and other relevant inspections conducted
- Implement IDDE program
- Review site plans of construction sites as part of the construction stormwater runoff control program
- Conduct site inspection of construction sites as necessary
- Inspect and maintain stormwater treatment structures
- Log catch basins cleaned or inspected
- Sweep all curbed streets at least annually
- Continue investigations of catchments associated with Problem Outfalls
- Implemented SWPPPs for all permittee owned or operated maintenance garages, public works yards, transfer stations, and other waste handling facilities
- Review inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment; update if necessary
- Review O&M programs for all permittee owned facilities; update if necessary
- Implement all maintenance procedures for permittee owned facilities in accordance with O&M programs
- Implement program for MS4 infrastructure maintenance to reduce the discharge of pollutants
- Enclose all road salt storage piles or facilities and implemented winter road maintenance procedures to minimize the use of road salt
- Review as-built drawings for new and redevelopment to ensure compliance with post construction bylaws, regulations, or regulatory mechanism consistent with permit requirements
- Inspect all permittee owned treatment structures (excluding catch basins)
- Identify additional permittee-owned properties that could potentially be modified or retrofitted with BMPs to reduce impervious areas so that the permittee maintains a minimum of 5 sites in their inventory, until such a time when the permittee has less than 5 sites remaining

Provide any additional details on activities planned for permit year 5 below:

The Merrimack Valley Stormwater Collaborative and Greenscapes North Shore Coalition are seeking funding to spearhead proactive stormwater compliance and mitigation efforts. The focal point of this project will be the

production of an interactive web-based resource which facilitates the assemblage and dissemination of MS4 relevant model code language specific to community characteristics and needs. This will aid in the completion of section 2.3.6 (c) of the MS4 permit, which requires that all year 4 code review recommendations be implemented, in accordance with schedules, as contained in the assessment report.

Additionally, section 2.3.6 (d) of the MS4 permit requires communities to continuously identify and update additional permitee owned sites which could be retrofitted such that the permitee maintains a minimum of 5 BMP retrofit sites within their inventory. Currently, the Merrimack Valley's year 4 identified BMP retrofit sites reside on a dynamic "Low Impact Development" GIS viewer available on the Greenscapes North Shore Coalition webpage, which allows for the easy tracking of retrofit location and status. To build the viewer's capacity to track LID project implementation on a regional and state level, this work will utilize MVPC's ArcGIS-based platform to develop an updated, survey-based interface with new ERSI "survey123" technology which permits direct municipal input to the viewer.

Part V: Certification of Small MS4 Annual Report 2021

40 CFR 144.32(d) Certification

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

Name: Keith Hawkinson Title: Town Administrator

Signature: Date: 9/16/22

[Signatory may be a duly authorized representative]